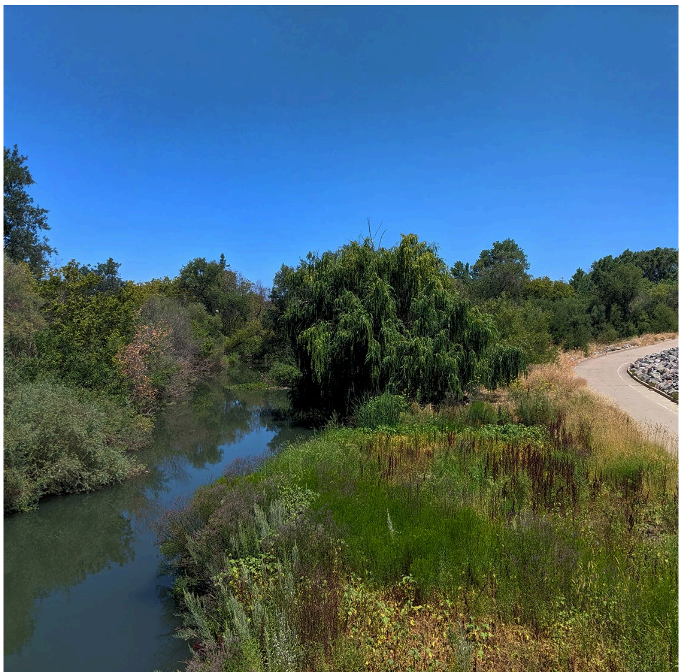

Fish and Aquatic Habitat Collaborative Effort

Draft Program Environmental Impact Report

Santa Clara Valley Water District

State Clearinghouse #2015022008

Santa Clara County, California

June 30, 2021

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Note: Appendices are in separate volumes.

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Terms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
µS/cm	microSiemens per centimeter
AB	Assembly Bill
ADSRP	Anderson Dam Seismic Retrofit Project
AF	acre-feet
AFY	acre-feet per year
AMP	adaptive management program
AMT	adaptive management team
ARB	Air Resources Board
B.P.	before present
BAAQMD	Bay Area Air Quality Management District
Basin Plan	Water Quality Control Plan
BMP	best management practice
CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
CC	cumulatively considerable
CCAA	California Clean Air Act
CCC	Central California Coast
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CE	California endangered
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CH_4	methane
CHSC	California Health and Safety Code
cm	centimeter
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COLD	cold freshwater habitat (beneficial use)
County	Santa Clara County
CRHR	California Register of Historic Resources

Terms and Abbreviations

CRPR	California Rare Plant Rank
CVP	Central Valley Project
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationship System
CWMZ	cold water management zone
dB	decibel
dBA	A-weighted decibel
District Act	Santa Clara Valley Water District Act
DO	dissolved oxygen
DPM	diesel particulate matter
DPS	distinct population segment
DSOD	Division of Safety of Dams
DWR	California Department of Water Resources
EFH	essential fish habitat
EIR	Environmental Impact Report
EO	Executive Order
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FAHCE	Fish and Aquatic Habitat Collaborative Effort
FCAA	federal Clean Air Act
FE	federal endangered
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHRP	Fish Habitat Restoration Plan
FMP	fishery management plan
FOCP	FERC Order Compliance Project
FP	fully protected
FRSH	freshwater replenishment (beneficial use)
FT	federal threatened
FTA	Federal Transit Administration
FY	fiscal year
GCRCD	Guadalupe-Coyote Resource Conservation District
GHG	greenhouse gas
GSP	Groundwater Sustainability Plan
GWMP	Groundwater Management Plan
GWR	groundwater recharge (beneficial use)
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HAI	Habitat Availability Index
HCP	habitat conservation plan
HEC-RAS	Hydrologic Engineering Center River Analysis System
HMMP	Habitat Mitigation and Monitoring Plan

Terms and Abbreviations

HUC	hydrologic unit code
I-280	Interstate 280
in	inch
in/sec	inch per second
LBV	least Bell's vireo
LSAA	Lake and Streambed Alteration Agreement
LTS	less than significant
LWD	large woody debris
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
mg/L	milligrams per liter
MIGR	fish migration (beneficial use)
MM	mitigation measure
MT	metric ton
MUN	municipal supply (beneficial use)
MWAT	mean weekly average temperature
N/A	not applicable
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NCC	not cumulatively considerable
NCCP	natural community conservation plan
NCCP Act	Natural Community Conservation Plan Act
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGO	nongovernmental organization
NHPA	National Historic Preservation Act
NI	no impact
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRHP	National Register of Historic Places
O_3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
PCB	polychlorinated biphenyl
PFMC	Pacific Fishery Management Council
PG&E	Pacific Gas and Electric Company

Terms and Abbreviations

PIT	Passive Integrated Transponders
PLCI	Pacific Lamprey Conservation Initiative
PM_{10}	particulate matter
$PM_{2.5}$	fine particulate matter
POI	point of interest
ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
PRPA	Paleontological Resources Preservation Act
RARE	preservation of rare and endangered species (beneficial use)
REC1	water contact recreation (beneficial use)
REC2	noncontact water recreation (beneficial use)
RMS	root mean square
RMU	Regional Management Unit
ROG	reactive organic gas
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCCPRD	Santa Clara County Parks and Recreation Department
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SDWA	Safe Drinking Water Act
SE	state endangered
SEI	Stockholm Environment Institute
Settlement Agreement	*Settlement Agreement Regarding Water Rights of the Santa Clara Valley Water District on Coyote, Guadalupe and Stevens Creeks*
SFBAAB	San Francisco Bay Area Air Basin
SGMA	Sustainable Groundwater Management Act
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SJPRNS	San José Parks, Recreation, and Neighborhood Services
SJWC	San José Water Company
S/M	significant but mitigable to a less than significant impact
SMP	Stream Maintenance Program
SO_2	sulfur dioxide
south bay	south region of the San Francisco Bay
SPWN	fish spawning (beneficial use)
SSC	species of special concern
ST	state threatened
S/U	significant and unavoidable
SVP	Society of Vertebrate Paleontology
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan

Terms and Abbreviations

SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TCR	traditional cultural resource
TDS	total dissolved solids
TMDL	total maximum daily load
TWG	Technical Work Group
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
URMP	*Urban Runoff Management Plan*
UWMP	*Urban Water Management Plan*
Valley Water	Santa Clara Valley Water District
VHP	Valley Habitat Plan
VOC	volatile organic compound
WARM	warm freshwater habitat (beneficial use)
WEAP	Water Evaluation and Planning
WILD	wildlife habitat (beneficial use)
WSCP	Water Shortage Contingency Plan
WY	water year
YOY	young-of-the-year

Executive Summary

ES-1 Executive Summary

ES-1.1 Introduction

The Santa Clara Valley Water District (Valley Water) is proposing to implement the Fish and Aquatic Habitat Collaborative Effort (FAHCE) Settlement Agreement through a Fish Habitat Restoration Plan (FHRP; Appendix A; Valley Water 2018a). The Settlement Agreement is between Valley Water, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), California Department of Fish and Game, Guadalupe-Coyote Resource Conservation District (GCRCD), Trout Unlimited, Pacific Coast Federation of Fishermen's Associations, Urban Creeks Council, Northern California Council of Federation of Fly Fishers, and California Trout, Inc., to resolve disputes regarding Valley Water's use of its water rights on the Stevens Creek and Guadalupe River watersheds in Santa Clara County, California. The FHRP has been designed as a restoration project to implement measures to improve fish passage and enhance fish habitat within the Stevens Creek and Guadalupe River watersheds while maintaining a reliable current and future water supply and water deliveries where Valley Water holds water rights licenses in northern Santa Clara County. As such, the Proposed Project, or Project, is essentially a restoration project implemented through measures specified in the Settlement Agreement and adaptively managed through a program to administer these restoration activities consistent with Valley Water's water rights and water supply commitments.

ES-1.1.1 California Environmental Quality Act Compliance

The Proposed Project, or Project, is essentially a restoration project implemented through measures specified in the Settlement Agreement and adaptively managed through a program to administer these restoration activities consistent with Valley Water's water rights and water supply commitments (see Section ES-1.3, *Description of the Proposed Project*). As the lead agency responsible for compliance with the California Environmental Quality Act (CEQA), Valley Water has determined that implementation of the proposed FHRP measures constitutes a "Project" for the purposes of CEQA (pursuant to CEQA Guidelines [14 California Code of Regulations Section 15378]). Accordingly, Valley Water has prepared this Environmental Impact Report (EIR) pursuant to the requirements under CEQA (Public Resources Code [PRC] Section 21000 et seq.) and the CEQA Guidelines (14 California Code of Regulations Section 15000 et seq.).

The Draft EIR evaluates the environmental impacts that could result from implementation of the FHRP and changes to Valley Water's water rights in the Stevens Creek and Guadalupe River watersheds. It also identifies the mitigation measures Valley Water would employ to reduce impacts to the extent feasible. While the Proposed Project could result in significant and unavoidable environmental effects, overall, beneficial environmental effects would result from implementation of the Proposed Project because of the improvement of water quality and habitat conditions for fisheries in the Stevens Creek and Guadalupe River watersheds.

ES-1.1.2 Overview of Valley Water's Water Resources Management

Valley Water has jurisdiction throughout Santa Clara County (County) and began managing water resources in the County in 1929, largely in response to over-pumping of Santa Clara Valley groundwater. Valley Water constructed conservation reservoirs to capture rainfall and replenish the underground aquifer through managed groundwater recharge. Valley Water currently provides approximately 284,000 acre-feet per year of water for municipal, industrial, agricultural, and environmental uses (Valley Water 2017a).

In addition, in response to the 1996 complaint between GCRCD and the State Water Resources Control Board (SWRCB), Valley Water convened local environmental organizations and state and federal resource agencies in settlement negotiations—developing what is known as the FAHCE. FAHCE participants include Valley Water; Trout Unlimited; California Trout, Inc.; Northern California Federation of Fly Fishers; Pacific Coast Federation of Fishermen's Associations; NMFS; USFWS; and the California Department of Fish and Wildlife (CDFW, formerly known as the California Department of Fish and Game)—collectively referred to hereafter as the Initialing Parties. Measures developed through FAHCE are intended to modify instream flows and improve habitat conditions, as appropriate, to meet the management objectives specified in the *Settlement Agreement Regarding Water Rights of the Santa Clara Valley Water District on Coyote, Guadalupe and Stevens Creeks* (Settlement Agreement), initialed by the Initialing Parties on May 27, 2003 (Appendix B; Valley Water et al. 2003).

It should be noted that Valley Water has implemented many changes to reservoir operations, monitoring and permit compliance, geomorphic functions, and fish passage impediments since the FAHCE process was initiated in 1996. These changes align with the objectives of the Settlement Agreement and, in some cases, resulted in early implementation of elements identified in the Settlement Agreement and improved baseline conditions for fisheries.

ES-1.1.2.1 Evolution of the FAHCE EIR

As mentioned previously, the FAHCE Settlement Agreement addressed improvements to fish habitat in three watersheds: Coyote Creek, Stevens Creek, and Guadalupe River. In 2015, Valley Water published a Notice of Preparation (NOP) for a single EIR that would analyze impacts of Settlement Agreement implementation in all three watersheds, and Valley Water began preparation of a Draft FHRP and Draft EIR that covered all three watersheds.

In 2019, however, Valley Water decided it would be more appropriate and efficient to move CEQA review of the Coyote Creek watershed Phase 1 FAHCE measures to the Anderson Dam Seismic Retrofit Project (ADSRP) EIR. This was decided primarily because ADSRP post-construction reservoir operations would be based on the Anderson Reservoir FAHCE rule curves, and the ADSRP avoidance and minimization measures would include Coyote Creek Phase 1 non-flow measures. Therefore, Valley Water's CEQA review of the FAHCE Settlement Agreement measures is now planned to occur in two EIRs: this Stevens Creek and Guadalupe River FAHCE EIR and the ADSRP EIR.

ES-1.2 Project Objectives

The FAHCE Settlement Agreement management objectives (Section 6.2.2; Appendix B) provided guidance to Valley Water for framing the Proposed Project objectives. The following is a summary of the objectives of the Proposed Project:

- **Objective 1:** Restore and maintain a healthy steelhead population in the Stevens Creek watershed by providing suitable spawning and rearing habitat, adequate passage for upmigrating adults and outmigrating juvenile steelhead, and extended distribution of suitable habitat in Phases 2 and 3 as determined through the adaptive management program (AMP);
- **Objective 2:** Restore and maintain healthy steelhead and Chinook salmon populations in the Guadalupe River watershed by providing suitable spawning and rearing habitat, adequate passage for upmigrating adults and outmigrating juvenile fish, and extended distribution of suitable habitat in Phases 2 and 3 as determined through the AMP; and
- **Objective 3:** Maintain flexible and reliable groundwater recharge to support current and future water supply and water deliveries in a practical, cost-effective, and environmentally sensitive manner so that sufficient water is available for any present or future beneficial use.

These fundamental Project objectives are intended to be implemented together, in a balanced manner. Project objectives 1 and 2 were established in the FAHCE Settlement Agreement and are subject to funding obligations and limitations specified in Settlement Agreement Article VIII, Appendices C and D. Objective 3 is fundamental to Valley Water and consistent with the Santa Clara Valley Water District Act.

ES-1.2.1 Project Location

The Project area considered in the Draft EIR is the geographic extent of the area in which Project actions could affect environmental resources. This includes portions of the Stevens Creek and Guadalupe River watersheds, including mainstem tributaries and Valley Water water supply facilities where Valley Water holds corresponding water rights licenses. The Project area extends from the Valley Water reservoirs and dams to the tidally influenced areas of Stevens Creek and Guadalupe River because the Proposed Project and alternatives would not substantively affect aquatic habitat conditions in the tidally influenced and estuarine reaches, given the dominant influence that tidal conditions have on the habitat in these areas, both historically and under existing conditions. The Project area is, therefore, smaller than the entire Stevens Creek and Guadalupe River watersheds.

The Stevens Creek and Guadalupe River watersheds are located in Santa Clara County and ultimately drain to the southern end of the San Francisco Bay (south bay), as shown in Figure ES-1. The Project area is located on land owned by Valley Water, the County, the Cities,[1] and various private parties.

Valley Water's water supply operations in the Project area include six reservoirs, a network of conveyance systems, and three sets of percolation ponds that provide recharge to local groundwater basins. Valley Water holds water rights licenses for the Stevens Creek and Guadalupe River watersheds, which allow water diversion and storage for irrigation and domestic uses. Corresponding facilities manage and release instream flows to creeks and rivers in the study area and recharge the Santa Clara Plain portion of the Santa Clara Subbasin, where released water is used to recharge the groundwater aquifer and is diverted from the creeks to provide municipal and industrial supplies.

ES-1.3 Description of the Proposed Project

Valley Water developed the FHRP to detail the implementation plan for certain provisions outlined in the Settlement Agreement. As defined in the Settlement Agreement, FHRP implementation includes up to four phases.

Phase 1 consists of implementing measures included in the FHRP specific to reservoir re-operation rule curves and facility improvements necessary to support fish passage, spawning and rearing habitat, and hydrologic enhancements. Phase 1 would be implemented over a 10-year term. Upon the expiration of the 10-year period, Valley Water would evaluate monitoring data to determine whether objectives are being met. If program objectives are not being met, Valley Water would implement **Phase 2** for a 10-year period, potentially followed by **Phase 3**. If during the 10-year program evaluation Valley Water determines that program objectives are being met, they would transition to Phase 4. **Phase 4** would be a continued implementation of the preceding phase where program objectives are being met. No new actions would be implemented under Phase 4 not contemplated in Phases 1, 2, and 3.

[1] San José, Mountain View, Sunnyvale, and Palo Alto

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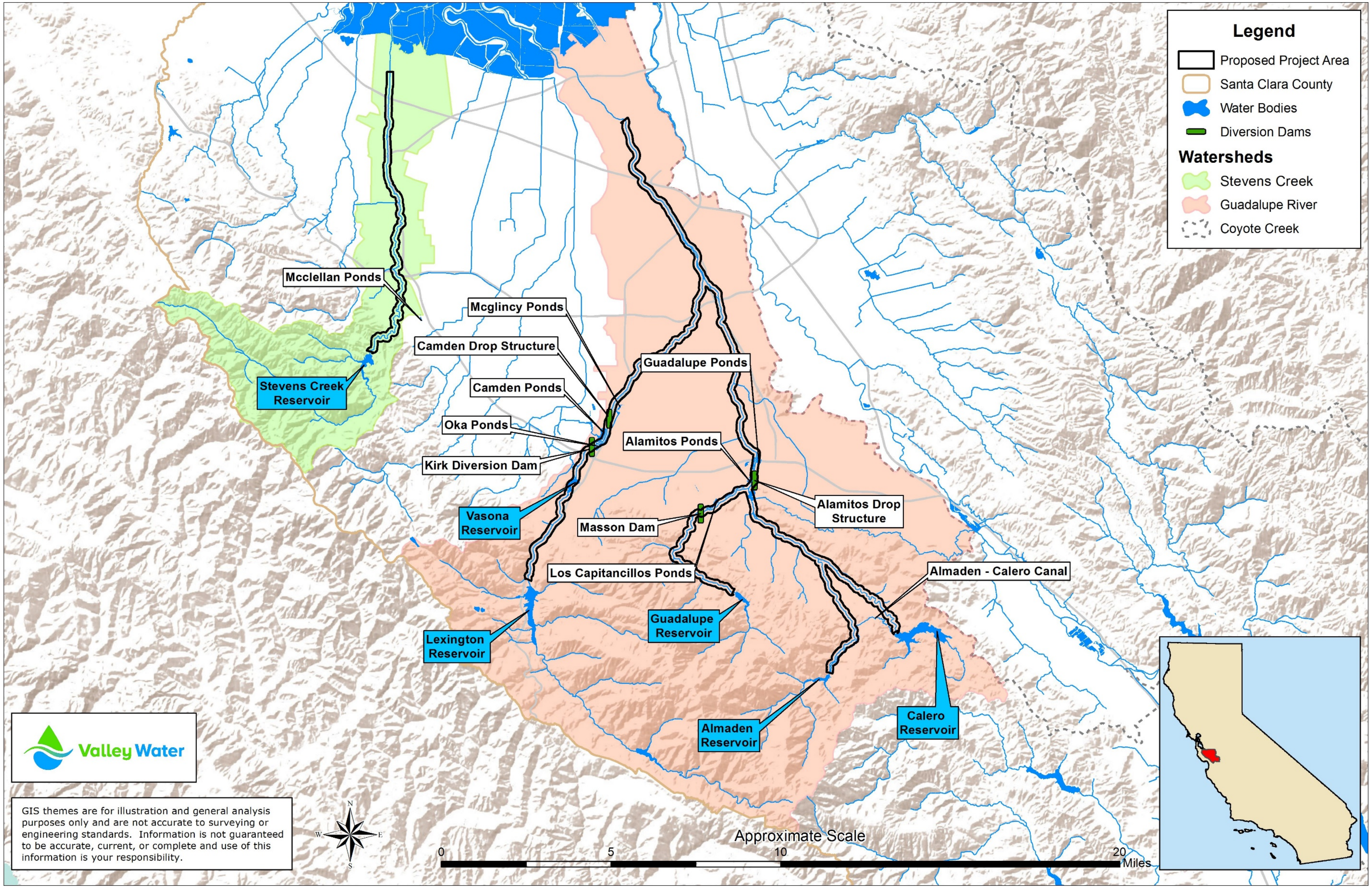
Figure ES-1. FAHCE FHRP Proposed Project Area and Valley Water's Water Supply Facilities



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Phase 4 would include monitoring Valley Water facilities and the continuation of the AMP. Maintenance of all facilities with measures defined in the FHRP would also be included in Phase 4.

The Proposed Project for this EIR is the implementation of the FAHCE FHRP Phase 1 measures in the Stevens Creek and Guadalupe River watersheds, adaptive management of these Phase 1 restoration measures through the FHRP AMP, and amendments to associated Valley Water water rights.

This EIR evaluates the environmental impacts of implementation of the Phase 1 measures. Phase 1 includes maintenance of existing facilities and monitoring. Phases 2 through 3 would be considered based on the results of monitoring during Phase 1. These subsequent phases, and measures that might be undertaken during these phases, are speculative at this time, and are therefore not evaluated in this EIR.

This section summarizes the Proposed Project components considered in this EIR.

ES-1.3.1 Flow Measures

Operation of each reservoir is governed by rule curves developed to achieve specific purposes (for example, water supply and flood control) for that reservoir. The FAHCE process resulted in a series of reservoir re-operation rule curves (rule curves) that describe planned changes to the release of impounded water from seven Valley Water reservoirs (Stevens, Guadalupe, Almaden, Calero, Vasona, Anderson/Coyote, and Lexington) to support the life-cycle needs of steelhead and Chinook salmon, as appropriate.

These rule curve parameters form a central element of the Settlement Agreement, identifying seasonal pulse flows to facilitate passage of upmigrating adult steelhead and outmigrating steelhead smolts, and to provide instream flows and maintain water temperature suitable for juvenile rearing. This EIR evaluates these rule curves at a Project-specific level using data from the hydrologic modeling completed in conjunction with the development of the FHRP specific to the targeted fish species. Rule curve parameters include:

- **Proposed Winter Base Flow Releases:** Winter base flows are reservoir releases made between November 1 and April 30 to improve winter and springtime habitat for salmonids. Winter base flows combined with flood releases and stormwater spill events provide flow cues to immigrating salmonids. Valley Water also maintains minimum bypass flow releases required by CDFW Lake and Streambed Alteration Agreements.
- **Proposed Spring Pulse Flow Releases:** Spring pulse flows would improve passage conditions for migrating steelhead, Chinook salmon, or both, depending on the watershed. Pulse flows are reservoir releases of 50 cubic feet per second for a period of 5 consecutive days made between February 1 and April 30. These releases would be at the same locations as those described above for winter base flow releases, except no spring pulse flows would occur at Lexington Reservoir because the pulse flows would be muted prior to reaching areas where anadromous fish occur due to flow control at Vasona Reservoir. Upstream passage for adults would be enhanced by providing a greater volume of water over potential impediments and critical riffles. These short-term pulse events would also benefit outmigrating juveniles by providing them cues for migration, encouraging them to swim downstream from the upper watershed, aiding them in their downstream migration to the San Francisco Bay and ultimately to the ocean.
- **Proposed Summer Base Flow Releases:** Summer base flows would be made between May 1 and October 31, based on each reservoir's re-operation rule curve to enhance summer rearing conditions for steelhead. Between April 15 and April 30 of each year, Valley Water

would survey the Guadalupe and Stevens Creek Reservoirs to determine the volume of the hypolimnion that is at or below 14 degrees Celsius (°C) at Guadalupe Reservoir and 15°C at Stevens Creek Reservoir. Based on this information, Valley Water would determine the appropriate reservoir release rates to maximize the extent of the cold water management zones (CWMZs) from April 30 (when spring pulse flows end) through October 31. Proposed reservoir re-operation rule curves for applicable reservoirs are designed to maintain cold water storage availability for summer flow releases.

- **Proposed Flow Ramping:** Flow ramping is used to manage changes in reservoir release flow volumes to minimize impacts on aquatic species. Flow ramping manages changes in the rate of water flow in a slow, stepwise fashion, helping fish and other aquatic life to avoid stranding. Ramping would occur whenever Valley Water-controlled flows from reservoirs would be decreased by 50 percent or more from the existing flow condition.

ES-1.3.2 Non-flow Measures Common to All Watersheds

The following proposed non-flow measures would be implemented during Phase 1.

ES-1.3.2.1 Proposed Fish Passage Barrier Remediation and Maintenance

Removal or replacement of major passage barriers in the Stevens Creek and Guadalupe River watersheds would enhance fish passage to suitable spawning and rearing habitat. These barrier remediation measures have been evaluated in this EIR at a programmatic level of detail because of the lack of site-specific plans and designs.

The intent of each barrier remediation design is to be self-maintaining. While there might be short-term impacts from constructing these improvements, which are analyzed in this EIR, the intent of these measures is to improve fish habitat conditions over the long term. Ongoing monitoring would confirm functionality, and any subsequent maintenance for Valley Water-owned facilities would be performed consistent with Valley Water's Stream Maintenance Program or as part of the AMP. Table ES-1 lists the five barrier remediation locations included in the Proposed Project, by watershed and ownership.

Table ES-1. Remaining Fish Passage Barriers Identified in the Settlement Agreement and Included in FHRP for Implementation

Watershed/Creek	Barrier Name	Ownership	Valley Water Role
Stevens Creek Watershed/ Stevens Creek	Moffett Fish Ladder	Valley Water	Lead
Stevens Creek Watershed/ Stevens Creek	Fremont Fish Ladder	Valley Water	Lead
Guadalupe River Watershed/ Pheasant Creek	Pheasant Creek Culvert	To be determined	Reasonable best efforts to partner with owner to remediate barrier
Guadalupe River Watershed/ Guadalupe Creek	Old Dam	Private	Reasonable best efforts to partner with owner to remediate barrier
Guadalupe River Watershed/ Alamitos Creek	Bertram Road Drop Structure	Private	Reasonable best efforts to partner with owner to remediate barrier

ES-1.3.2.2 Proposed Spawning and Rearing Habitat Improvements

Habitat restoration or enhancement measures would be implemented at those locations where the benefit to aquatic species is greatest. Restoration and enhancement activities focused on improving spawning and rearing would generally occur in the upper watershed. Valley Water has produced a study identifying specific potential restoration sites.[2] Valley Water would develop an annual work plan for review by the adaptive management team (AMT). Restoration and enhancement sites included in each annual work plan would be selected based on data collected as part of the FHRP monitoring.

Instream habitat enhancement projects may include, but not be limited to, installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or large woody debris (LWD) to provide cover, and placement of appropriately sized gravels within the limits of the bankfull channel (the stage at which water is at the top of its banks and any further rise would result in water moving into the floodplain) to increase suitable spawning habitat. Specific methods and techniques for placement and anchoring would be identified during project design. The focus of these projects is to increase instream complexity within the Project area[3] by effectively modifying watershed hydrology and disrupting the natural supply and transport of gravel, sediment, and LWD. Six representative gravel or LWD augmentation project sites have been identified within the Stevens Creek and Guadalupe River watersheds. This EIR considers spawning and habitat improvements in these six locations as representative for the program, as shown on Table ES-2. The EIR analysis remains at a programmatic level and subsequent CEQA analysis might be required after further project definition.

Table ES-2. Representative Sites Identified for Gravel Augmentation and LWD Improvement

Waterway[a]	General Location
Stevens Creek Watershed	
Stevens Creek	In Stevens Creek County Park, just upstream and adjacent to Bay Tree Picnic Area
Guadalupe Watershed	
Guadalupe Creek 1-1	Just downstream of Guadalupe Dam and stream gage 5017
Guadalupe Creek 3-1	Near intersection of Hicks and Wagner Roads
Guadalupe River	Guadalupe River approximately 1,500 feet downstream of Alamitos Creek and Guadalupe Creek confluence, just downstream of Alamitos Percolation Pond Diversion
Los Gatos Creek 1-1	Just downstream of Camden Drop Structure, near intersection of Camden Avenue and Highway 17
Los Gatos Creek	Between Highway 17 bridge and Creekside Way bridge

[a] Watershed designation, including numbering, reference the corresponding designations in the *Countywide Gravel and Large Woody Debris Study* (Valley Water 2018).

ES-1.3.2.3 Bank Stabilization Guidelines

The Project includes the development of general guidelines for bank stabilization projects undertaken by itself and others. The guidelines would include techniques and strategies based on the ability of riparian vegetation to hold soil, protect banks, and otherwise stabilize the stream channel. They would

[2] *Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement, Santa Clara County, California*

[3] Project area waterways include Stevens Creek, Los Gatos Creek, Guadalupe Creek, Alamitos Creek, and Guadalupe River.

also address use of structures to rebuild a streambank and to offer stability until riparian vegetation is established. No physical changes to the environment would be caused by preparation of the bank stabilization guidelines.

ES-1.3.2.4 Completion of An Advanced Recycled and Other Urban Water Plan in Coordination with the City of San José

This measure is limited to development of a plan for future water use options. The Plan would be developed during implementation of Phase 1, so details about the Plan are not currently available. Therefore, impacts of this measure are not evaluated in this EIR because they are speculative in nature.

ES-1.3.3 Non-flow Measures Specific to an Individual Watershed

ES-1.3.3.1 Stevens Creek Watershed-specific Improvements

Two additional measures identified for the Stevens Creek watershed in the Proposed Project include a portable multiport outlet and a trap-and-truck feasibility study. Construction of the portable multiport outlet would allow for releases of cooler water during the summer from Stevens Creek Reservoir to meet instream water temperature objectives and to improve cold-water pool management in the reservoir.

The trap-and-truck feasibility study would evaluate the suitability of spawning and rearing habitat for steelhead trout above the reservoir, the practicality of moving steelhead trout above the reservoir and achieving successful outmigration, and the potential effects of such movement on existing steelhead trout populations in Stevens Creek. No physical changes to the environment would be caused by preparation of the feasibility study.

ES-1.3.3.2 Guadalupe River Watershed-specific Improvements

The Guadalupe River watershed-specific improvements include two additional measures—the Plan for Almaden Dam and geomorphic function enhancement. The Plan for Almaden Dam would not require physical changes to the environment. Recommendations produced by the study are unknown at this time and cannot be evaluated; therefore, no resource impacts were analyzed for this plan.

Proposed geomorphic function enhancement involves a geomorphic functions study and implementation of pilot projects to restore geomorphic functions. Pilot projects could include any of the following channel enhancements: modifying channel dimensions for carrying bankfull flow; varying the meander shape; planting riparian vegetation; removing culverts, riprap, and other structures; and stabilizing the area by using bioengineering techniques. Project sites would be selected based on data collected as part of the FHRP monitoring program.

ES-1.3.4 SWRCB Water Rights Petitions for Change

In May 2015, Valley Water submitted Petitions for Change to SWRCB to update the water rights held in the Project study area in northern Santa Clara County. Technical changes include correcting the locations of points of diversion, updating maps, and changing the place of use to include the entire Valley Water service area to correctly reflect current operations. The petitions also request that Valley Water's water rights licenses be amended to add Fish and Wildlife Preservation and Enhancement as a purpose use of the affected watersheds. Because approving the amendments is a discretionary action, SWRCB as a responsible agency would rely on this EIR for CEQA compliance before approving the water rights amendments.

ES-1.3.5 Monitoring, Maintenance, and Adaptive Management

Adaptive management is "a framework and flexible decision-making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvements in management planning and implementation of a project to achieve specified objectives" (California Water Code Section 85052). Valley Water has developed an AMP that addresses its obligations as outlined in the Settlement Agreement. The AMP covers adaptive management of Phase 1 measures identified in Section 6 of the Settlement Agreement in the Three Creeks (Stevens Creek, Guadalupe River, and Coyote Creek).

The Settlement Agreement requires Valley Water to administer and staff an AMT to assist with overseeing implementation of the fish habitat restoration effort. The FAHCE AMT was convened on October 29, 2020.

A critical component of the AMP is monitoring to determine whether the implemented flow and non-flow measures are meeting overall management objectives. During subsequent evaluation of the monitoring data, Valley Water and the AMT would consider interannual and seasonal variation in hydrologic conditions, and other constraints and limiting factors affecting achievement of the overall management objectives. The AMP includes up to four phases, as defined previously in Section ES-1.3, *Description of the Proposed Project*. This allows for sufficient time to gain a better understanding of system effects from implementing the FHRP. The FHRP AMP is part of the Project, and the Draft EIR generally evaluates the impacts of foreseeable Phase 1 monitoring, maintenance, and adaptive actions for Stevens Creek and Guadalupe River Phase 1 measures that would be part of AMP implementation.

Phase 2 and Phase 3 Additional Measures are uncertain at this juncture. Pursuant to Settlement Agreement Section 6.1.2, Valley Water would identify and implement Additional Measures only if all three of the following criteria are met:

- Overall management objectives for the preceding phase have not been met. This would be determined at the end of the 10-year monitoring period for the preceding phase.
- The proposed measures are deemed feasible under CEQA and NEPA.
- The proposed measures are determined to be cost-effective during implementation of the AMP.

Valley Water would undertake future CEQA reviews when and if specific, defined, feasible measures are proposed for implementation, and would implement those measures only if the above three criteria are met, provided that funding allocated to that applicable phase is available.

Phase 4 is the final phase and includes maintenance of instream flows in accordance with previous phases, long-term monitoring of measures implemented as part of the FHRP, and maintenance of facility improvements and other non-flow measures implemented in previous phases. Phase 4 could follow Phase 1, 2, or 3 once it is found that all Settlement Agreement objectives are met.

ES-1.3.6 Best Management Practices

The Proposed Project includes best management practices (BMPs) and Valley Habitat Plan (VHP) conditions relevant to each resource topic evaluated in the EIR. Applicable BMPs and VHP conditions are routinely implemented on Valley Water projects and are discussed within the context of each resource topic evaluation when a BMP or VHP condition can effectively avoid or minimize a potential adverse impact that could occur in the absence of the BMP or VHP condition. Although Valley Water BMPs do not apply to barrier-removal projects owned by others, Valley Water would include measures similar to Valley Water BMPs as conditions of funding these projects. VHP conditions apply only within the VHP boundaries.

ES-1.4 Alternatives Evaluated in the Draft EIR

After reviewing public scoping comments and input from the Initialing Parties and FAHCE Technical Work Group,[4] Valley Water considered a range of alternative suggestions in addition to the No Project Alternative required by CEQA. These suggestions were screened to confirm whether the measures, either alone or grouped with other measures to form a complete alternative to the Proposed Project, could feasibly meet the Project objectives and reduce adverse impacts or provide more beneficial impacts.

Two operations rule curves, along with a set of non-flow measures, were considered in formulating feasible alternatives for further analysis. The Draft EIR includes an analysis of the No Project Alternative and two action alternatives to the Proposed Project as described in the following sections; Table ES-3 summarizes elements in the Proposed Project and alternatives for comparison.

Table ES-3. Summary of Elements Included in Proposed Project and Alternatives

Project or Alternative	FAHCE Non-flow Measures	Water Rights Petitions Granted	Operations Rule Curves	
			FAHCE	FAHCE-plus
Proposed Project	X	X	X	
No Project Alternative				
Non-flow Measures Only Alternative	X			
FAHCE-plus Alternative	X	X		X

ES-1.4.1 No Project Alternative

Under the No Project Alternative, the Proposed Project (FAHCE) would not proceed and existing environmental conditions and Valley Water operations would be maintained.

Under the No Project Alternative, assumptions include the following:

- The completion of safety upgrades at Almaden, Calero, and Guadalupe Reservoirs would occur as separate Valley Water projects (that is, not as part of the Proposed Project).
- There would be no changes to drainage patterns or runoff during high-flow events other than what would otherwise have occurred under the current baseline conditions.
- The stream habitat restoration measures included in this Project would not be implemented.
- The average monthly water supply delivery would remain similar. Accordingly, reductions or increases in service area deliveries would not occur other than what would otherwise have occurred without the Proposed Project.
- Water demand would increase by 2035, as projected in Valley Water's *Urban Water Management Plan*.
- Water rights petitions for change would not be granted.

[4] The Technical Work Group, which has been advising Valley Water on development of the FHRP, includes technical representatives from most of the parties above, as well as the Regional Water Quality Control Board and the Stockholm Environment Institute and HDR, as Valley Water consultants

The No Project Alternative would not meet the first two Proposed Project objectives. The No Project Alternative was retained because it is required by CEQA and provides a useful basis for comparing the impacts of the No Project Alternative with the Proposed Project impacts.

ES-1.4.2 Non-flow Measures Only Alternative

Under the Non-flow Measures Only Alternative, only the non-flow measures and related maintenance, monitoring, and AMP measures included in the Proposed Project would be implemented; the flow measures and related monitoring and AMP measures included in the Proposed Project would not be implemented. This alternative was included to determine the extent to which certain adverse impacts of the Proposed Project's flow measures could be reduced. The non-flow measures that would be implemented under this alternative are the same as for the Proposed Project, and include:

- fish passage barrier remediation
- spawning and rearing habitat improvements
- bank stabilization guidelines
- completion of an Advanced Recycled and Other Urban Water Plan
- other non-flow measures specific to both the Stevens Creek and Guadalupe River watersheds

ES-1.4.3 FAHCE-plus Alternative

The FAHCE-plus Alternative is intended to increase the benefit of reservoir releases during key salmonid life-stages. This alternative provided an updated rule curve that combined concepts of the Proposed Project flow measures (that is, FAHCE rule curves) with an additional set of rules designed to maximize fish migration, and the need to balance all three Project objectives as recommended by the Technical Work Group. This revised scenario is known as the FAHCE-plus Alternative. This alternative was developed to determine the extent to which the fisheries benefits of the Proposed Project's rule curves could be further enhanced.

This alternative includes (1) pulse flow revisions, which include both adjustment of the FAHCE-plus flows in magnitude, duration, and frequency based on model outputs and prioritization of multipurpose pulse flows to aid in both up- and outmigration of steelhead; (2) winter base flow adjustments, which include conservation of reservoir storage in the winter for pulse flows to make summer rearing flows more reliable by reducing winter base flows; and (3) summer base flow adjustments, which include a slight increase in temperature limits of upmigration pulse and outmigration pulse flows. FAHCE-plus flow measure changes relative to the Proposed Project are as follows:

- **Pulse Flow Revisions:** New safeguard pulse flows were developed for FAHCE-plus specific to each watershed. In addition to changes in magnitude and duration, the timing of pulse flows was expanded to include pulse checks throughout the adult salmonid upstream migration period. A safeguard pulse flow was added in March with a lower threshold than standard pulse flows to produce connection flows in the maximum years possible. The safeguard pulse flow would be activated if upstream steelhead migration flows are not available by March 1 of any given year. In addition, a regular outmigration pulse flow was added in mid-April of each year.
- **Winter Base Flow Adjustments:** The Proposed Project rule curves include multiple flow levels for winter base flows based on a tiered system of reservoir storage. The FAHCE-plus scenario retained tiers that supported incubation in the critical spawning areas, for example, FAHCE CWMZs, while removing tiers that did not provide additional benefit to the spawning reaches downstream. The reserved water in the FAHCE-plus scenario enables additional pulse flows.

- **Summer Base Flow Adjustments:** Summer base flows under the Proposed Project would be more reliable and cooler. In FAHCE-plus, temperature limits were raised within the normal temperature range for steelhead rearing to enhance summer flows for supporting rearing habitat downstream.

ES-1.5 Comparison of Proposed Project and Alternative Impacts

Table ES-4 summarizes impacts of the alternatives and compares Proposed Project impacts with the impacts of each of the alternatives evaluated in the EIR. Main categories of impacts include:

- no impact (NI)
- less than significant impact (LTS)
- significant but mitigable impact (S/M); impacts would be less than significant with mitigation
- significant and unavoidable impact (S/U); no feasible mitigation measures are available to reduce impacts to less than significant level
- beneficial impact

Table ES-4 also compares the magnitude of impacts of the alternatives to those of the Proposed Project, with a "+" indicating that the alternative would have a higher adverse impact than the Proposed Project, a "-" indicating that the alternative would have a lower adverse impact than the Proposed Project, and an "=" indicating the alternative would have an equal adverse impact as the Proposed Project.

Table ES-4 also provides a more detailed summary of impacts on aquatic biological resources, given the importance of these impacts for achieving the Project purpose and objectives. Aquatic resource impacts are categorized as short term (during construction of non-flow measures) and long term (operational), and are shown for each watershed and each species. Aquatic biological resource impacts are also shown for two baselines, current and future.[5] When the results of the Proposed Project are analyzed within the Guadalupe River watershed, the effects of the flow and non-flow measures provide an overall benefit to native fish species populations analyzed in this discussion (steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin) within the study area.

As shown in Table ES-4, significant but mitigable impacts would result from implementation of non-flow measures for terrestrial biological resources and geology and soils (applicable to the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative). Significant and unavoidable impacts would also be caused by implementation of non-flow measures, and are listed in Section ES-1.6, *Significant and Unavoidable Impacts*.

Hydrology, groundwater resources, water supply, water quality, recreation, aquatic biological resources, air quality, greenhouse gas (GHG) emissions, and utilities would experience either no impacts or less than significant impacts (applicable to the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative). In addition, long-term beneficial impacts would occur for water quality, aquatic biological resources, and terrestrial biological resources (applicable to the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative).

[5] The current baseline represents 2015 conditions using a hydrological period of record extending from 1990 through 2010 and includes current storage seismic restrictions for certain dams. Future baseline conditions represent 2035 water demands and conditions and assume dam seismic restrictions are lifted.

The Proposed Project's and FAHCE-plus Alternative's flow and non-flow measures provide overall benefits to steelhead and Chinook salmon in the Stevens Creek and Guadalupe River Project areas, with the FAHCE-plus Alternative flow measures overall providing greater benefits than the FAHCE flow measures.

Table ES-5 lists mitigation measures proposed to reduce significant impacts resulting from the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative.

Table ES-4. Comparison of Proposed Project and Alternative Impacts

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Hydrology								
Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of a course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site	LTS	LTS	S/U (+)	NI (-)	NI (-)	LTS (=)	LTS (=)	LTS (=)
Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream runoff in a manner that would result in flooding on or off site	LTS	LTS	S/U (+)	NI (-)	NI (-)	LTS (=)	LTS (=)	LTS (=)
Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff	LTS	LTS	S/U (+)	NI (-)	NI (-)	LTS (=)	LTS (=)	LTS (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Groundwater Resources								
Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin	LTS	NI	NI (-)	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)
Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality	LTS	NI	NI (-)	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)
Water Supply								
Impact WS-1: Substantially alter or reduce Valley Water's ability to have sufficient water supplies available to serve its retailers from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years	LTS	NI	NI (-)	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)
Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects	NI	NI	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Water Quality								
Impact WQ-1: Impair beneficial uses of surface waters	LTS (beneficial)	LTS (beneficial)	NI (-)	NI (-)	NI (-)	LTS (beneficial) (=)	LTS (beneficial) (=)	LTS (beneficial) (=)
Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality	LTS (beneficial)	LTS (beneficial)	NI (-)	NI (-)	NI (-)	LTS (beneficial) (=)	LTS (beneficial) (=)	LTS (beneficial) (=)
Recreation								
Impact REC-1: Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated	LTS	LTS	NI (-)	NI (-)	NI (-)	LTS (=)	LTS (=)	LTS (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Aquatic Biological Resources								
Impact AQUA-1a: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Stevens Creek watershed portion of the study area – *Steelhead*	Current: NI (beneficial)	Short-term: LTS	Current: NI (=)	Short-term: NI (-)	Current: NI (=)	Short-term: LTS (=)	Current: NI (beneficial) (=)	Short-term: LTS (=)
	Future: NI (beneficial)	Long-term: NI (beneficial)	Future: NI (=)	Long-term: NI (=)	Future: NI (=)	Long-term: NI (beneficial) (=)	Future: NI (beneficial) (=)	Long-term: NI (beneficial) (=)
Impact AQUA-1a: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Stevens Creek watershed portion of the study area – *Pacific Lamprey*	Current: NI (beneficial)	Short-term: LTS	Current: NI (=)	Short-term: NI (-)	Current: NI (=)	Short-term: LTS (=)	Current: NI (beneficial) (=)	Short-term: LTS (=)
	Future: NI (beneficial)	Long-term: NI (beneficial)	Future: NI (=)	Long-term: NI (=)	Future: NI (=)	Long-term: NI (beneficial) (=)	Future: NI (beneficial) (=)	Long-term: NI (beneficial) (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area – *Steelhead*	Current: NI (beneficial)	Short-term: LTS	Current: LTS (+)	Short-term: NI (-)	Current: NI (=)	Short-term: LTS (=)	Current: NI (beneficial) (=)	Short-term: LTS (=)
	Future: NI (beneficial)	Long-term: NI (beneficial)	Future: LTS (+)	Long-term: NI (=)	Future: NI (=)	Long-term: NI (beneficial) (=)	Future: NI (beneficial) (=)	Long-term: NI (beneficial) (=)
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area – *Chinook Salmon*	Current: LTS (beneficial)	Short-term: LTS	Current: LTS (beneficial) (=)	Short-term: NI (-)	Current: NI (-)	Short-term: LTS (=)	Current: LTS (beneficial) (=)	Short-term: LTS (=)
	Future: LTS (beneficial)	Long-term: NI (beneficial)	Future: LTS (=)	Long-term: NI (=)	Future: NI (-)	Long-term: NI (beneficial) (=)	Future: LTS (beneficial) (=)	Long-term: NI (beneficial) (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area – *Pacific Lamprey*	Current: NI (beneficial)	Short-term: LTS	Current: LTS (+)	Short-term: NI (-)	Current: NI (=)	Short-term: LTS (=)	Current: NI (beneficial) (=)	Short-term: LTS (=)
	Future: NI (beneficial)	Long-term: NI (beneficial)	Future: LTS (+)	Long-term: NI (=)	Future: NI (=)	Long-term: NI (beneficial) (=)	Future: NI (beneficial) (=)	Long-term: NI (beneficial) (=)
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area – *Sacramento Hitch*	Current: NI (beneficial)	Short-term: LTS	Current: NI (=)	Short-term: NI (-)	Current: NI (=)	Short-term: LTS (=)	Current: NI (beneficial) (=)	Short-term: LTS (=)
	Future: NI (beneficial)	Long-term: NI (beneficial)	Future: NI (=)	Long-term: NI (=)	Future: NI (=)	Long-term: NI (beneficial) (=)	Future: NI (beneficial) (=)	Long-term: NI (beneficial) (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	**Non-flow Measures**	**Flow Measures**	**Non-flow Measures**	**Flow Measures**	**Non-flow Measures**	**Flow Measures**	**Non-flow Measures**
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area – *Riffle Sculpin*	Current: NI	Short-term: LTS	Current: LTS (+)	Short-term: NI (-)	Current: N/A	Short-term: LTS (=)	Current: NI (=)	Short-term: LTS (=)
	Future: NI	Long-term: NI (beneficial)	Future: LTS (+)	Long-term: NI (=)	Future: N/A	Long-term: NI (beneficial) (=)	Future: NI (=)	Long-term: NI (beneficial) (=)
Terrestrial Biological Resources								
Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modifications, on an identified candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	NI	S/M	NI (=)	NI (-)	NI (=)	S/M (=)	NI (=)	S/M (=)
Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS	NI (beneficial)	S/M	NI (=)	NI (-)	NI (=)	S/M (=)	NI (beneficial) (=)	S/M (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means	NI (beneficial)	S/M	NI (=)	NI (-)	NI (=)	S/M (=)	NI (beneficial) (=)	S/M (=)
Impact TERR-4: Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites	NI (beneficial)	LTS (beneficial)	NI (=)	NI (-)	NI (=)	LTS (beneficial) (=)	NI (beneficial) (=)	LTS (beneficial) (=)
Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance	NI	S/M	NI (=)	NI (-)	NI (=)	S/M (=)	NI (=)	S/M (=)
Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan	NI	NI	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Cultural Resources								
Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources	NI	S/U	NI (=)	NI (-)	NI (=)	S/U (=)	NI (=)	S/U (=)
Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources	NI	S/U	NI (=)	NI (-)	NI (=)	S/U (=)	NI (=)	S/U (=)
Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Tribal Cultural Resources								
Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed, or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant	NI	S/U	NI (=)	NI (-)	NI (=)	S/U (=)	NI (=)	S/U (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Geology and Soils								
Impact GEO-1: Result in substantial soil erosion or the loss of topsoil	LTS	LTS	NI (-)	NI (-)	NI (-)	LTS (=)	LTS (=)	LTS (=)
Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site	NI	S/M	NI (=)	NI (-)	NI (=)	S/M (=)	NI (=)	S/M (=)
Air Quality								
Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Impact AIR-2: Violate any air quality standards or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
GHG Emissions and Energy								
Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs	NI	NI	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)
Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Noise								
Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels	NI	S/U	NI (=)	NI (-)	NI (=)	S/U (=)	NI (=)	S/U (=)
Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Utilities								
Impact UTIL-1: Generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)

Notes: NI = no impact, LTS = less than significant, S/M = significant but mitigable to a less than significant impact, S/U = significant and unavoidable
(+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project
Current = current baseline, Future = future baseline, beneficial = beneficial impact
BAAQMD = Bay Area Air Quality Management District, CRHR = California Register of Historic Resources

Table ES-5. Summary of Significant Impacts and Mitigation Measures

Impact	Alternative	Project Component Triggering Significance	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
Terrestrial Biological Resources					
Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	▪ Proposed Project ▪ Non-flow Measures Only ▪ FAHCE-plus	Non-flow Measures	SI	**MM TERR-1a:** Biological Resources Screening and Assessment **MM TERR-1b:** Endangered/Threatened Species Habitat Assessment and Protocol Surveys **MM TERR-1c:** Nesting Avian Species Avoidance and Minimization **MM TERR-1d:** Payment of VHP Impact Fees **MM TERR-1e:** Implement Compensatory Mitigation for Special-status Plant Species for Areas Outside or Activities Not Covered by the VHP	S/M
Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS	▪ Proposed Project ▪ Non-flow Measures Only ▪ FAHCE-plus	Non-flow Measures	SI	**MM TERR-1a:** Biological Resources Screening and Assessment **MM TERR-1b:** Endangered/Threatened Species Habitat Assessment and Protocol Surveys **MM TERR-1d:** Payment of VHP Impact Fees **MM TERR-1e:** Implement Compensatory Mitigation for Special-status Plant Species for Areas Outside or Activities Not Covered by the VHP	S/M

Impact	Alternative	Project Component Triggering Significance	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means	▪ Proposed Project ▪ Non-flow Measures Only ▪ FAHCE-plus	Non-flow Measures	SI	**MM TERR-1d:** Payment of VHP Impact Fees **MM TERR-2:** Mitigation for Wetlands and Other Waters of the United States and State Outside of VHP-covered Areas	S/M
Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance	▪ Proposed Project ▪ Non-flow Measures Only ▪ FAHCE-plus	Non-flow Measures	SI	**MM TERR-3:** Tree Replacement	S/M
Cultural Resources					
Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources	▪ Proposed Project ▪ Non-flow Measures Only ▪ FAHCE-plus	Non-flow Measures	SI	**MM CUL-1a:** Conduct Cultural Resources Studies and Avoid Impacts on Built-environment Resources **MM CUL-1b:** Follow the Secretary of the Interior's Standards for the Treatment of Historic Properties **MM CUL-1c:** Record Built-environment Resources to Historic American Buildings Survey and Historic American Engineering Record Standards	S/U
Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources	▪ Proposed Project ▪ Non-flow Measures Only ▪ FAHCE-plus	Non-flow Measures	SI	**MM CUL-2a:** Conduct Cultural Resources Studies and Avoid Impacts on Archaeological Resources **MM CUL-2b:** If Cultural Resources Are Discovered, Immediately Halt Construction and Implement An Accidental Discovery Plan	S/U

Impact	Alternative	Project Component Triggering Significance	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
Tribal Cultural Resources					
Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed, or eligible for listing, in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant	▪ Proposed Project ▪ Non-flow Measures Only ▪ FAHCE-plus	Non-flow Measures	SI	**MM TRI-1a:** Conduct Cultural Resources Studies and Avoid Effects on TCRs **MM TRI-1b:** Consult With Native American Communities and Implement Appropriate Measures to Mitigate Effects on TCRs	S/U
Geology and Soils					
Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site	▪ Proposed Project ▪ Non-flow Measures Only ▪ FAHCE-plus	Non-flow Measures	SI	**MM GEO-1:** Follow the Society of Vertebrate Paleontology Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources	S/M
Noise					
Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels	▪ Proposed Project ▪ Non-flow Measures Only ▪ FAHCE-plus	Non-flow Measures	SI	**MM NOISE-1:** Implement Construction Noise Mitigation Measures	S/U

Notes: SI = significant impact, S/M = significant but mitigable to a less than significant impact, S/U = significant and unavoidable
TCR = traditional cultural resource

ES-1.6 Significant and Unavoidable Impacts

Significant and unavoidable impacts could occur as a result of the Proposed Project, Non-flow Measures Only Alternative, or FAHCE-plus Alternative. Each significant and unavoidable impact is caused by the implementation of non-flow measures. These impacts, applicable to the Proposed Project, Non-flow Measures Only Alternative, or FAHCE-plus Alternative, are as follows.

- **Cultural Resources**
  - **Impact CUL-1:** Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources
  - **Impact CUL-2:** Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources
- **Tribal Cultural Resources**
  - **Impact TRI-1:** Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant
- **Noise**
  - **Impact NOISE-1:** Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels

ES-1.7 Cumulative Impacts

As required by CEQA Guidelines Section 15130, impacts from reasonably foreseeable probable future projects were evaluated specific to each of the significance thresholds and added to the incremental impacts of the Proposed Project and action alternatives. A conclusion of cumulative impact significance was made, and the incremental contribution of the Proposed Project or alternative was then judged for whether it was cumulatively considerable (CC) or not cumulatively considerable (NCC). If cumulatively considerable, feasible mitigation measures to reduce the incremental contributions were considered; these are the same as Project- and alternative-specific mitigation measures described in Chapters 3 and 4. Table ES-6 compares the Proposed Project's incremental contribution to cumulative impacts (post-mitigation) compared with the two alternatives (post-mitigation).

As shown in Table ES-6, resources resulting in cumulatively considerable impacts post-mitigation, if applicable, include:

- **Cultural Resources**
  - **Cumulative Impact CUL-1:** Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources (*applicable to Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative*).
  - **Cumulative Impact CUL-2:** Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources (*applicable to Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative*).

- **Tribal Cultural Resources**
  - **Cumulative Impact TRI-1:** Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant *(applicable to Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative).*
- **Noise**
  - **Cumulative Impact NOISE-1:** Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels (*applicable to Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative*).

Resources resulting in no cumulatively considerable impacts include hydrology, groundwater, water supply, recreation, aquatic biological resources, terrestrial biological resources, geology and soils, air quality, GHG emissions and energy, and utilities.

Table ES-6. Comparison of Proposed Project and Alternative Cumulative Impacts (Post-Mitigation)

Cumulative Impact	Proposed Project	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Hydrology			
Cumulative Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of a course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site	NCC	NCC	NCC
Cumulative Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream runoff in a manner that would result in flooding on or off site	NCC	NCC	NCC
Cumulative Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff	NCC	NCC	NCC
Groundwater Resources			
Cumulative Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin	NCC	NCC	NCC
Cumulative Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality	NCC	NCC	NCC

Cumulative Impact	Proposed Project	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Water Supply			
Cumulative Impact WS-1: Substantially alter or reduce Valley Water's ability to have sufficient water supplies available to serve its retailers from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years	NCC	NCC	NCC
Cumulative Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects	NCC	NCC	NCC
Water Quality			
Cumulative Impact WQ-1: Impair beneficial uses of surface waters	NCC	NCC	NCC
Cumulative Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality	NCC	NCC	NCC
Recreation			
Cumulative Impact REC-1: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated	NCC	NCC	NCC
Aquatic Biological Resources			
Cumulative Impact AQUA-1: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS	NCC	NCC	NCC
Terrestrial Biological Resources			
Cumulative Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	NCC	NCC	NCC
Cumulative Impact TERR-2: Have a substantial adverse effect on riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS	NCC	NCC	NCC
Cumulative Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means	NCC	NCC	NCC

Cumulative Impact	Proposed Project	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Cumulative Impact TERR-4: Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites	NCC	NCC	NCC
Cumulative Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance	NCC	NCC	NCC
Cumulative Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan	NCC	NCC	NCC
Cultural Resources			
Cumulative Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources	CC	CC	CC
Cumulative Impact CUL-2: Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources	CC	CC	CC
Cumulative Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries	NCC	NCC	NCC
Tribal Cultural Resources			
Cumulative Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant	CC	CC	CC
Geology and Soils			
Cumulative Impact GEO-1: Result in substantial soil erosion or the loss of topsoil	NCC	NCC	NCC
Cumulative Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site	NCC	NCC	NCC
Air Quality			
Cumulative Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan	NCC	NCC	NCC
Cumulative Impact AIR-2: Violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants	NCC	NCC	NCC
Cumulative Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations	NCC	NCC	NCC

Cumulative Impact	Proposed Project	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Cumulative Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people	NCC	NCC	NCC
GHG Emissions and Energy			
Cumulative Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on BAAQMD significance thresholds	NCC	NCC	NCC
Cumulative Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs	NCC	NCC	NCC
Cumulative Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy during Project construction or operation	NCC	NCC	NCC
Cumulative Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	NCC	NCC	NCC
Noise			
Cumulative Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels	CC	CC	CC
Cumulative Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels	NCC	NCC	NCC
Utilities			
Cumulative Impact UTIL-1: Generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure	NCC	NCC	NCC

ES-1.8 Environmentally Superior Alternative

CEQA Guidelines Section 15126.6(e)(2) requires the identification of an environmentally superior alternative to the proposed project. If the environmentally superior alternative is the no project alternative, the EIR shall also identify an environmentally superior alternative among the action alternatives. For this EIR, the No Project Alternative is not considered environmentally superior because it would not achieve the Project objectives, which emphasize taking actions to restore and maintain healthy steelhead and Chinook salmon populations.

As noted in the Project and action alternative descriptions, the non-flow measures in each Project and action alternative description are identical. The variation in the Proposed Project (FAHCE) and FAHCE-plus Alternative focuses primarily on the pulse flows.

Based on the analysis of the proposed flow measures under both the Proposed Project and FAHCE-plus Alternative, the FAHCE-plus Alternative was found to improve habitat conditions and migration potential for steelhead to the largest extent. Otherwise, FAHCE and the FAHCE-plus Alternative both would improve habitat conditions overall and migration potential for the Chinook salmon. Other resources, including hydrology, water quality, groundwater, and water supply, show differences between the Proposed Project and FAHCE-plus Alternative; however, given the importance of steelhead impacts to achieving Project objectives, those differences were not at a level that would sway the selection of an environmentally superior alternative.

The proposed non-flow measures, common to the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative, were found to improve habitat conditions overall for both steelhead and Chinook salmon. However, the Non-flow Measures Only Alternative would forego benefits to fisheries habitat and migration potential achieved by the flow measures included in the Proposed Project and FAHCE-plus Alternative.

Based on this analysis, while the Proposed Project and FAHCE-plus Alternative would achieve the Project objectives and requirements of the Settlement Agreement and have similar levels of impact significance after the implementation of mitigation, the FAHCE-plus Alternative is the environmentally superior alternative because it has the greatest benefits to steelhead habitat conditions and migration potential.

ES-1.9 Areas of Known Controversy

CEQA Guidelines Section 15123 states that an EIR must identify areas of known controversy that might have been raised by other agencies, the public, or other stakeholders. Areas of communicated controversy related to the EIR identified in the EIR scoping process include, but are not limited to, the following:

- effects of the Proposed Project on Valley Water's water supply reliability
- schedule for implementing Proposed Project measures
- degree to which the Proposed Project would achieve the habitat conditions necessary to restore and maintain anadromous salmonid fisheries
- content of the monitoring program and AMP
- relationship of Proposed Project to Alamitos Drop structure impacts
- range of alternatives to be evaluated in the Draft EIR

ES-1.10 Issues to be Resolved

CEQA Guidelines Section 15123 calls for the lead agency to disclose issues to be resolved—including the choice among alternatives and whether or how to mitigate significant effects. Issues to be resolved related to the Proposed Project or EIR include, but are not limited to, the following:

- commitment and timing for implementing barrier remediation projects for facilities owned by others, not by Valley Water
- choice among alternatives as it pertains to the commitments set forth in the Settlement Agreement
- selection of mitigation measures for implementation
- need for additional Phase 2 and 3 measures to restore fish habitat

ES-1.11 Stakeholder Coordination and Public Involvement Process

ES-1.11.1 Stakeholder Coordination and Engagement Process

Through the development of the Settlement Agreement and FHRP, Valley Water has coordinated and engaged with a number of agencies and stakeholders, including a Technical Advisory Committee made up of Valley Water staff, technical consultants, and a FAHCE Consensus Committee, which was a policy group with an objective of establishing foundational principles for the FAHCE.

Another group, the Initialing Parties, consisted of Valley Water, California Department of Fish and Game (now CDFW), NMFS, USFWS, GCRCD, Trout Unlimited, Pacific Coast Federation of Fishermen's Associations, Urban Creeks Council, Northern California Council of Federation of Fly Fishers, and California Trout, Inc.

A third group referred to as the Technical Work Group has been advising Valley Water on development of the FHRP and includes technical representatives of the previously mentioned parties and the Stockholm Environment Institute and HDR, as representatives of Valley Water.

Finally, a fourth group, the AMT, consists of a single representative from each of the Initialing Parties and will review and would consent to all of the plans, studies, reports, and other measures required by the AMP.

Over the years, the committees and groups and Valley Water's interactions with these groups also evolved. Valley Water has conducted periodic meetings with these various stakeholders outside of the formal CEQA scoping process since 2015.

ES-1.11.2 EIR Scoping

Valley Water circulated an NOP for the Proposed Project on February 2 through March 3, 2015. To provide an additional opportunity for public input on the scope and content to be addressed in the EIR, Valley Water later held a scoping meeting in June 2017. A scoping report that summarizes comments received in response to the 2015 NOP and comments received at the June 2017 scoping meeting is in Appendix C, *Stakeholder Engagement*, of this EIR.

ES-1.11.3 Draft EIR Public Comment Period

Valley Water has issued a Notice of Availability to provide agencies and the public with formal notification that the Draft EIR is available for review and comment. Copies of the Draft EIR and selected appendices are available at the following website: www.valleywater.org/FAHCE. The Draft EIR and all appendices are available at the following locations:

- Valley Water, 5750 Almaden Expressway, San José, CA 95118
- Evergreen Branch Library, 2635 Aborn Road, San José, CA 95121
- Los Gatos Library, 100 Villa Avenue, Los Gatos, CA 95030
- Cupertino Library, 10800 Torre Avenue, Cupertino, CA 95014
- Milpitas Library, 60 North Main Street, Milpitas, CA 95035
- Morgan Hill Library, 660 West Main Ave, Morgan Hill, CA 95037

Valley Water is circulating this Draft EIR for a 45-day public review and comment period and will host a public hearing during this period. The purpose of public circulation and the public hearing is to provide agencies and interested individuals with opportunities to comment on the contents of the Draft EIR.

Written comments or questions concerning this Draft EIR should be mailed or emailed during this review period and should be directed to the name and address listed below. Please submit your response at the earliest possible date, but no later than 45 days from release of the Draft EIR (June 30, 2021).

Ryan Heacock, Senior Water Resources Specialist
Operations and Maintenance Environmental Support Unit, Santa Clara Valley Water District
5750 Almaden Expressway
San José, CA 95118-3686
(408) 265-2600
FAHCE@valleywater.org

Written comments received on the Draft EIR will be addressed in the Final EIR.

Chapter 1 – Introduction

1 Introduction

The Santa Clara Valley Water District (Valley Water) is proposing to implement the Fish and Aquatic Habitat Collaborative Effort (FAHCE) Settlement Agreement through a Fish Habitat Restoration Plan (FHRP) (Appendix A). The FHRP is designed as a restoration project to improve fish passage and enhance fish habitat within Valley Water jurisdictional watersheds while maintaining a reliable current and future water supply and water deliveries where Valley Water holds water rights licenses in northern Santa Clara County, California. As such, the Proposed Project, or Project, is essentially a restoration project implemented through measures specified in the Settlement Agreement and adaptively managed through a program to administer these restoration activities consistent with Valley Water's water rights and water supply commitments.

Valley Water has prepared this Environmental Impact Report (EIR) pursuant to requirements under the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Section 21000 et seq.) and the CEQA Guidelines (14 California Code of Regulations Section 15000 et seq.).

Chapter 1 provides an overview of the Project geographic area and gives a brief history of the FAHCE, the Settlement Agreement, and the FHRP. This chapter also briefly summarizes the proposed measures included in the Proposed Project, defines the requirements and scope of the EIR analysis, and offers clarity about how this EIR will be used in agency decision-making. Finally, Chapter 1 provides an overview of the agency coordination and public involvement processes, including opportunities for public input; identifies areas of controversy and issues to be resolved; and summarizes the organization of the EIR.

1.1 Geographic Area Overview

European settlement and the initiation of irrigated farming resulted in significant changes to natural stream conditions and hydrology of the Stevens Creek and Guadalupe River watersheds. To contain flood flows, stream channels were enlarged and levees were constructed. To quickly convey flood flows through vulnerable portions of the lower watersheds, previously natural stream channels were hardened with concrete and/or straightened. In addition, urbanization greatly reduced the amount of permeable land, resulting in faster runoff occurring in the streams.

Since the formation of the Santa Clara Valley Water District, now known as Valley Water,[1] additional changes to streams and the watershed have occurred through the construction and operation of stormwater, flood management, and water supply facilities. Modifications to the streams included the building of dams, percolation ponds, levees, canals, pipelines, ditches, culverts, concrete channels, flow modification structures, diversion structures, fish ladders, and other facilities.

The urbanization of Santa Clara Valley has also changed summer flow patterns. Summer runoff from irrigated agriculture, gardens, and lawns, and the discharge of nuisance water from foundation pumps and other shallow groundwater drain connections, often leads to elevated summer flows, as do reservoir releases during dry weather and summer months to recharge groundwater for water supply and to support wetlands, fish, and other environmental resources. Additionally, winter runoff from urban areas is accelerated by the amount of impervious surface. Urban discharges may also transport relatively high concentrations of pollutants and excess nutrients to the streams through the municipal

[1] The Settlement Agreement references the Santa Clara Valley Water District. Section 1.2, *Overview of Valley Water's Water Resources Management*, provides a brief history of Valley Water's water resources management.

storm sewer systems. Overall, alterations to the urban landscape, as a result of development of the valley floor, continue to be external stressors to the stream environment.

The Project area for this EIR includes portions of the Stevens Creek and Guadalupe River watersheds, specifically portions of those reservoirs, creeks, and rivers downstream from the dams and upstream from the tidal influence zone, where Valley Water would implement proposed restoration measures (Figure 1.2-1). Valley Water's water supply operations in the Project area include six reservoirs, a network of conveyance systems, and three sets of percolation ponds that provide recharge to local groundwater basins.

The six Valley Water dams and associated reservoirs within the Project area are operated under licenses granted by the State Water Resources Control Board (SWRCB) and maintained under the requirements of the California Department of Water Resources (DWR), Division of Safety of Dams (DSOD).[2] Valley Water also operates three instream diversions within the Project area under licenses granted by SWRCB.[3] The north County dams located in the Stevens Creek and Guadalupe River watersheds are facilities with operations addressed by the Proposed Project. Valley Water holds water rights licenses for the Stevens Creek and Guadalupe River watersheds, which allow water diversion and storage for irrigation and domestic uses. Corresponding facilities manage and release instream flows to creeks and rivers in the Project area and recharge the Santa Clara Plain portion of the Santa Clara Subbasin, where released water is used to provide instream recharge for water supply, to prevent groundwater pumping-related subsidence, and to provide municipal and industrial supplies when diverted from the creeks to offstream percolation facilities.

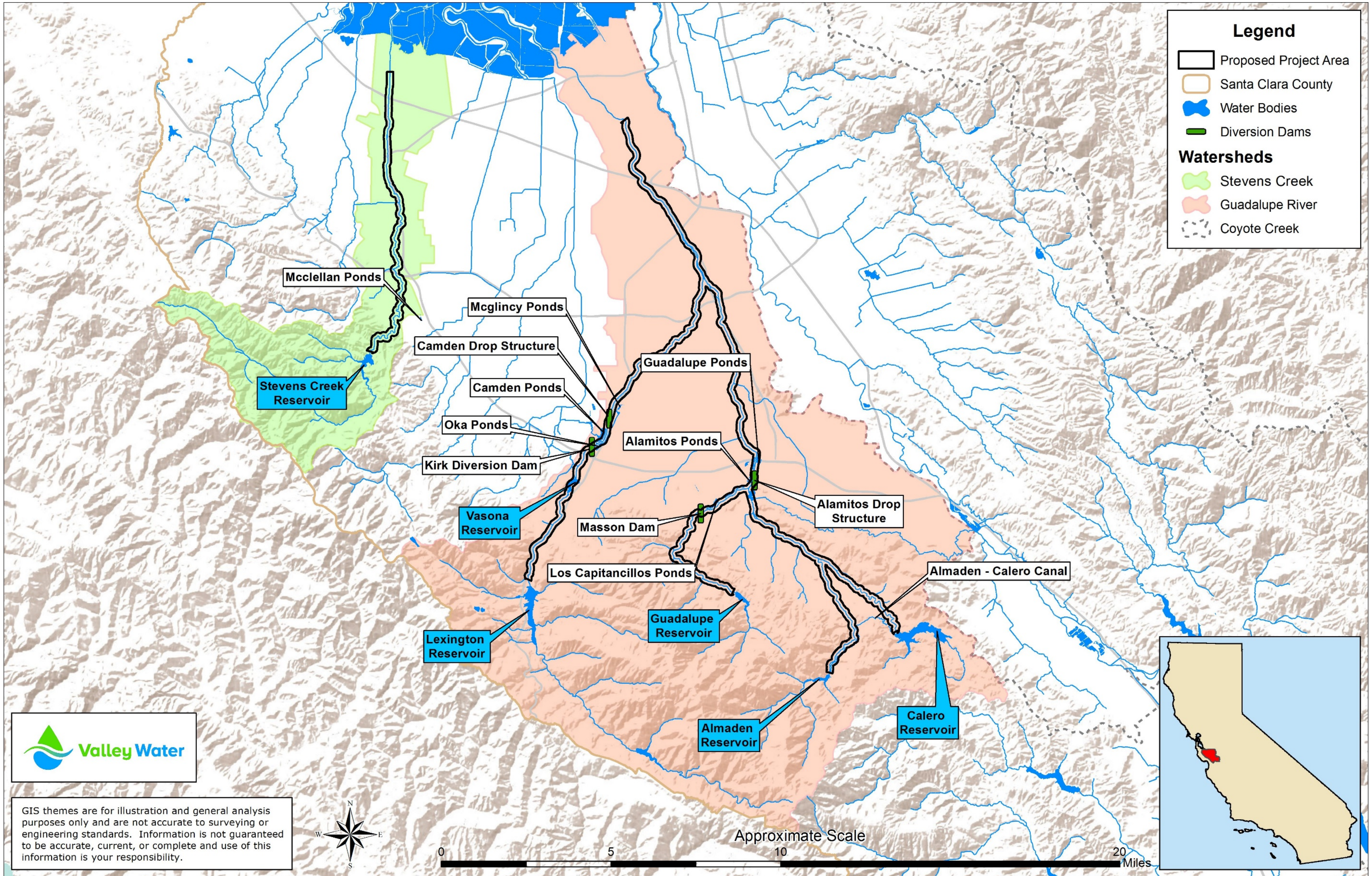
1.2 Overview of Valley Water's Water Resources Management

Valley Water was created by the California Legislature and operates as a State of California special district, with jurisdiction throughout Santa Clara County (County). It began managing water resources in the County in 1929, largely in response to the over-pumping of Santa Clara Valley groundwater. Valley Water constructed conservation reservoirs to capture rainfall and replenish the underground aquifer through managed groundwater recharge.

Valley Water currently provides approximately 285,000 acre-feet per year (AFY) of water for municipal, industrial, agricultural, and environmental uses (Valley Water 2016a). Valley Water's water supply system consists of storage, conveyance, recharge, treatment, and distribution facilities, which include local reservoirs, groundwater basins, groundwater recharge facilities, treatment plants, and imported, raw, and treated water conveyance facilities.

[2] Stevens Creek, Lexington, Vasona, Guadalupe, Almaden, and Calero Reservoirs
[3] Kirk Diversion, Masson Diversion, and Alamitos Percolation Pond Diversion

Figure 1.2-1. Proposed Project Area and Valley Water's Water Supply Facilities



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Chapter 1 – Introduction

To meet countywide needs, Valley Water's water supply and distribution system relies on the following major facilities (Valley Water 2019a):

- 10 surface raw water reservoirs, totaling 169,000 acre-feet (AF) of reservoir storage capacity
- 9 instream water supply diversion dams
- 279 miles of natural channels and 44 miles of concrete-lined channels
- 17 miles of raw surface water canals and ditches
- 25 groundwater recharge pond facilities
- 91 miles of controlled instream recharge
- 142 miles of pipelines
- raw water pumping stations
- 3 drinking water treatment plants

Raw water conveyance relies on streams and constructed infrastructure to distribute local and imported supplies to Valley Water's drinking water treatment plants and groundwater recharge facilities. Valley Water manages these systems to meet multiple objectives, including water supply, flood protection, and stream stewardship.

1.2.1 FAHCE and the Settlement Agreement

In 1996, the Guadalupe-Coyote Resource Conservation District (GCRCD) filed a complaint with SWRCB. The complaint alleged that Valley Water operations affected fish and wildlife, in conflict with requirements of the Water Code, Fish and Game Code, and other State of California laws.

In response to the 1996 complaint, Valley Water convened local environmental organizations as well as state and federal resource agencies in settlement negotiations and developed what is known as the FAHCE. FAHCE participants include Valley Water; Trout Unlimited; California Trout, Inc.; the Northern California Council of Federation of Fly Fishers; the Pacific Coast Federation of Fishermen's Associations; the National Marine Fisheries Service (NMFS); the U.S. Fish and Wildlife Service (USFWS); and the California Department of Fish and Wildlife (CDFW, formerly known as the California Department of Fish and Game), collectively referred to hereafter as the Initialing Parties. Measures developed through FAHCE are intended to modify instream flows and improve habitat conditions, as appropriate, to meet the management objectives specified in the *Settlement Agreement Regarding Water Rights of the Santa Clara Valley Water District on Coyote, Guadalupe and Stevens Creeks*, initialed by the Initialing Parties on May 27, 2003 (Settlement Agreement; Appendix B; Valley Water et al. 2003).

The Settlement Agreement was initialed by the Initialing Parties in recognition that certain environmental review and regulatory permitting efforts must be completed before implementation of the restoration program described in Article VI of the Settlement Agreement. These efforts are considered conditions precedent and, as such, Valley Water and other Initialing Parties must employ good-faith efforts to complete their assigned conditions. Once the conditions precedent is completed, the Initialing Parties are obligated to execute the Settlement Agreement (Settlement Agreement Section 4.1.7).

The Settlement Agreement contains a restoration program that details those provisions defined during the FAHCE process for flow measures, including requirements for fish passage improvements and fish habitat restoration measures (Settlement Agreement Article VI). The FAHCE Technical Advisory Committee, which included Valley Water staff, technical consultants, and representatives of the Initialing Parties, with an objective of establishing foundational principles for the FAHCE, determined that application of these measures would restore and maintain healthy populations of Central California Coast (CCC) steelhead trout (*Oncorhynchus mykiss*; steelhead trout or steelhead) and Central Valley fall-run Chinook salmon (*Oncorhynchus tshawytscha*; Chinook salmon) as appropriate for each of the Three Creeks by providing (1) suitable spawning and rearing habitat within each watershed, and (2) adequate passage for adult steelhead trout and salmon to reach suitable spawning and rearing habitat and for outmigration of juveniles (Settlement Agreement Section 6.2.2, Overall Management Objectives).

In 2016, the Initialing Parties agreed to revise the regulatory pathway for implementing the Settlement Agreement that had been detailed in Article V of the 2003 Settlement Agreement. Meeting minutes from the December 13, 2016, Valley Water Board of Directors (Valley Water Board, or Board) meeting state that the change in regulatory pathway is a “key procedural element in moving forward on implementing the Settlement Agreement.”

FAHCE, FHRP, and Proposed Project

- **FAHCE** refers to the collaboration that began in 1996 between Valley Water, federal and state resource agencies, and Initialing Parties to identify actions to balance Valley Water’s water supply operations with aquatic habitat needs in the Stevens Creek, Guadalupe River, and Coyote Creek (Three Creeks) watersheds. These are reflected in the FAHCE Settlement Agreement.
- **FHRP** refers to the Fish Habitat Restoration Plan prepared to implement the Settlement Agreement. It includes Phase 1 measures to be implemented during the first 10 years, and an adaptive management program (AMP) that would monitor Phase 1 measures and determine whether additional Phase 2 or Phase 3 measures (currently undefined) are needed to achieve management objectives. Phase 4 is a perpetual phase that could directly follow Phase 1, 2, or 3, depending on when the management objectives are found to be met.
- The **Proposed Project** for this EIR is the implementation of the FAHCE FHRP Phase 1 measures in the Stevens Creek and Guadalupe River watersheds, adaptive management of Phase 1 measures through the FHRP AMP, and amendments to associated Valley Water water rights. These components are fully described in Chapter 2, *Project Description*, of this EIR.

More specifically, the obligation of the non-federal parties to the Settlement Agreement (that is, CDFW and nongovernment organizations [NGOs]) to implement measures defined in the agreement on satisfaction of specified conditions has not been changed. These conditions require Valley Water to conform to the articles of the Settlement Agreement and demonstrate compliance with all state regulatory requirements to support both dismissal of the water rights complaint and subsequent issuance of orders to amend 15 existing water rights.[4] Receipt of the amended water rights orders would trigger the “effective date” of the Settlement Agreement implementation, and prompt Valley Water’s implementation of the Phase 1 measures, subject to obtaining any state and federal permits or authorizations required by applicable laws for implementation of such measures. In addition, the obligation of the federal parties (that is, USFWS and NMFS) to comply with conditions outlined in the Settlement Agreement, which are contingent on Valley Water’s satisfaction of any applicable federal statutes or regulations, such as compliance with the National Environmental Policy Act (NEPA) and Endangered Species Act (ESA), has been deferred and will follow issuance of amended water rights

[4] These 15 water rights amendments are across all three creeks; 10 of these are within the Stevens Creek and Guadalupe River watersheds and are analyzed in this EIR.

orders, but prior to implementation of any FHRP measures that require federal agency authorizations. If necessary, federal permitting may occur after required state permits, but prior to implementation of any FHRP measures that require federal permits or authorizations for implementation.

The amendment to the Settlement Agreement was circulated among the Initialing Parties prior to the Valley Water Board meeting when this amendment to the regulatory pathway was approved; the Initialing Parties agreed in principle to pursuing the amended regulatory pathway as described above. NMFS and CDFW have provided letters of support for this change.

Although the 2016 initial amendment proposed additional changes to the Settlement Agreement, the amended regulatory pathway was the only major revision accepted by the Initialing Parties. Therefore, all of the citations referenced in this EIR, aside from this discussion on regulatory pathway, are extracted from the 2003 Settlement Agreement (Appendix B; Valley Water et al. 2003) unless otherwise specified. Two other process variations from the 2003 Settlement Agreement are also worth noting. The first is that, while the 2003 Settlement Agreement states that a 1996 baseline year will be used in the CEQA environmental review, this EIR uses a more current existing conditions baseline, as well as a future conditions baseline (see Section 3.1.2). Second, the decision was made to make the FHRP more expansive than originally described in the 2003 Settlement Agreement to include all Phase 1 measures discussed in the document and the AMP.

The FHRP is intended to serve as the basis for settlement between the complainants and Valley Water. The FHRP addresses all provisions required by the Settlement Agreement and provides additional detail about how each Phase 1 measure has been or would be implemented. Monitoring and maintenance of measures completed is also included.

It should be noted that Valley Water has implemented many changes to reservoir operations, monitoring and permit compliance, geomorphic functions, and fish passage impediments since the FAHCE process was initiated in 1996. These changes align with the objectives of the Settlement Agreement and, in some cases, resulted in early implementation of elements identified in the Settlement Agreement and improved baseline conditions for fisheries.

1.2.2 Evolution of FAHCE Environmental Impact Report

As mentioned previously, the FAHCE Settlement Agreement addressed improvements to fish habitat in three watersheds: Coyote Creek, Stevens Creek, and Guadalupe River. In 2015, Valley Water published a Notice of Preparation (NOP) for a single EIR that would analyze impacts of Settlement Agreement implementation in all three watersheds, and Valley Water began preparation of a Draft FHRP and Draft EIR that covered all three watersheds.

In 2019, however, Valley Water decided it would be more appropriate and efficient to move CEQA review of the Coyote Creek watershed Phase 1 FAHCE measures to the Anderson Dam Seismic Retrofit Project (ADSRP) EIR. This was decided primarily because ADSRP post-construction reservoir operations would be based on the Anderson Reservoir FAHCE rule curves, and the ADSRP conservation measures would include Coyote Creek Phase 1 non-flow measures.

Therefore, Valley Water's CEQA review of the FAHCE Settlement Agreement measures is now planned to occur in two EIRs: this Stevens Creek and Guadalupe River FAHCE EIR and the ADSRP EIR. This approach is consistent with CEQA requirements to avoid "piecemealing" because (1) the Coyote Creek watershed is physically separated and isolated from the Stevens Creek and Guadalupe River watersheds and (2) the Coyote Creek and Stevens Creek and Guadalupe River FAHCE measures have independent utility, in that the Coyote Creek measures could be implemented even if the Stevens Creek and Guadalupe River measures were not, and vice versa.

That being said, for ease of future FAHCE implementation, Valley Water has decided to retain a single FHRP that includes a common adaptive management framework for all three watersheds. The ADSRP EIR will evaluate impacts of the FAHCE Coyote Creek Phase 1 measures and their monitoring, maintenance, and potential adaptive actions. In contrast to the FAHCE EIR, the ADSRP EIR will analyze Coyote Creek non-flow measures at a greater level of detail. It should be noted that while all three watersheds are included in the FHRP, none of the Coyote Creek Phase 1 measures would be implemented before the ADSRP EIR is certified and the ADSRP is approved.

1.2.3 Water Rights

Valley Water holds 10 water right licenses for water diversions in the Stevens Creek and Guadalupe River watersheds; each license allows diversions for irrigation and domestic uses, currently identified as the purpose of use for these Valley Water facilities.

Valley Water is proposing changes to all of its currently held water rights in the Project area as part of the Proposed Project. The proposed water rights changes are intended to resolve the complaint filed by GCRCD before the SWRCB and are dependent on Valley Water's implementation of the measures defined in the Settlement Agreement and included in the FHRP. Valley Water's water rights petitions are concurrently being reviewed by the SWRCB, and acceptance of the changes is required to implement the FHRP; likewise, the Settlement Agreement assumes the SWRCB's approval of the proposed changes to these water rights. Table 1.2-1 summarizes existing and proposed uses for each of Valley Water's Stevens Creek and Guadalupe River water rights.

Table 1.2-1. Summary of Proposed Water Right Amendments

Watershed	Valley Water Facility and License Number	Water Source	Existing Purpose of Use	Proposed Purpose of Use
Stevens Creek	Stevens Creek Reservoir 2207	Stevens Creek	Domestic and irrigation	Municipal, fish and wildlife preservation and enhancement
Guadalupe River	Alamitos Percolation Ponds 6943	Guadalupe Creek	Domestic and irrigation	Municipal, fish and wildlife preservation and enhancement
Guadalupe River	Guadalupe Reservoir 2206	Guadalupe Creek	Domestic and irrigation	Municipal, fish and wildlife preservation and enhancement
Guadalupe River	Masson Dam 2837	Guadalupe Creek	Domestic and irrigation	Municipal, fish and wildlife preservation and enhancement
Guadalupe River	Almaden Reservoir 2205	Alamitos Creek	Domestic and irrigation	Municipal, fish and wildlife preservation and enhancement
Guadalupe River	Almaden-Calero Canal 2209	Alamitos Creek	Domestic and irrigation	Municipal, fish and wildlife preservation and enhancement
Guadalupe River	Calero Reservoir 2208	Calero Creek	Domestic and irrigation	Municipal, fish and wildlife preservation and enhancement
Guadalupe River	Kirk Dam 11791	Los Gatos Creek	Domestic and irrigation	Municipal, fish and wildlife preservation and enhancement
Guadalupe River	Vasona Reservoir 6944	Los Gatos Creek	Domestic and irrigation	Municipal, fish and wildlife preservation and enhancement
Guadalupe River	Lexington Reservoir 5729	Los Gatos Creek	Domestic and irrigation	Municipal, fish and wildlife preservation and enhancement

In addition to requesting that Valley Water's water right licenses be amended to add purposes of use (see Table 1.2-1), Valley Water's water rights applications also request minor changes in points of diversions to reflect existing practices. In Application 5653 (Alamitos Percolation Ponds), Valley Water is requesting that the point of diversions for License 6943 be changed to reflect actual (existing) points of diversions and storage.

Because approving the amendments is a discretionary action, the SWRCB as a responsible agency would rely on this EIR for CEQA compliance before approving the water rights amendments. This Stevens Creek and Guadalupe River FAHCE EIR will provide CEQA compliance for SWCRB's approval of Valley Water's water rights Petitions for Change that are needed to implement the FAHCE measures in these two watersheds.

The ADSRP EIR will provide CEQA compliance for SWCRB's approval of Valley Water's water rights Petitions for Change in the Coyote Creek watershed that are needed to implement the FAHCE Coyote Creek Settlement Agreement measures.

1.2.4 Purpose and Content of Fish Habitat Restoration Plan

The FHRP addresses the issues raised in the original water rights complaint, including all Phase 1 measures described for the Stevens Creek, Guadalupe River, and Coyote Creek watersheds in the FAHCE Settlement Agreement, and sets forth an AMP for these watersheds. The measures included in the FHRP, when they are finalized, would be incorporated into the 15 SWRCB-issued water rights amendments. These amendments would modify Valley Water's water right licenses in the three watersheds and help resolve the water rights complaint. By implementing the FHRP, Valley Water would be carrying out its obligations under the FAHCE Settlement Agreement.

Because implementation of the FHRP is required once Valley Water's water right licenses are amended, Valley Water would be in violation of its amended water right licenses unless it performs the measures defined in the FHRP. If necessary, federal permitting may occur after required state permits, but prior to implementation of any FHRP measures that require federal permits or authorizations for implementation. More specifically, once these water right licenses are amended, distributing, recharging, and using water diverted from the watersheds would be contingent on the implementation of the prescribed measures laid out in the FHRP.

Valley Water developed the FHRP to expand on how it would implement the provisions outlined in the Settlement Agreement. The FHRP implementation includes up to four phases considered in an adaptive management framework, consistent with the terms of the Settlement Agreement.

Phase 1 consists of implementing measures included in the FHRP specific to reservoir re-operation rule curves ("flow measures" and "non-flow" measures) that support fish passage, spawning and rearing habitat, and hydrologic enhancements. Phase 1 would be implemented over a 10-year term, and performance would be monitored through the AMP. Upon the expiration of the 10-year period, Valley Water would evaluate monitoring data to determine whether management objectives are being met. If management objectives are not being met, Valley Water would implement Phase 2 for a 10-year period, potentially followed by Phase 3. If during any 10-year program evaluation Valley Water determines that management objectives are being met, the AMP would transition to Phase 4. Phase 4 would be a continued implementation of the preceding phase where management objectives are being met. For a more detailed discussion of implementation phasing, see Section 2.6, *Adaptive Management Program*, and the Draft FHRP in Appendix A.

1.3 California Environmental Quality Act Compliance

1.3.1 Overview

Valley Water is the lead agency under CEQA because it is the public agency proposing to approve and carry out the FHRP. SWRCB, CDFW, and the San Francisco Bay Regional Water Quality Control Board (RWQCB) are considered responsible agencies under CEQA because they have discretionary approval over some aspect of the Proposed Project and would use this EIR for their CEQA compliance.

CEQA's primary purposes (CEQA Guidelines Section 15002) are to:

- ensure that the significant environmental effects of proposed activities are disclosed to decision-makers and the public;
- identify ways to avoid or reduce environmental damage; prevent environmental damage by requiring implementation of feasible alternatives; and avoid, minimize, reduce, and/or compensate for environmental impacts through implementation of mitigation measures;
- disclose the reasons for agency approval of projects with significant environmental effects;
- foster multidisciplinary interagency coordination in the review of projects; and
- allow for public participation in the planning process.

As described in the CEQA Guidelines Section 15121(a), an EIR is a public information document that assesses potential environmental effects of a proposed project and identifies mitigation measures and alternatives to the project that could reduce or avoid adverse environmental impacts.

1.3.2 Scope of This Program Environmental Impact Report

This EIR is a Program EIR that also provides project-level CEQA compliance for some project components. According to the CEQA Guidelines [Section 15168(a)], a lead agency should prepare a Program EIR when it proposes:

- a series of related actions that are linked geographically;
- logical parts of a chain of contemplated events, rules, regulations, or plans that govern the conduct of a continuing program; or
- individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects that can be mitigated in similar ways.

A Program EIR "may be prepared on a series of actions that can be characterized as one large project and are related ... in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program" [CEQA Guidelines Section 15168(a)(3)].

The Proposed Project for this EIR is the implementation of the FAHCE FHRP Phase 1 measures in the Stevens Creek and Guadalupe River watersheds, adaptive management of Phase 1 measures through the FHRP AMP, and amendments to associated Valley Water water rights. The EIR presents different levels of analysis for different FHRP measures, as discussed in Section 3.1.4. It presents a detailed "project-level" analysis of flow measures because sufficient formation is available about the characteristics, timing, and locations of these measures. It presents a more general "programmatic" analysis of non-flow measures, for which detailed information on the characteristics, timing, and/or locations of these measures was not available at the time of EIR preparation. Some non-flow measures can be identified by specific action and location, such as fish passage barrier remediation. For these measures, the EIR provides a more detailed analysis of impacts.

Other non-flow measures require the preparation of a plan or study to evaluate the feasibility of potential actions to address environmental concerns. Since these plans or studies do not, in and of themselves, create a physical change in the environment and the actions to be included in the plan or study are unknown, the EIR does not analyze impacts of future plans and studies because they are speculative. Any proposed projects arising from these plans or studies would be required to comply with CEQA and would be analyzed separately.

The FAHCE AMP is included in the EIR project description, and the Draft EIR generally evaluates the impacts of foreseeable Phase 1 monitoring, maintenance, and adaptive actions for Stevens Creek and Guadalupe River Phase 1 measures that would be part of AMP implementation. Future activities as defined by Valley Water and the adaptive management team (AMT) through the monitoring of the FHRP Phase 1 measures would be examined in light of this EIR to determine whether an additional environmental document must be prepared [CEQA Guidelines Section 15168(c) and (d)]. If no new effects would occur or no new mitigation measures would be required, Valley Water may approve the future activity as being within the scope of the Project covered by this EIR, and no new environmental document would be required. If a future activity would have effects that were not examined in this EIR, Valley Water would prepare appropriate CEQA documentation, depending on the nature of the environmental impacts.

Phase 2 and 3 measures, if determined to be necessary to meet Settlement Agreement management objectives (Section 2.3, *Project Objectives*), may require additional CEQA review prior to implementation. The Draft EIR does not evaluate the impacts of potential FAHCE Phase 2 and Phase 3 additional measures because these measures are not currently known, nor are they reasonably foreseeable. Phase 4 is a perpetual phase that could directly follow Phase 1, 2, or 3 depending on when the management objectives are found to be met. Phase 4 would include monitoring Valley Water facilities and the continuation of the AMP. Phase 4 measures following Phases 1, 2 or 3 may also require additional CEQA environmental review prior to implementation.

1.4 Required Permits, Approvals, Environmental Reviews, and Consultations

As the lead agency, Valley Water will rely on the information in this EIR for its Board of Directors to decide whether to approve the Proposed Project.

This EIR would be used by local and state agencies that would also make a decision to approve aspects of the Proposed Project. As potential Responsible Agencies for implementation of the Project, these agencies and their potential approvals include:

- The County, which would approve access to work and recreation facilities for non-flow measures.
- Bay Area Air Quality Management District (BAAQMD), which may issue Authorities to Construct and Permits to Operate stationary source equipment for non-flow measures.
- SWRCB, which would approve the amendments to Valley Water's 10 water rights.
- CDFW, which would issue Lake and Streambed Alteration Agreements (LSAAs) and provide California Endangered Species Act (CESA) Section 2081 authorization for incidental take for non-flow measures. Incidental take is currently authorized by the Valley Habitat Plan (VHP) for terrestrial species within VHP boundaries (which include a large portion of the Guadalupe River watershed); incidental take permits maybe required for terrestrial species outside VHP boundaries.

- San Francisco Bay RWQCB, which may issue a water quality certification or waste discharge requirements for non-flow measures involving discharges of dredged or fill material to waters of the state, including waters of the United States.

Federal agencies that would authorize components of the Project may also use information from this EIR to support their decision-making. In making their decisions, federal agencies would also comply with applicable environmental review and consultation requirements under NEPA, Section 404 of the Clean Water Act (CWA), Section 7 of the ESA, and Section 106 of the National Historic Preservation Act (NHPA). These federal agencies and their potential approvals include:

- **CWA**: U.S. Army Corps of Engineers (USACE), which for non-flow measures would issue Section 404 permits for the discharge of dredged or fill materials to waters of the United States. In order to issue a permit, USACE would need to comply with Section 7 of the ESA and Section 106 of the NHPA.
- **ESA**: For measures likely to adversely affect fish or wildlife species listed for protection under the ESA, take authorization under the ESA could be issued by either USFWS or NMFS, depending on the listed species, under Sections 7 or 10. Under formal Section 7 consultation, USFWS or NMFS would provide a biological opinion and incidental take statement to the consulting federal agency, also issuing a permit for measures likely to adversely affect a listed species. For measures likely to adversely affect listed species that do not require approval of any federal agency other than USFWS or NMFS, USFWS or NMFS would issue an incidental take permit under ESA Section 10(a)(1)(A) if take could result from scientific study or monitoring or recovery efforts. USFWS or NMFS could also authorize take incidental to otherwise lawful activities and approve a habitat conservation plan (HCP) under ESA Section 10(a)(1)(B). Incidental take for terrestrial species within VHP boundaries is authorized by the VHP for certain flow and non-flow measures upon applicant satisfaction of VHP conditions.
- **NHPA**: Federal agency issuance of a permit or authorization for any measures likely to adversely affect historic or cultural resources would also require compliance with Section 106 of the NHPA.

Table 1.4-1 summarizes the potential approvals for each local, state, and federal agency. This EIR has been prepared to provide information that each agency can use during its environmental review and/or consultation process prior to its approval decision.

Table 1.4-1. Applicable Agency Permits and Reviews Potentially Required

Agency Type	Agency	Permit or Approval
Local	Santa Clara County	▪ Approval from the Parks and Recreation Department for access to parks and recreation facilities
Regional	BAAQMD	▪ Authority to Construct and Permit to Operate stationary source equipment
State	CDFW	▪ California Fish and Game Code, Section 1601 – LSAA ▪ CESA – Authorization for incidental take
State	SWRCB	▪ Water Rights Amendments
State	San Francisco Bay RWQCB	▪ CWA, Section 401 Water Quality Certification ▪ Waste Discharge Requirements
Federal	USACE	▪ CWA, Section 404 permit
Federal	USFWS	▪ Federal ESA – Authorization under ESA Sections 7 or 10
Federal	NMFS	▪ Federal ESA – Authorization under ESA Sections 7 or 10

1.5 Selected Other Valley Water Projects (Not Part of Proposed Project)

Valley Water is undertaking several programs in the Stevens Creek and Guadalupe River watersheds that are not part of the Proposed Project but may affect related resources or have similar objectives, but retain independent utility. As such, these are noted when relevant to the impact analysis and will be addressed, as appropriate, in the analysis of cumulative effects. These related programs are listed in Table 1.5-1, with a more detailed description and analysis included in Section 5.5, *Approach to Cumulative Impacts Analysis*, which also identifies additional Valley Water programs and projects not included Table 1.5-1.

Table 1.5-1. Selected Other Valley Water Projects

Valley Water Program	Brief Description	Linkage to FAHCE
Seismic Retrofit Projects	The following projects are in progress to protect the facilities against potential earthquakes: ▪ Guadalupe Reservoir Retrofit Project ▪ Calero Dam Seismic Retrofit Project	Because of current storage restrictions, the proposed reservoir release rule curves cannot be implemented until after the seismic retrofit projects are completed.
Almaden Lake Improvement Project	The Almaden Lake Improvement Project would separate the creek from the lake by constructing a new levee in a north-to-south direction through the lake. Restoring the creek channel section means Alamitos Creek can flow directly into the Guadalupe River as it once did prior to the breaching of the gravel quarry pits. Natural creek features, such as riffles, pools, and runs, would be returned to improve passage for native fish to the upper watershed. Riparian habitat would also be returned to improve the wildlife corridor with its numerous ancillary benefits to a creek system.	The Almaden Lake Improvement Project is a Settlement Agreement Phase 1 measure ("Plan for Almaden Lake") and, therefore, part of FAHCE, but with independent utility. This project was identified by Valley Water as a candidate for early implementation to improve habitat conditions for fish in the Project area.[a]
FAHCE-plus Flow Pilot Project	This 2-year pilot project, developed in consultation with the FAHCE Technical Work Group (TWG), began on October 15, 2020, to implement the FAHCE-plus rule curves (see Chapter 4, *Alternatives*) on the Guadalupe and Stevens Creek reservoirs to test the efficacy of these rule curves. The pilot project also includes monitoring flows and water temperature within the cold water management zones (CWMZs) on Guadalupe Creek and Stevens Creek, as described in the Settlement Agreement.	This pilot project is an initial test requested by the Initialing Parties to provide early data regarding the effectiveness of the FAHCE-plus rule curves, an alternative to the Proposed Project.
Almaden Dam Improvement Project	This project would modify or construct a new intake structure, reconfigure the spillway, and improve aging hydraulic lines, valves, and energy dissipaters.	Because of current storage restrictions, the proposed reservoir release rule curves cannot be implemented until after this project is completed.
Dam Safety Program	The program identifies activities to be carried out in a series of 5-year work plans. The work includes regulatory compliance, for example, complying with a permit with CDFW and the San Francisco Bay and Central Coast RWQCBs, and a take authorization for protected terrestrial species under the Santa Clara VHP.	Maintains dam structures and facilities to ensure functions and operation that will be necessary to implement the Proposed Project flow measures.

Valley Water Program	Brief Description	Linkage to FAHCE
Stream Maintenance Program (SMP)	The SMP performs sediment removal, bank protection, vegetation management, and other routine maintenance activities throughout the county, including the Three Creeks. Although the primary work season is from June 15 through October 15, some stream maintenance activities can occur year-round in reaches where Valley Water holds fee title or easement.	SMP work is conducted routinely in channels where the Proposed Project would be implemented.
Safe, Clean Water and Natural Flood Protection Program	The Safe, Clean Water and Natural Flood Protection Program provides grant and partnership funds for water quality and habitat improvements projects. Examples include: ▪ Creek/Lake Separation: To provide fish passages in local creeks, the effort included planning and design of two creek/lake separations and construction of one creek/lake separation project in partnership with local agencies. ▪ Large Woody Debris and Gravel Augmentation: This effort includes planning studies for major steelhead streams to identify priority locations for installing large woody debris (LWD) and gravel at a minimum of five sites (one for each of the five major watersheds). As part of this program, Valley Water, working with the City of San José, removes illegal encampments on Valley Water-owned property to reduce damage to riparian habitat, reduce trash entering the waterway, and improve water quality.	The Proposed Project includes removal of specific fish passage barriers to be remediated and efforts to continue removing barriers not specifically identified. It also includes placement of spawning gravel and large organic debris.
Guadalupe River Flood Protection Project	This flood protection project constructed improvements along the Guadalupe River extending from Airport Boulevard to Interstate 280 (I-280). Improvements include channel widening, construction of floodwalls and levees, replacement of road crossings, and planting of streamside vegetation on Guadalupe River and Guadalupe Creek.	The project addresses barriers to fish migration identified in the Settlement Agreement and defines monitoring and remediation protocols to ensure fish passage through the Project area.
Upper Guadalupe River Flood Protection Project	This flood protection project is to plan, design, and construct improvements along 5.5 miles of channel extending from I-280 to Blossom Hill Road. Improvements include channel widening, construction of floodwalls and levees, replacement of road crossings, and planting of streamside vegetation. Planned mitigation measures would extend fish access to an additional 12 miles of habitat within and upstream of the project reach.	The project addresses barriers to fish migration identified in the Settlement Agreement and defines monitoring and remediation protocols to ensure fish passage through the Project area.

[a] https://fta.valleywater.org/dl/9cHagn7nt0/ (Valley Water 2021a)

1.6 Agency Coordination and the Public Involvement Process

1.6.1 Agency Coordination

A number of agencies or entities have been involved in developing the FAHCE Settlement Agreement and FHRP:

- **Technical Advisory Committee and FAHCE Consensus Committee**. In response to the water rights complaint, as introduced in Section 1.2, *Overview of Valley Water's Water Resources Management*, the FAHCE relied on a Technical Advisory Committee, which included Valley Water staff, technical consultants, technical representatives from the Initialing Parties, and a FAHCE Consensus Committee, which was a policy group with an objective of establishing foundational principles for the FAHCE. These groups were intended as interim committees to set the management goals for FAHCE and develop a team to carry efforts forward (the TWG). The committee goals were reached in 2003 with the initialing of the Settlement Agreement.
- **Initialing Parties**. The Initialing Parties originally consisted of CDFW, NMFS, USFWS, GCRCD, Trout Unlimited, Pacific Coast Federation of Fishermen's Associations, Northern California Council of Federation of Fly Fishers, Urban Creeks Council, and California Trout, Inc.
- **TWG**. The TWG, which has been advising Valley Water on development of the Draft FHRP, includes technical representatives from most of the parties above, as well as the RWQCB and Stockholm Environment Institute (SEI) and HDR, as Valley Water consultants.
- **AMT**. The AMT, consisting of a single representative from each of the Initialing Parties, was convened on October 29, 2020. The AMT will review and consent to all of the plans, studies, reports, and other measures required by the Settlement Agreement.

1.6.2 Agency and Stakeholder Engagement Process

Valley Water has conducted periodic meetings with various stakeholders outside the formal CEQA scoping process:

- FAHCE updates have been provided to the Valley Water Board and various Board committees over the years.
- Valley Water has participated in several other interim stakeholder briefings to discuss the status and progression of modeling used to evaluate fisheries impacts.
- In 2015, Valley Water began a series of technical meetings with the TWG to solicit input regarding refinements to the modeling approaches and to discuss preliminary modeling results.
- The TWG has held over 30 technical meetings since November 2015 with the objective of providing technical insight for developing and implementing the modeling work plan and fisheries evaluation framework to support CEQA analysis.
- Valley Water held 18 meetings with the Initialing Parties and others during EIR preparation to provide updates on EIR progress, and key approaches and findings of the fisheries evaluations.
- In October 2020, the FAHCE AMT was established and started meeting to discuss the AMP, including the monitoring program.
- In December 2020, the Valley Water Board established a Stewardship Planning and Operations Committee, which started public meetings on January 14, 2021. The Committee tracks progress on FAHCE Settlement Agreement implementation.

In addition to meetings, Valley Water has posted materials related to the FAHCE program website for easy access by the public.

1.6.3 California Environmental Quality Act Scoping Process

Scoping refers to the public outreach process used in CEQA processes to solicit feedback on the scope of an EIR and the initial CEQA planning process. The scoping comment period offers an important opportunity for public review and comment in the early phases of a project. The scoping process for an EIR is initiated by publication of the NOP to provide formal notice to the public and to interested agencies and organizations that the lead agency is preparing a draft EIR. The purpose of the NOP is to notify the public, responsible agencies, and trustee agencies of the intent to prepare an EIR and to solicit feedback as to the scope and content of the environmental information to be included in the environmental review (CEQA Guidelines Section 15375). During the scoping period, agencies and the public are invited to comment on the project, the approach to environmental analysis, and any issues of concern. Appendix C, *Stakeholder Engagement*, includes a copy of the NOP.[5]

1.6.3.1 Notice of Preparation Comments

Valley Water circulated an NOP for the Proposed Project on February 2 through March 3, 2015. The NOP identified Valley Water as the lead agency for the Proposed Project and was circulated to the public; the Governor's Office of Planning and Research; responsible, trustee, and other relevant local, state, and federal agencies; and other interested parties of the public. The State Clearinghouse Number for the Proposed Project is 2015022008.

Valley Water received six comment letters in response to the NOP from the following organizations:

- CDFW, dated March 3, 2015
- Santa Clara County Parks and Recreation Department (SCCPRD), dated March 5, 2015
- NMFS, dated March 5, 2015, and March 12, 2015 (two letters)
- Sierra Club Loma Prieta Chapter, dated March 2, 2015
- Water and Power Law Group PC, dated March 16, 2015

1.6.3.2 Scoping Meeting

To provide an opportunity for additional public input on the scope and content to be addressed in the EIR, Valley Water held a scoping meeting on June 19, 2017, from 4 to 6 p.m. The meeting location was the Valley Water Board Room at 5700 Almaden Expressway in San José. During the scoping meeting, presentation boards were displayed. Throughout the scoping meeting, discussions with meeting attendees were documented. A total of 17 comments were received related to clarifications pertaining to the Project definition, agency coordination, suggested areas for inclusion within the scope of analysis, and technical areas to consider in the impact analysis. Appendix C includes a scoping report that summarizes comments received in response to the 2015 NOP and at the 2017 scoping meeting.

[5] As noted in Section 1.2.2, since circulation of the NOP, which stated that the FAHCE EIR would include implementation of the proposed FHRP and water rights modifications within Stevens Creek, Guadalupe River, and Coyote Creek, Valley Water decided it would be more efficient to move the analysis of the Coyote Creek watershed Phase 1 FAHCE measures to the ADSRP EIR.

1.6.4 Tribal Consultation

Assembly Bill (AB) 52, passed in 2014, requires formal consultation with Native American tribes during the CEQA process for projects that have an NOP filed on or after July 1, 2015. Formal consultation under AB 52 is not required for this EIR because the NOP was filed on February 2, 2015; however, notification letters were provided to tribal representatives (Appendix C, *Stakeholder Engagement*). No tribal responses were received. AB 52 tribal notification would be completed, as appropriate, for any project-level CEQA analysis following this program-level EIR.

1.6.5 Draft Environmental Impact Report Comment Period

Valley Water has issued a Notice of Availability to provide agencies and the public with formal notification that the Draft EIR is available for review and comment. Copies of the Draft EIR and selected appendices are available at the following website: www.valleywater.org/FAHCE. The Draft EIR and all appendices are available at the following locations:

- Valley Water, 5750 Almaden Expressway, San José, CA 95118
- Evergreen Branch Library, 2635 Aborn Road, San José, CA 95121
- Los Gatos Library, 100 Villa Avenue, Los Gatos, CA 95030
- Cupertino Library, 10800 Torre Avenue, Cupertino, CA 95014
- Milpitas Library, 60 North Main Street, Milpitas, CA 95035
- Morgan Hill Library, 660 West Main Avenue, Morgan Hill, CA 95037

Valley Water is circulating this Draft EIR for a 45-day public review and comment period and will host a public hearing during this period. The purpose of public circulation and the public hearing is to provide agencies and interested individuals with opportunities to comment on the contents of the Draft EIR.

Written comments or questions concerning this Draft EIR should be mailed or emailed during this review period and should be directed to the name and address listed below. Please submit your response at the earliest possible date, but no later than 45 days from release of the Draft EIR (June 30, 2021).

Ryan Heacock, Senior Water Resources Specialist
Operations and Maintenance Environmental Support Unit, Santa Clara Valley Water District
5750 Almaden Expressway
San José, CA 95118-3686
(408) 265-2600
FAHCE@valleywater.org

Written comments received on the Draft EIR will be addressed in the Final EIR.

1.7 Areas of Known Controversy

CEQA Guidelines Section 15123 states that an EIR must identify areas of known controversy that might have been raised by other agencies, the public, or other stakeholders. Areas of communicated controversy related to the Proposed Project or EIR identified in the EIR scoping process include, but are not limited to, the following:

- effects of Proposed Project on Valley Water's water supply reliability
- schedule for implementing Proposed Project measures
- degree to which the Proposed Project would achieve the habitat conditions necessary to restore and maintain anadromous salmonid fisheries

- content of monitoring program and AMP included in the FHRP
- relationship of Proposed Project to Alamitos Drop Structure impacts
- range of alternatives evaluated in the Draft EIR

1.8 Issues To Be Resolved

CEQA Guidelines Section 15123 calls for the lead agency to include issues to be resolved, including the choice among alternatives and whether or how to mitigate significant effects. Issues to be resolved related to the Proposed Project or EIR include, but are not limited to, the following:

- commitment and timing for implementing barrier remediation projects for non-Valley Water facilities owned by others
- choice among alternatives as it pertains to the commitments set forth in the Settlement Agreement
- selection of mitigation measures for implementation
- need for additional Phase 2 and 3 measures to restore fish habitat

1.9 Organization of This Draft Environmental Impact Report

This Draft EIR contains the following components:

- **Executive Summary**. A summary is provided at the beginning of this document to present an overview of the Proposed Project, a description of the Project alternatives, and a summary of environmental impacts and mitigation measures
- **Chapter 1, *Introduction***. This chapter provides background information on the FAHCE and describes the development of the FHRP. This chapter also defines the scope of analysis and intent of the EIR, including what decisions are to be made based on this environmental review.
- **Chapter 2, *Project Description***. This chapter describes the Project area and the Proposed Project that is evaluated in this EIR.

  Chapter 3, *Environmental Setting and Impact Analysis*. This chapter describes existing environmental conditions and the impacts of the Proposed Project on resources in the Project area (defined in Section 2.2, *Proposed Project Area*).
- **Chapter 4, *Alternatives***. This chapter describes the process through which alternatives to the Proposed Project were developed and screened, identifies alternatives that were considered but dismissed from further evaluation, summarizes the environmental impacts associated with alternatives evaluated in this EIR, and identifies the environmentally superior alternative.
- **Chapter 5, *Other Statutory Considerations***. This chapter addresses the irreversible environmental changes and significant and unavoidable impacts resulting from the Proposed Project, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative; evaluates the growth-inducing potential of the Proposed Project and each action alternative; and evaluates the Proposed Project and each action alternative's contributions to cumulative impacts.
- **Chapter 6, *List of Preparers*.** This chapter lists the individuals involved in preparing this Draft EIR and their responsibilities.
- **Chapter 7, *References Cited*.** This chapter lists the references cited in the text of this Draft EIR.

- ***Appendices:***
  - Appendix A – Draft Fish Habitat Restoration Plan (hard-copy bound)
  - Appendix B – Settlement Agreement (hard-copy bound)
  - Appendix C – Stakeholder Engagement (hard-copy bound)
  - Appendix D – District Best Management Practices (hard-copy bound)
  - Appendix E – General Conditions of the Valley Habitat Plan Applicable to FAHCE FHRP (hard-copy bound)
  - Appendix F – Initial Study (hard-copy bound)
  - Appendix G – Valley Water Daily WEAP Model Technical Memorandum
  - Appendix H – Methods for Establishing Reaches of Interest and Points of Interest Technical Memorandum
  - Appendix I – Temperature Modeling Technical Memorandum
  - Appendix J – White Paper on Work Flow of the HEC-RAS Cross Section Analysis
  - Appendix K – Fisheries and Aquatic Habitat Technical Memorandum
  - Appendix L – Proposed Petitions to Change Water Rights
  - Appendix M – Water Supply Technical Memorandum
  - Appendix N – Fisheries Habitat Availability Estimation Methodology
  - Appendix O – Use of Habitat Data in Support of CEQA Analysis for FAHCE Fish Habitat Restoration Plan
  - Appendix P – Terrestrial Biological Resources Technical Memorandum
  - Appendix Q – CalEEMod Air Quality Modeling

Chapter 2 – Project Description

2 Project Description

While Chapter 1 introduces the FAHCE and FHRP and the intended uses of the EIR, Chapter 2 describes the Proposed Project. Specifically, the Proposed Project for this EIR consists of implementation of the FAHCE FHRP Phase 1 measures in the Stevens Creek and Guadalupe River watersheds, adaptive management of Phase 1 measures through the FHRP AMP, and amendments to associated Valley Water water rights.

Chapter 2 introduces the Project location and general environmental conditions that contributed to the development of the Project objectives. The Proposed Project measures are then summarized to introduce the concepts of reservoir re-operation rule curves and proposed measures to support fish passage, spawning and rearing habitat, and hydrologic enhancements to meet Proposed Project objectives. Finally, Chapter 2 discusses the specific activities proposed under the Proposed Project Phase 1 measures that are evaluated either at a project or programmatic level in this EIR.

2.1 Project Location and General Environmental Conditions

The Project area, as it pertains to the EIR analysis, includes portions of two watersheds, including mainstem tributaries and Valley Water's water supply facilities, as discussed in Section 1.1, *Geographic Area Overview*, where Valley Water holds corresponding water rights licenses. Both watersheds are located in Santa Clara County, and each watershed ultimately drains to the south region of the San Francisco Bay (south bay), as shown in Figure 1.2-1. The Project area is located on land owned by Valley Water, the County, the Cities,[1] and various private parties.

According to the Santa Clara County *General Plan* Land Use Plan Map and the Santa Clara County *Zoning Atlas*, the Project area is predominantly located in an area designated and zoned as Urban Service Area (Santa Clara County 2016a, 2016b). California Government Code Section 56080 defines an Urban Service Area as "developed, undeveloped, or agricultural land, either incorporated or unincorporated, within the sphere of influence of a city, which is served by urban facilities, utilities, and services or which are proposed to be served during the first five years of an adopted capital improvement program of the city if the city adopts that type of program for those facilities, utilities, and services" (Santa Clara County 1994). Given the importance of the Guadalupe Reservoir and its watershed lands to the region's water supply system, these areas have been designated as Areas of Critical Environmental Concern by state law, as described in the Santa Clara County *General Plan* (Santa Clara County 1994). Spans of the Stevens Creek and Guadalupe River watersheds are also located within and adjacent to areas zoned as HS: Hillside, R1: One-Family Residence, and AR: Agricultural Ranchlands (Santa Clara County 2003, 2016b). Land use designations, including Hillsides, Other Public Lands, Existing Regional Parks, and Rural Residential Areas, are located outside of the Urban Service Area boundary and surround the Project area to the north, east, south, and west (Santa Clara County 2016a). No changes to these surrounding or downstream land uses are proposed.

The Stevens Creek and Guadalupe River watershed systems, including the Guadalupe River, Guadalupe Creek, Alamitos Creek, Los Gatos Creek, and Calero Creek, have been identified as habitat for ESA-listed CCC steelhead (*Oncorhynchus mykiss*; federal threatened). Additionally, Central Valley fall-run Chinook salmon (*Oncorhynchus tshawytscha*; federal species of concern and state species of special concern [SSC]) may use reaches of the Guadalupe River watersheds, as discussed in Section 3.7, *Aquatic Biological Resources*.

[1] Cities of San José, Mountain View, Sunnyvale, Cupertino, Campbell, Los Altos, Los Gatos, and Santa Clara

2.2 Proposed Project Area

The Project area is defined to be the reservoirs, creeks, and rivers where the Proposed Project would be implemented, together with immediately adjacent areas. In the Stevens Creek watershed, all Proposed Project activities would occur within Stevens Creek at or below Stevens Creek Reservoir. In the Guadalupe River watershed, all Proposed Project activities would occur in Alamitos, Calero, Guadalupe, and Los Gatos Creeks, and the Guadalupe River, at or below their five respective reservoirs. The Project area extends from the Valley Water dams to the tidally influenced areas of Stevens Creek and Guadalupe River; the Proposed Project and alternatives would not substantially affect aquatic habitat conditions in the tidally influenced and estuarine reaches because of the dominant influence of tidal conditions on habitat in these areas, both historically and under existing conditions. The Project area is, therefore, smaller than the entire Stevens Creek and Guadalupe River watersheds.

An overview of the geographic extent of the two Project area watersheds and a summary of existing Valley Water operations in the Project area are provided below. Chapter 3, *Environmental Setting and Impact Analysis*, identifies resource-specific study areas where the impacts from the Proposed Project could occur. In some cases, these study areas may be different than the Proposed Project area.

2.2.1 Stevens Creek Watershed

The 29-square-mile Stevens Creek watershed originates near Skyline Boulevard and Page Mill Road in the Santa Cruz Mountains (Figure 2.2-1). Several small ephemeral and perennial drainages feed into the creek upstream of the Stevens Creek Reservoir, which is managed by Valley Water. Heney Creek joins Stevens Creek downstream of the reservoir and north of I-280. During rainfall events, flows from Permanente Creek, which is west of Stevens Creek, were historically diverted to Stevens Creek through the Permanente Creek Diversion. However, during recent years, the diversion has not been reliably operational, resulting in all of Permanente Creek's flow being diverted to Stevens Creek. Valley Water has been conducting maintenance on the diversion to ensure the appropriate amount of water is diverted to Stevens Creek, which is anticipated to be completed in summer 2021. Stevens Creek discharges to the south bay near the city of Mountain View.

Stevens Creek Reservoir and Dam is one of six original systems approved for construction by voters in 1934. It was completed in 1935. In 1985, an additional 231,000 cubic yards of material was added to the dam, raising it 10 feet. The reservoir capacity is 3,138 AF of water. Its surface area is 92 acres (Valley Water 2018a). In addition to Stevens Creek Reservoir and Dam, Valley Water operates the West Pipeline, which can be used to provide imported water to the stream through the Stevens Creek turnout near the Highway 85 bridge. Stevens Creek does not have any instream diversion facilities. As described above, all Proposed Project activities would occur within Stevens Creek, at or below Stevens Creek Reservoir, and extending downstream of the Stevens Creek Dam and upstream of the tidally influenced section of the creek (approximately midway between Highway 101 and the Crittenden Lane pedestrian bridge). As such, this focused area defines the Proposed Project area for the Stevens Creek watershed.

2.2.2 Guadalupe River Watershed

The 59,000-acre Guadalupe River watershed is east of the Stevens Creek watershed (Figure 2.2-2). The river has three major tributaries: Alamitos, Guadalupe, and Los Gatos Creeks. The Guadalupe River watershed originates on the west side of the county in the Santa Cruz Mountains. Ultimately, the Guadalupe River discharges to the south bay through Alviso Slough in the community of Alviso, which is part of the city of San José. The present-day hydrology of the Guadalupe River watershed has been substantially influenced by Valley Water's water supply operations and urbanization of the Santa

Clara Valley floor, both of which have altered the hydrology of the creek systems over time. Upper watershed reservoirs capture rainfall runoff during the winter and store the water for use in the dry summer months.

Primary features in the Guadalupe River Watershed include:

- **Alamitos Creek**, which is the easternmost tributary, begins in the Santa Cruz Mountains and crosses the lower-elevation foothills before reaching the Santa Clara Valley floor. Almaden Reservoir is located on Alamitos Creek in the upper watershed. Below the Almaden Reservoir Dam, Alamitos Creek passes through Almaden Lake, then joins Guadalupe Creek to form the Guadalupe River.
- **Calero Creek** (also known as Arroyo Calero) is a tributary of Alamitos Creek and supplies water to Calero Reservoir. Downstream of Calero Reservoir, Calero Creek flows northwest to its confluence with Alamitos Creek.
- **Almaden Calero Canal** connects Almaden and Calero Reservoirs. Water is transferred from Almaden Reservoir to Calero Reservoir during winter when storage in Almaden Reservoir is high enough to facilitate operation of the canal, according to the water rights for this facility.
- **Guadalupe Creek** also originates in the Santa Cruz Mountains. Guadalupe Reservoir is located on Guadalupe Creek in a narrow, northwest-trending valley. Water released from the reservoir maintains stream habitat downstream in Guadalupe Creek to the confluence with Alamitos Creek, where they form the Guadalupe River.
- **Los Gatos Creek**, which is the westernmost tributary, begins in the Santa Cruz Mountains. Its waters form Vasona Reservoir and Lexington Reservoir, and Lake Elsman, a reservoir owned by the San José Water Company (SJWC). Historically, in the late-1800s and early-1900s, the lower part of Los Gatos Creek was a braided stream entering a marsh area at its confluence with the Guadalupe River, but it has been modified over time and is now a defined channel. These channel modifications, which include a series of diversion ditches and offstream percolation ponds, enhance the creek's ability to protect against floods and function as a water supply facility.
- The **Guadalupe River** mainstem begins at the confluence of Guadalupe and Alamitos Creeks approximately 400 feet downstream of Almaden Lake and flows north for 14 miles through heavily urbanized portions of San José before discharging to the south bay. In addition to the three major tributaries (that is, Alamitos, Guadalupe, and Los Gatos Creeks), the mainstem also intersects Ross and Canoas Creeks, which are trapezoidal channels with earthen and concrete sections throughout that do not provide anadromous fish habitat.

As described above, all Proposed Project activities would occur within the five specific waterways in the Guadalupe River watershed: Alamitos Creek, Guadalupe Creek, Calero Creek, Los Gatos Creek, and the Guadalupe River. All Proposed Project activities would occur at or below the associated reservoirs, extending below the associated dams and upstream of the tidally influenced section of Guadalupe River (approximately located at the pedestrian bridge downstream of the Montague Expressway). As such, this focused area defines the Proposed Project area for the Guadalupe River watershed.

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Figure 2.2-1. Stevens Creek Watershed and Project Area

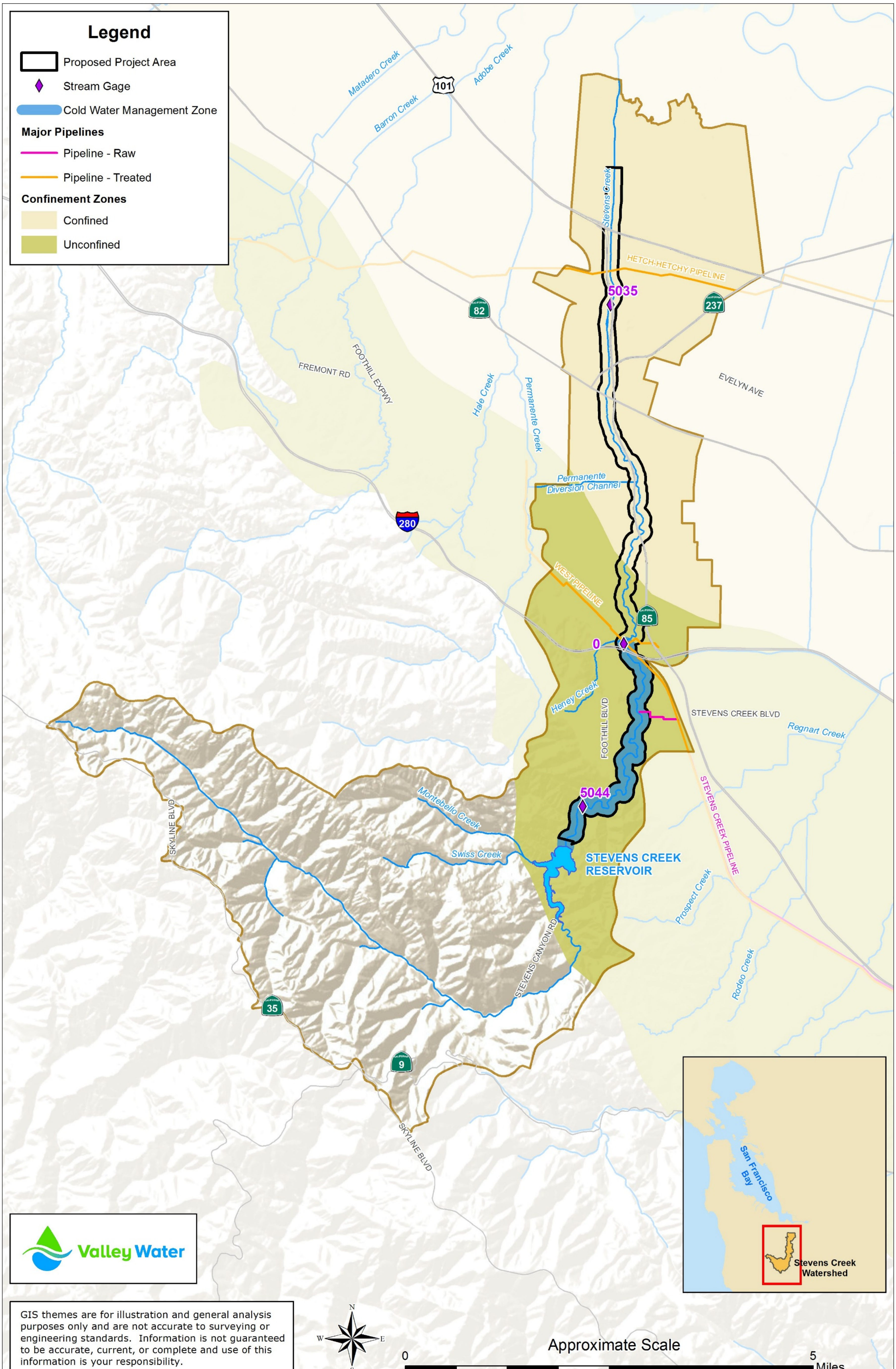
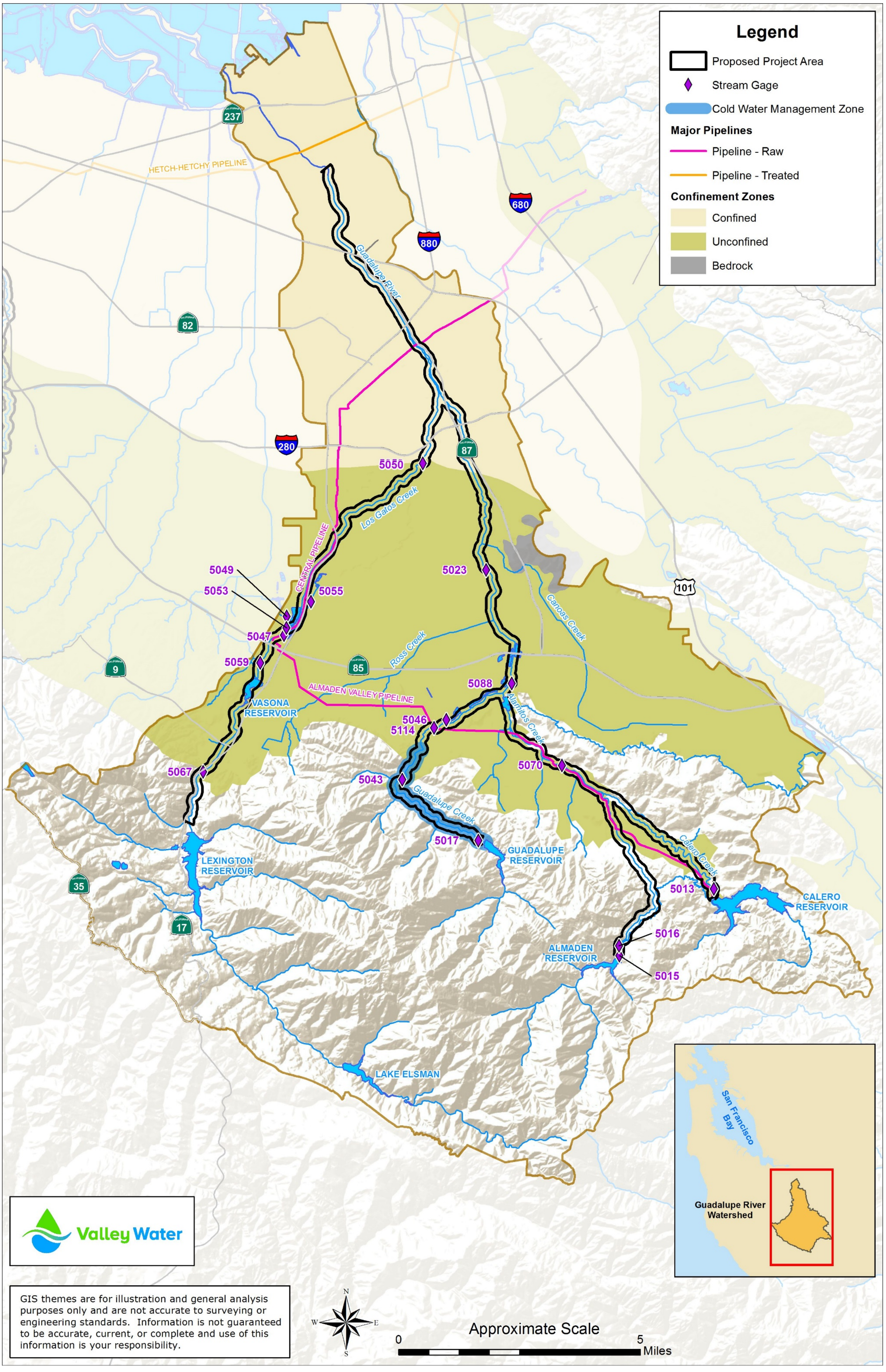


Figure 2.2-2. Guadalupe River Watershed and Project Area



2.2.3 Existing Reservoir Recharge Operations

Project area reservoirs are managed to maximize groundwater recharge. Table 2.2-1 summarizes how local flows are captured during the diversion period up to the maximum amount appropriated under SWRCB licenses for these facilities and are released later in the water year (WY) for groundwater recharge. Outside of the diversion period, minimum releases from the outlet are equal to upstream inflow to the reservoir.

Table 2.2-1. Reservoir Licenses, Appropriations, and Diversion Periods

Valley Water Facility/ Water Source	License No. License Date	Appropriation (AFY)	Diversion Period
Stevens Creek Reservoir/ Stevens Creek	2207 5/7/1941	4,000	12/01 to 04/30
Guadalupe Reservoir/ Guadalupe Creek	2206 5/7/1941	3,500	12/01 to 04/30
Almaden Reservoir/ Alamitos Creek	2205 5/7/1941	2,500	12/01 to 04/30
Almaden-Calero Canal/ Alamitos Creek	2209 5/7/1941	6,000[a]	12/01 to 04/30
Calero Reservoir/ Calero Creek	2208 5/7/1941	3,500	12/01 to 04/30
Vasona Reservoir/ Los Gatos Creek	6944 7/18/1963	1,684	12/01 to 06/01
Lexington Reservoir/ Los Gatos Creek	5729 6/5/1959	30,000	11/01 to 05/15

Note: No maximum withdrawal amounts are specified for each of these reservoirs.
[a] not to exceed 100 cubic feet per second (cfs)

Water is released from the reservoirs to percolate to groundwater within the downstream stream channels, to be re-diverted downstream to offstream percolation ponds, or to provide instream flows. Releases are generally equal to recharge demand at percolation facilities, and also meet bypass flow requirements for CDFW LSAAs for instream diversions, Masson Diversion on Guadalupe Creek, Alamitos Percolation Pond Diversion on Guadalupe River, and Kirk Diversion on Los Gatos Creek, downstream of the reservoirs.

2.2.4 Substantive Changes to Valley Water Facilities and Operations Already Implemented Since Initiation of the Settlement Agreement

Within the Proposed Project area, Valley Water has implemented the following changes to reservoir operations, monitoring and permit compliance, geomorphic functions, and fish passage impediments since the FAHCE process was initiated in 1996. These changes align with the objectives of the Settlement Agreement and, in some cases, resulted in early implementation of elements identified in the Settlement Agreement. When possible, Valley Water included fish barrier remediations identified in the Settlement Agreement as components of other Valley Water projects in the same creek reach. These changes are part of the existing conditions baseline.

- A. Modification to Groundwater Recharge and Reservoir Operations:
  - Valley Water has stopped using all instream spreader dams and diversions that did not have a fish ladder or other suitable fish passage facilities. As an example, Valley Water stopped a program to use 50-plus spreader dams throughout the County.
  - At the three instream diversion facilities, Alamitos Percolation Pond on Guadalupe River (fish ladder), Masson Diversion on Guadalupe Creek (fish ladder), and Kirk Diversion on Los Gatos Creek (bladder dam, no fish ladder due to downstream fish barriers), the following operational changes have been implemented:
    - Fish screens at all diversions to offstream facilities have been installed.
    - Flow rates are ramped when removing the temporary instream dams.
    - Bypass, diversion limits, and downstream flows are required in accordance with CDFW LSAAs for each facility.
    - Fish ladders are monitored regularly in accordance with LSAA requirements.
    - Maintenance activities are restricted to 50 feet upstream and 50 feet downstream at the dams in accordance with LSAAs of operation and maintenance of these facilities.
  - Coordination with CDFW and NMFS is occurring during drought and other low-flow conditions, or any time conditions of Valley Water's LSAAs cannot be met.
  - Flood rule curves have been followed to comply with internal operating guidelines, and pulse flows from reservoirs have been released at the request of and in coordination with CDFW and NMFS during below-average rainfall years.
  - The reservoirs have been operated under the revised DSOD capacity restrictions, which limit reservoir storage until safety upgrades have been implemented at specific dams.
- B. Monitoring and Permit Compliance Updates:
  - CDFW is notified when flashboard dams are installed or removed and required CDFW fees for routine maintenance activities are paid by Valley Water.
  - Preconstruction biological surveys have been conducted for flashboard dam installations and removals to ensure no impacts on fish and wildlife.
  - Monitoring for flow and turbidity has been increased during maintenance activities and removal/installation of the flashboards.
  - Annual compliance reports on all instream diversion dam and fish ladder operations are provided to CDFW by May of each calendar year. Valley Water's SMP conducts inspections, maintenance, and reporting on all other fish ladders within the Project area that are not associated with water diversions.
  - Additional stream gages and alert connectivity at stream gages, and two fish counter devices, have been installed in the overall FAHCE area.
- C. Geomorphic Functions Enhancements:
  - Geomorphic conditions have been enhanced and restored at Stevens Creek, including implementation of one geomorphic pilot project specified in the Settlement Agreement.
- D. Fish Passage Improvements:
  - Ten of the eighteen Valley Water priority fish passage barriers identified in the Settlement Agreement have been remediated (and, as a result, are not included in Proposed Project measures to be implemented), including:
    - Stream Gage 35 Remediation (Stevens Creek – Barrier)
    - Evelyn Fish Ladder Remediation (Stevens Creek – Barrier)
    - Alamitos Drop Structure (Guadalupe River – Barrier)

    - St. John Street Gage Weir (Guadalupe River – Barrier)
- Four of the nine priority fish barriers owned by others and identified in the Settlement Agreement have been remediated (and, as a result, are not included in Proposed Project measures to be implemented):
    - Blackberry Farms Road Crossing (Stevens Creek – Barrier – City of Cupertino – owner)
    - Blackberry Farms Irrigation Diversion (Stevens Creek – Barrier – City of Cupertino – owner)
    - Hillsdale Avenue Bridge (Guadalupe River – Barrier – City of San José – owner)
    - SJWC Low-flow Crossing (Guadalupe River – Barrier – SJWC – owner)

2.3 Project Objectives

The FAHCE Settlement Agreement management objectives (Section 6.2.2; Appendix B) provided guidance to Valley Water for framing the Proposed Project objectives. As the underlying Project purpose, implementation of the Settlement Agreement measures is intended to:

> … restore and maintain healthy steelhead trout and salmon populations as appropriate to each of the Three Creeks by providing (A) suitable spawning and rearing habitat within each watershed, and (B) adequate passage for adult steelhead trout and salmon to reach suitable spawning and rearing habitat and for out-migration of juveniles.

"As appropriate" in the agreement means that Valley Water's implementation of restoration measures must be consistent with the purpose of the Santa Clara Valley Water District Act (District Act), including providing sufficient water for all beneficial uses in the county. The Settlement Agreement commits to a program of measures intended to restore and maintain fisheries, wildlife, water quality, and other beneficial uses of the Stevens Creek and Guadalupe River watersheds in good condition (Settlement Agreement Section 6.2.1). The Settlement Agreement (Appendix B) also provides guidance on which species are targeted for restoration in each of the watersheds; the Draft FHRP (Appendix A) was subsequently developed to provide more detail on how these measures were to be implemented and monitored, and to provide a framework for the AMP. Essentially, restoration for CCC steelhead, including re-operation rule curves at Valley Water reservoirs, would occur in both the Stevens Creek and Guadalupe River watersheds, while measures to benefit Central Valley fall-run Chinook salmon would focus on the Guadalupe River watershed.

The fundamental Project objectives are listed below and are intended to be implemented together, in a balanced manner. Project objectives 1 and 2 were established in the FAHCE Settlement Agreement and are subject to funding obligations and limitations specified in Settlement Agreement[2] Article VIII, Appendices C and D. Objective 3 is fundamental to Valley Water and consistent with the District Act.

Objective 1: Restore and maintain a healthy steelhead population in the Stevens Creek watershed by providing:

- Suitable spawning and rearing habitat below Stevens Creek Dam within a CWMZ determined on an annual basis through the development of an operations plan (Settlement Agreement Section 6.5.1.1).
- Adequate passage for adult steelhead to reach suitable spawning and rearing habitat and for outmigration of juveniles (Settlement Agreement Section 6.5.1.1).

[2] According to the Settlement Agreement, a maximum of $42 million will be made available by Valley Water in each of the Phases 1, 2, and 3 in accordance with the agreed-upon cost accounting methodology.

- Extended distribution of suitable habitat in Phases 2 and 3, if needed, to satisfy overall management objectives as determined through the AMP (Settlement Agreement Section 6.5.1.2 and Section 6.5.1.3).

Objective 2: Restore and maintain healthy steelhead and Chinook salmon populations in the Guadalupe River watershed by providing:

- Suitable spawning and rearing habitat for steelhead and Chinook salmon in Guadalupe Creek from below Guadalupe Dam to its confluence with the Guadalupe River (Settlement Agreement Section 6.6.1.1).
- Suitable spawning and rearing habitat for Chinook salmon below Calero and Almaden Dams to their confluence with Lake Almaden (Settlement Agreement Section 6.6.1.1).
- Suitable spawning and rearing habitat for Chinook salmon in Los Gatos Creek from Camden Avenue to its confluence with the Guadalupe River (Settlement Agreement Section 6.6.1.1).
- Adequate passage for adult steelhead and Chinook salmon to reach suitable spawning and rearing habitat and for outmigration of juveniles (Settlement Agreement Section 6.6.1.1).
- Extended distribution of suitable habitat in Phases 2 and 3, if needed, to satisfy overall management objectives as determined through the AMP (Settlement Agreement Section 6.6.1.2 and Section 6.6.1.3).

Objective 3: Maintain flexible and reliable groundwater recharge to support current and future water supply and water deliveries for municipalities, industries, agriculture, and the environment in a practical, cost-effective, and environmentally sensitive manner so that sufficient water is available for any present or future beneficial use, including, but not limited to, the acquisition, storage (including surface and underground storage), and distribution of water for irrigation, domestic, fire protection, land subsidence prevention, reduced reliance on Delta imported water supplies, municipal, commercial, industrial, and environmental purposes.

2.4 Project Components – Fish Habitat Restoration Plan Phase 1 Measures

This section introduces the reservoir re-operation rule curves, which are assessed in this EIR at a project-level review, and, more generally, the facility improvements and enhancements proposed to support fish passage, spawning and rearing habitat, and hydrologic function, which will all be assessed at a programmatic level of review.

Phase 1 of the Settlement Agreement, which constitutes those measures that would be implemented as part of the Proposed Project through the FHRP, includes the following three primary elements common to the Stevens Creek and Guadalupe River watersheds that are included in this EIR:

- reservoir re-operation rule curves for five reservoirs (project-level analysis)
- fish passage barrier remediation for remaining barriers (programmatic-level analysis)
- spawning and rearing habitat improvements (programmatic-level analysis)

A description of Project elements common to both watersheds is provided in Sections 2.4.1 (flow measures; project-level review) and 2.4.2 (non-flow measures; programmatic-level review); more detail is provided in the Draft FHRP (Appendix A). Section 2.4.3 describes the watershed-specific non-flow measures also assessed at a programmatic level of detail in this EIR. Section 2.4.4 describes the water right changes that are part of the Project. Collectively, all of the measures described in Sections 2.4.1 through 2.4.4 are included in the Proposed Project and have been developed to meet the Project objectives described in Section 2.3. Section 2.5 provides a summary table of these Proposed Project measures, by watershed.

2.4.1 Settlement Agreement Flow Measures – Reservoir Re-operation Rule Curves

The FAHCE process resulted in a series of reservoir re-operation rule curves that describe planned changes to the release of impounded water from seven Valley Water reservoirs (Stevens, Guadalupe, Almaden, Calero, Vasona, Anderson/Coyote, and Lexington) to support the life-cycle needs of steelhead and Chinook salmon, as appropriate. These rule curve parameters form a central element of the Settlement Agreement, identifying seasonal peak flows to facilitate passage of upmigrating adult steelhead and outmigrating juvenile chinook salmon and steelhead smolts, and to provide instream flows and reduce water temperatures to levels more suitable for juvenile steelhead rearing in the central coastal California region. The detailed FAHCE rule curves and flow ramping parameters are included in the Draft FHRP, *Reservoir Reoperation Rule Curves – FAHCE Settlement Agreement Appendix E*, which is provided in Appendix A.

As described in the Settlement Agreement, Article VI, Section 6.2.4.1:

> Unless modified under paragraph 6.3, SCVWD will make reservoir flood releases, fisheries passage releases, and other planned (non-emergency) operations changes using the criteria described in Appendix E [of the Settlement Agreement].

The rule curves specific to each reservoir are provided below; more discussion of the watershed-specific rule curves can be found in the Draft FHRP (Appendix A). This EIR evaluates these re-operation rule curves at a project level, using data from the hydrologic and hydraulic modeling completed in conjunction with the development of the FHRP specific to targeted fish species for both existing conditions and conditions after Project implementation.

2.4.1.1 Development Process and Intent of Rule Curves

Existing operation of each reservoir is governed by rule curves developed to achieve specific purposes (for example, water supply, flood control, and environmental flows) for that reservoir. The reservoir re-operation rule curves were developed to add operational criteria that benefit steelhead, Chinook salmon, or both, depending on watershed, by providing winter base flows, pulse flows, and summer base flows to support each life stage, as well as providing a framework for ramping flows[3] and reservoir operations under low-flow conditions. Each type of flow is briefly described below.

The rules were developed by the stakeholders (FAHCE Consensus Committee and Technical Advisory Committee, as introduced in Section 1.2.1, *FAHCE and the Settlement Agreement*), to govern a reservoir's release rate based on that reservoir's storage volume on a specific date. These graduated rule curves were calculated so that the minimum release rate for each type of release could be met in 90 percent of historic WY conditions. That is, the calculations used to determine the rule curves assumed that the reservoir storage volume would be at least that which was documented in 90 percent of all WYs on record for each reservoir. At least 30 years of historic data, of which 21 years are data used in hydrologic modeling, are available for each Valley Water-managed reservoir. This does not mean that flow management is guaranteed in 90 percent of all years; rather, the rule curves for each reservoir were developed to meet flow-based obligations consistent with 90 percent of all WYs in the current dataset. In high-precipitation years, more flows may be available for recharge, water supply, and environmental uses. In periods of extended drought, less flow may be available for recharge, water supply, and environmental uses.

[3] Ramping flows are the water required at a specific rate to meet operational demands.

2.4.1.2 Dam Safety Operations Restrictions

Dam safety operations restrictions were placed by DSOD on Almaden, Calero, and Guadalupe Reservoirs that reduce reservoir storage capacities until identified safety concerns specific to each dam have been addressed. These restrictions have resulted in the loss of over 6,600 AFY, or about a quarter of the total surface storage capacity (Table 2.4-1), as well as a substantial loss of water supply yield (Valley Water 2017a).

These Valley Water facilities with DSOD restrictions have ongoing projects that are at varying phases of study and design to address safety concerns that are currently limiting the capacity of each facility. These projects are:

- Guadalupe Reservoir Seismic Retrofit Project
- Almaden Dam Improvements Project
- Calero Reservoir Seismic Retrofit Project

These projects are currently being defined, and each will undergo separate environmental review under CEQA. The timeframe for engineering, environmental review, and implementation of each of these projects is uncertain and will be staggered. These projects are not part of the Proposed Project, and the effects of implementation of these projects is not evaluated in this EIR.

What this means for this Project is that implementation of the reservoir flow releases (such as the pulse flow releases) that make up the proposed re-operation rule curves would be limited to flow release levels that correspond to the interim restricted capacity of each facility, assuming water storage reaches that level in a given year, until each retrofit project is completed. This further means that since flow releases associated with the re-operation rule curves at these reservoirs would not occur until DSOD operational restrictions are lifted, monitoring following the implementation of Proposed Project flow measures should consider the DSOD restrictions in assessing the effectiveness of the flow measures and defining needs for future reservoir-specific adaptive management.

This EIR’s impact analyses considered both scenarios—the existing baseline condition during which water demands reflect current demographics and reservoir capacities for Almaden, Calero, and Guadalupe Reservoirs, such that reservoir capacities would be restricted at these facilities, and a future baseline, which reflects lifting of DSOD restrictions on the three facilities. Table 2.4-1 summarizes the original and present-state DSOD dam safety restriction for the Almaden, Calero, and Guadalupe Reservoirs.

Table 2.4-1. Original and Restricted Capacities of Valley Water Reservoirs

Watershed	Reservoir	Year Built	Original Capacity[a] (AF)	Restricted Capacity[b] (AF/Percentage of Original Capacity)	Cause of DSOD Dam Safety Operating Restriction
Stevens Creek	Stevens Creek	1935	3,056	Not applicable	No restriction
Guadalupe River	Almaden	1935	1,586	1,444/93%	Requires outlet and spillway upgrades
Guadalupe River	Calero	1935	9,738	4,414/46%	Requires seismic upgrades
Guadalupe River	Guadalupe	1935	3,415	2,134/65%	Requires seismic upgrades
Guadalupe River	Lexington	—	—	Not applicable	No restriction
Guadalupe River	Vasona	—	—	Not applicable	No restriction

[a] original capacity = available water storage capacity at reservoir *without* DSOD dam safety operating restrictions
[b] restricted capacity = available water storage capacity at reservoir *with* DSOD dam safety operating restrictions

2.4.1.3 Proposed Winter Base Flow Releases

Winter base flows are reservoir releases made between November 1 and April 30 to improve winter and springtime habitat for salmonids. Winter base flows, combined with flood releases and stormwater spill events, provide flow cues to immigrating salmonids. These are in addition to Valley Water's minimum bypass flow releases required by CDFW LSAAs that are required at all instream diversions below the dams to maintain a wetted channel downstream of those facilities when water is being diverted. Under the Proposed Project, winter base flows would be managed according to the reservoir rule curves displayed for each reservoir (Figure 2.4-1 through Figure 2.4-6)[4]; more detailed discussion of each of these reservoir rule curves in each watershed is included in the Draft FHRP (Appendix A). These figures provide the reservoir storage capacity and flows by month and when pulse flows are released.

The specific flow rate would depend on the reservoir storage and where that storage volume falls within the range of graduated curves. Proposed winter flow releases would not be initiated until there is adequate storage above a given curve to allow for 5 days of consecutive releases at that release rate as a measure to reduce probability of fish stranding when flows are decreased based on reduced storage. Higher reservoir storage volume allows for increased reservoir releases, up to the maximum reservoir re-operation rule curve for that reservoir; maximum flow release levels specific to each reservoir are listed in Table 2.4-1 and shown in Figure 2.4-1 through Figure 2.4-6. As reservoir storage decreases, or if storage never reaches the maximum re-operation rule curve, a reduced winter flow would be released. In dry WYs, where adequate storage above even the minimum rule curve does not allow for 5 days of consecutive releases, winter base flow releases may not occur. For any disruptions experienced at existing recreation facilities, access and use would be restored following the completion of these releases.

[4] Rule curves for the Almaden-Calero and Vasona Reservoirs were not defined in the Settlement Agreement and are, therefore, not part of this Proposed Project.

Implementation of the winter rule curves for Lexington Reservoir would be temporarily delayed because of downstream flood flow capacity on the Guadalupe River. A flood reduction rule curve with a target reservoir storage at 74 percent until April 1, increasing linearly to a full reservoir on May 1, would be applied until Lower Guadalupe flood capacity is restored.

Table 2.4-2 lists the five reservoir release locations included in the Proposed Project and information related to proposed winter base flow obligations, as identified in the 2003 Settlement Agreement (Appendix A to the Draft FHRP [Appendix A to this Draft EIR]). All winter base flow releases would be made between November 1 and April 30; the only exception is at Stevens Creek Reservoir, where winter base flow releases would occur between January 1 and April 30 given the absence of Chinook salmon in Stevens Creek. Any other restrictions specific to an individual reservoir are noted in Table 2.4-1. The Draft FHRP (Appendix A) includes further details on the proposed winter base flow release plans for each reservoir.

Table 2.4-2. Winter Base Flow Proposed Releases

Watershed	Release Reservoir and Location	Release Flow Obligation with Storage Above Maximum Rule Curve Criteria (cfs)[a]	Targeted Species[a]	Notes[a]
Stevens Creek	Stevens Creek Reservoir to Stevens Creek	0.5–16	Steelhead	None
Guadalupe River	Guadalupe Reservoir to Guadalupe Creek	0.5–11	Steelhead and Chinook salmon	None
Guadalupe River	Almaden Reservoir to Alamitos Creek	0.5–14	Steelhead and Chinook salmon	None
Guadalupe River	Calero Reservoir to Calero Creek	0.5–10	Steelhead and Chinook salmon	Imported water temporarily stored in reservoir is not included in release calculations.
Guadalupe River	Lexington and Vasona Reservoirs, or Vasona Pump Station to Los Gatos Creek	0.5–13	Steelhead and Chinook salmon	None

[a] Information provided is from 2003 Settlement Agreement, Appendix E (appendix to Draft FHRP, which is Appendix A of this Draft EIR).

Figure 2.4-1. Stevens Creek Reservoir Operation Rule Curves

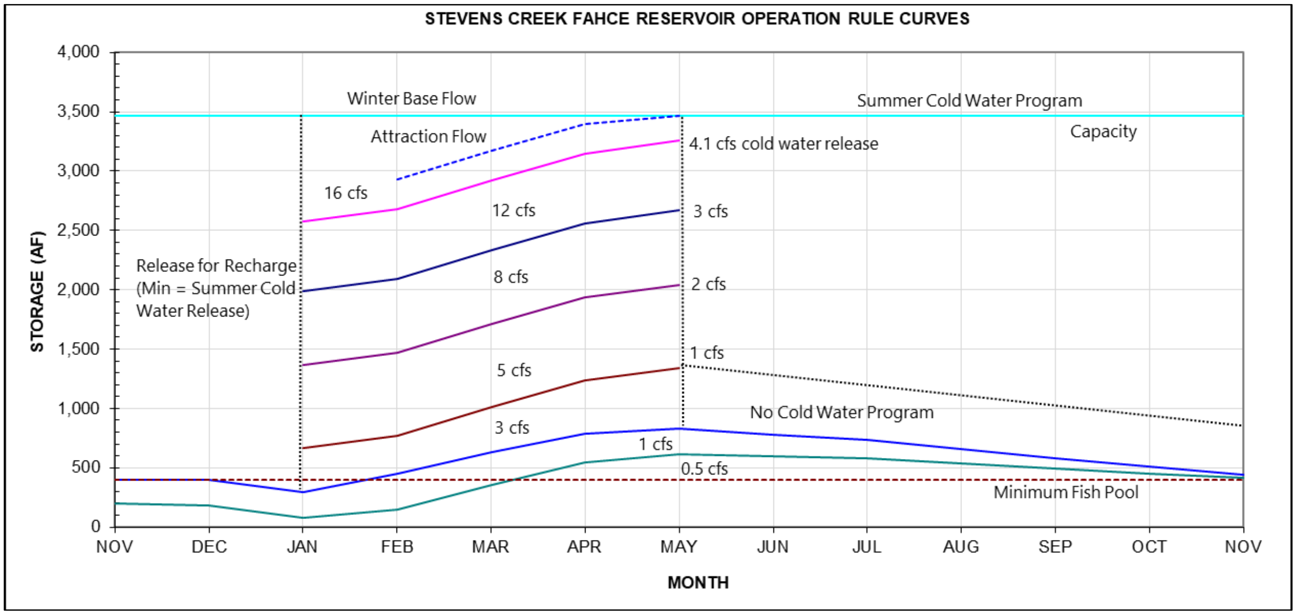


Figure 2.4-2. Guadalupe Reservoir Operation Rule Curves

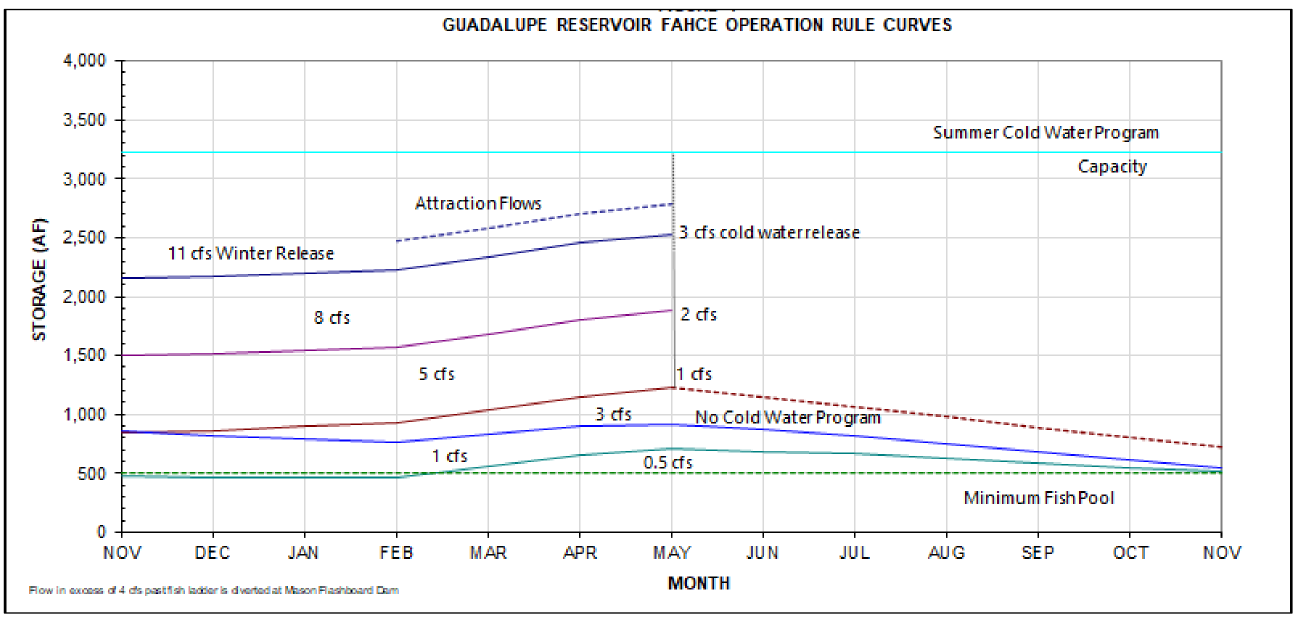


Figure 2.4-3. Almaden Reservoir Operation Rule Curves

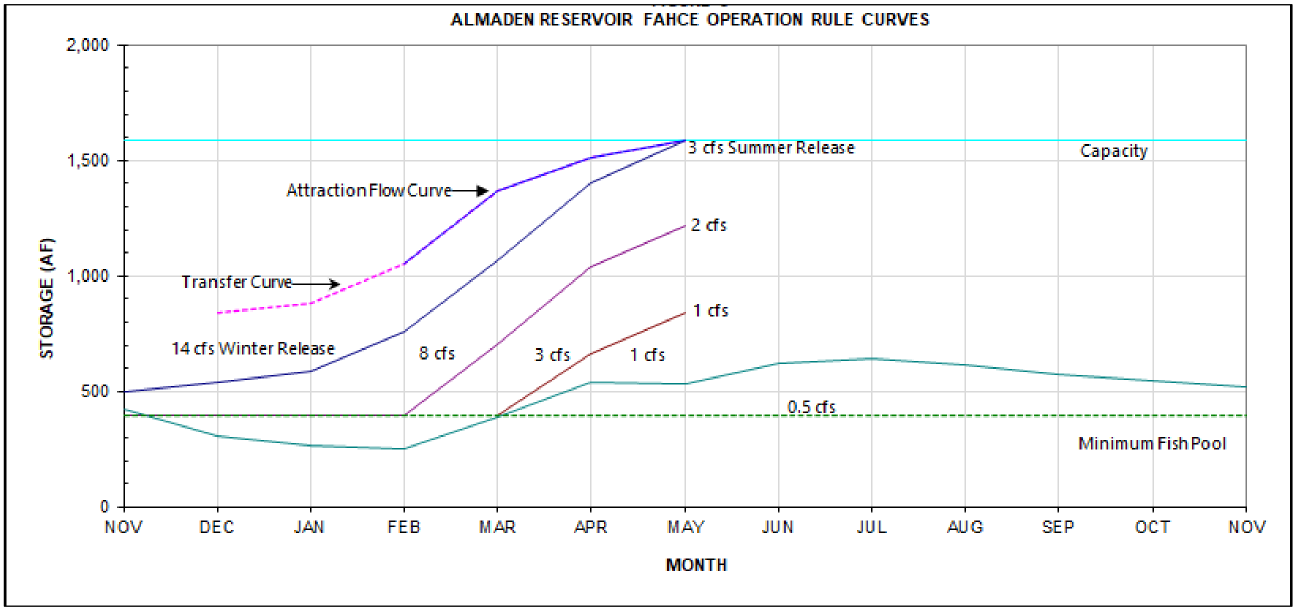


Figure 2.4-4. Calero Reservoir Operation Rule Curves

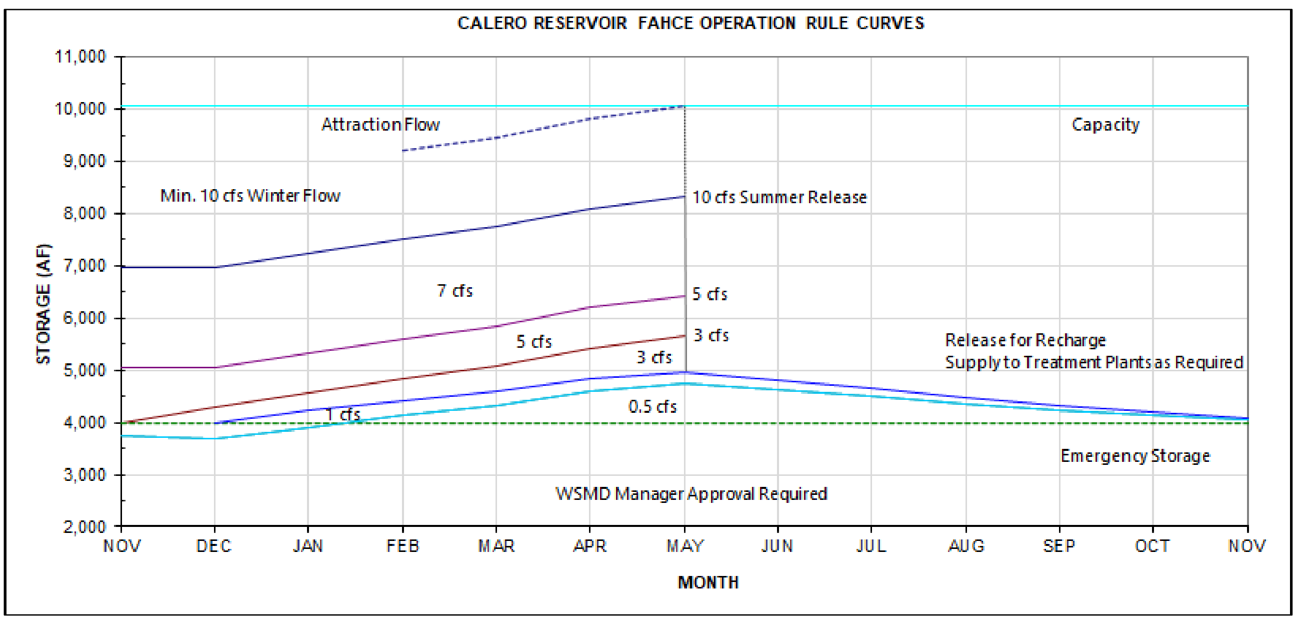
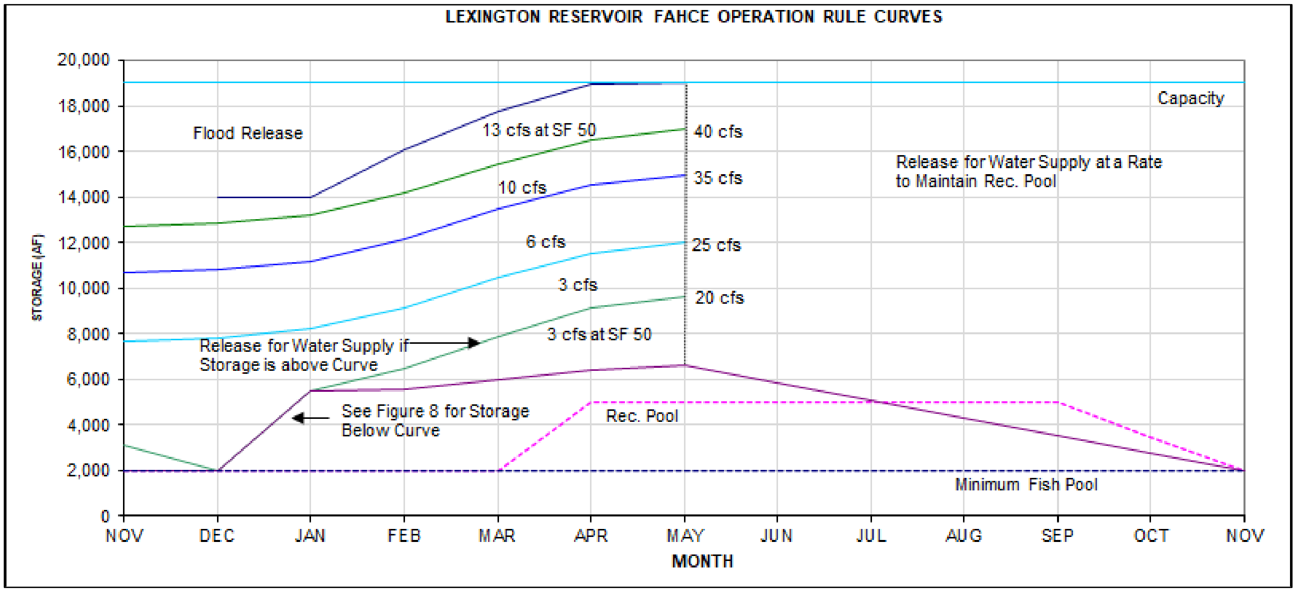
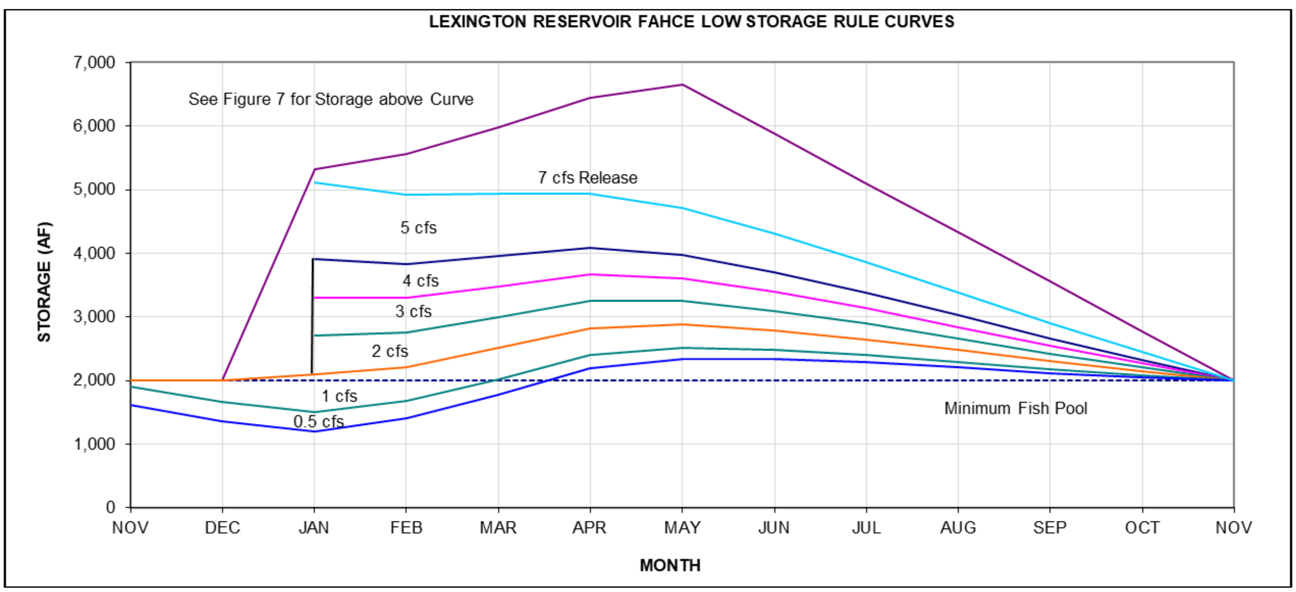


Figure 2.4-5. Lexington Reservoir Operation Rule Curves



Note: Only minimum base flows are provided in the Settlement Agreement for Lexington Reservoir. Summer releases are not required under FAHCE. Releases will be made for recharge and water supply when water capacity is above the low storage threshold.

Figure 2.4-6. Lexington Reservoir Low Storage Rule Curves



2.4.1.4 Proposed Spring Pulse Flow Releases

Valley Water proposes to implement pulse flows to improve passage conditions for migrating steelhead, Chinook salmon, or both, depending on the watershed. Pulse flows are reservoir releases of 50 cfs for a period of 5 consecutive days made between February 1 and April 30. These releases would be at the same locations as those described above for winter base flow releases, with the exception of no spring pulse flows occurring at Lexington Reservoir (Table 2.4-3) because the pulse flows would be muted prior to reaching areas where anadromous fish occur on account of flow control at Vasona Reservoir. Upstream passage for adults would be enhanced by providing a greater volume of water over potential impediments and critical riffles. These short-term pulse events would also benefit outmigrating juveniles by providing them cues for migration, encouraging them to swim downstream from the upper watershed, aiding them in their downstream migration to San Francisco Bay and ultimately to the ocean.

Pulse flow releases would be provided at all reservoirs except Lexington in accordance with reservoir re-operation rule curves (shown Figure 2.4-1 through Figure 2.4-4), and would be triggered when pulse flow targets are achieved. Such conditions are probable in average to wet WYs, or about 50 percent of the time. Pulse flows would be operated until two periods of 5 consecutive days of stream flow occur that meet or exceed 50 cfs, including those caused by flood releases and spill events, between February 1 and April 30 of any one WY. The Draft FHRP (Appendix A) includes a detailed description of the proposed pulse flow release plan for each reservoir.

2.4.1.5 Proposed Summer Base Flow Releases

Summer base flows would be made between May 1 and October 31, based on each reservoir's re-operation rule curve (Figure 2.4-1 through Figure 2.4-6) to enhance summer rearing conditions for steelhead.

Below Stevens and Guadalupe Dams, Valley Water would maintain CWMZs (Figure 2.2-1 and Figure 2.2-2) along designated lengths of stream to provide over-summer refugia for rearing steelhead based on available cold water in the reservoirs in accordance with the FAHCE Settlement Agreement. The CWMZ for Stevens Creek is approximately 3 miles long, from the base of Stevens Creek Dam downstream to I-280. The CWMZ for Guadalupe Creek is approximately 3.5 miles long, from the base of Guadalupe Dam downstream to Camden Avenue. The extent of each reservoir's CWMZ may vary by year, depending on reservoir storage volume. Proposed reservoir re-operation rule curves for these reservoirs are designed to maintain cold water storage availability for summer flow releases. Between April 15 and April 30 of each year, Valley Water would survey the Guadalupe and Stevens Creek reservoirs to determine the volume of the hypolimnion that is at or below 14 degrees Celsius[5] (°C) for Guadalupe Reservoir and 15°C at Stevens Creek Reservoir. Based on this information, Valley Water would determine the appropriate reservoir release rates to maximize the extent of the CWMZs from April 30 (when spring pulse flows end) through October 31. Additional reservoir temperature profiles would be made monthly from June through October to aid in determining cold water releases. Releases of warmer than ideal water may need to be made in certain years to avoid dry conditions in the CWMZ.

[5] Celsius is referenced in this section to align with units of measurement used in the Settlement Agreement. For public readability, an imperial unit of Fahrenheit is used in the Project and alternative impact analyses.

Table 2.4-3. Summer Base Flow Proposed Releases

Watershed	Release Reservoir and Location	Management Zone[a]	Notes[a]
Stevens Creek	Stevens Creek Reservoir to Stevens Creek	CWMZ is in Stevens Creek from the base of Stevens Creek Dam to approximately I-280 just upstream of Heney Creek (Figure 2.2-1).	Maintain temperatures in CWMZ not to exceed 19°C, as available storage allows.
Guadalupe River	Guadalupe Reservoir to Guadalupe Creek	CWMZ is in Guadalupe Creek from the base of Guadalupe Reservoir to Camden Avenue (Figure 2.2-2).	Maintain temperatures in CWMZ not to exceed 18°C, as available storage allows.
Guadalupe River	Almaden Reservoir to Alamitos Creek	Management zone is from Almaden Dam to Lake Almaden. There is no CWMZ for Alamitos Creek.	Releases would be made to achieve a minimum pool storage in reservoir of 400 AF on December 1.
Guadalupe River	Calero Reservoir to Calero Creek	Management zone is from Calero Dam to Lake Almaden. There is no CWMZ for Calero Creek.	Releases would be made to achieve a minimum pool storage in reservoir of 4,000 AF on December 1.
Guadalupe River	Lexington or Vasona Reservoirs, or Vasona Pump Station to Los Gatos Creek	Management zone objective is from Camden Avenue drop structure to confluence with Guadalupe River. There is no CWMZ for Los Gatos Creek.	Releases would be made to maintain a recreation storage and achieve a minimum pool storage in reservoir of 2,000 AF on December 1.

[a] Information provided is from 2003 Settlement Agreement, Appendix E (appendix to Draft FHRP, which is Appendix A of this Draft EIR).

The Draft FHRP (Appendix A) includes a detailed description of the proposed summer base flow release plan for each reservoir. For any disruptions experienced at existing recreation facilities, access and use would be restored following the completion of these releases and would not result in a permanent disruption.

2.4.1.6 Proposed Flow Ramping

Flow ramping is used to manage changes in reservoir release flow volumes to minimize impacts on aquatic species. Flow ramping manages changes in the rate of water flow in a slow, stepwise fashion, helping fish and other aquatic life to avoid stranding. Ramping would occur whenever Valley Water-controlled flows from reservoirs would be increased or decreased by 50 percent or more from the existing flow condition.

Flows that are under Valley Water control would be reduced in specified increments over a specified period of time, in accordance with the discharge rating curves that would be used to determine ramping schedules at each reservoir. Ramping would be applied to reservoir releases, pulse flow releases, and controlled releases from pipelines and diversion dams. Flow ramping applies only to flows within Valley Water control; inflow to the stream from uncontrolled events such as natural runoff or reservoir spillway flows is not subject to the ramping provisions.

When ramping is needed, Valley Water has developed protocols to ramp reservoir releases, depending on whether the original flow is more or less than 50 cfs.

2.4.2 Non-flow Measures – Settlement Agreement Elements Common to All Watersheds

2.4.2.1 Proposed Fish Passage Barrier Remediation and Maintenance

Removal or replacement of major passage barriers in the Stevens Creek and Guadalupe River watersheds, combined with appropriate maintenance of remaining passage structures, is the goal of this element of the Proposed Project. In turn, these efforts would enhance fish passage to suitable spawning and rearing habitat as discussed in the next sections. The locations of these proposed barriers are known; however, although there maybe conceptual designs for some remediation projects, there is a lack of design specificity or site-specific field data. As such, these barrier remediation measures have been evaluated in this EIR at a programmatic level of detail with more project-level detail provided and evaluated as possible.

Those physical barriers to passage identified in the Settlement Agreement remaining for removal or improvement[6] are listed in Table 2.4-4 and identified as “Proposed” in Figure 2.4-7 and Figure 2.4-8. Each of these barrier remediation locations are discussed more thoroughly in the Draft FHRP (Appendix A). Specific plans and designs to address these barriers have not yet been developed. The intent of each barrier remediation design is to be self-maintaining. While there might be short-term impacts from constructing these improvements that are analyzed in this EIR, the intent of these measures is to improve fish habitat conditions over the long term. Ongoing monitoring would confirm functionality, and any subsequent maintenance would be performed consistent with Valley Water’s SMP and as part of the AMP, as described in Section 2.6, *Adaptive Management Program*. The impacts associated with this work would be analyzed on a project-by-project basis in future CEQA reviews as design documents are prepared.

Typical activities that may result in temporary impacts during construction associated with implementation of these types of projects may include, but not be limited to, traffic from hauling of heavy equipment and materials to and from the project site, pruning or removal of riparian vegetation to access the work area, channel dewatering within the limits of the active work area, dredging and removal of barrier materials, disturbance of the channel bed and bank, and closure or limited use of public trails during construction. Additionally, any work at human-made fish passage barriers would likely include concrete or asphalt demolition and removal as well as installation of new energy dissipation improvements or erosion control materials, including riprap or potentially concrete where necessary. All areas with soil not permanently affected would be revegetated with native plantings to restore their pre-project functions and values.

Instream work would be limited to the summer work season beginning June 15 and ending October 15. Flows in the two watersheds are lowest during this time, but dewatering would be necessary for most projects. Dewatering of the instream work area would consist of placing a cofferdam upstream of the work area to temporarily impound water. The impounded water would be piped around the active work area using either pumps placed in the impoundment pool or using a gravity fed inlet. The water would be released into the active channel below the Project area. Rock may be placed below the pipe outlet as an energy dissipation measure to reduce erosion of the channel bed.

[6] Some barrier remediation projects identified in the Settlement Agreement have been completed (see Appendix B of Appendix A, *Draft Fish Habitat Restoration Plan*, for a description of these completed projects).

Figure 2.4-7. Proposed Stevens Creek Barrier Remediation Measure Locations

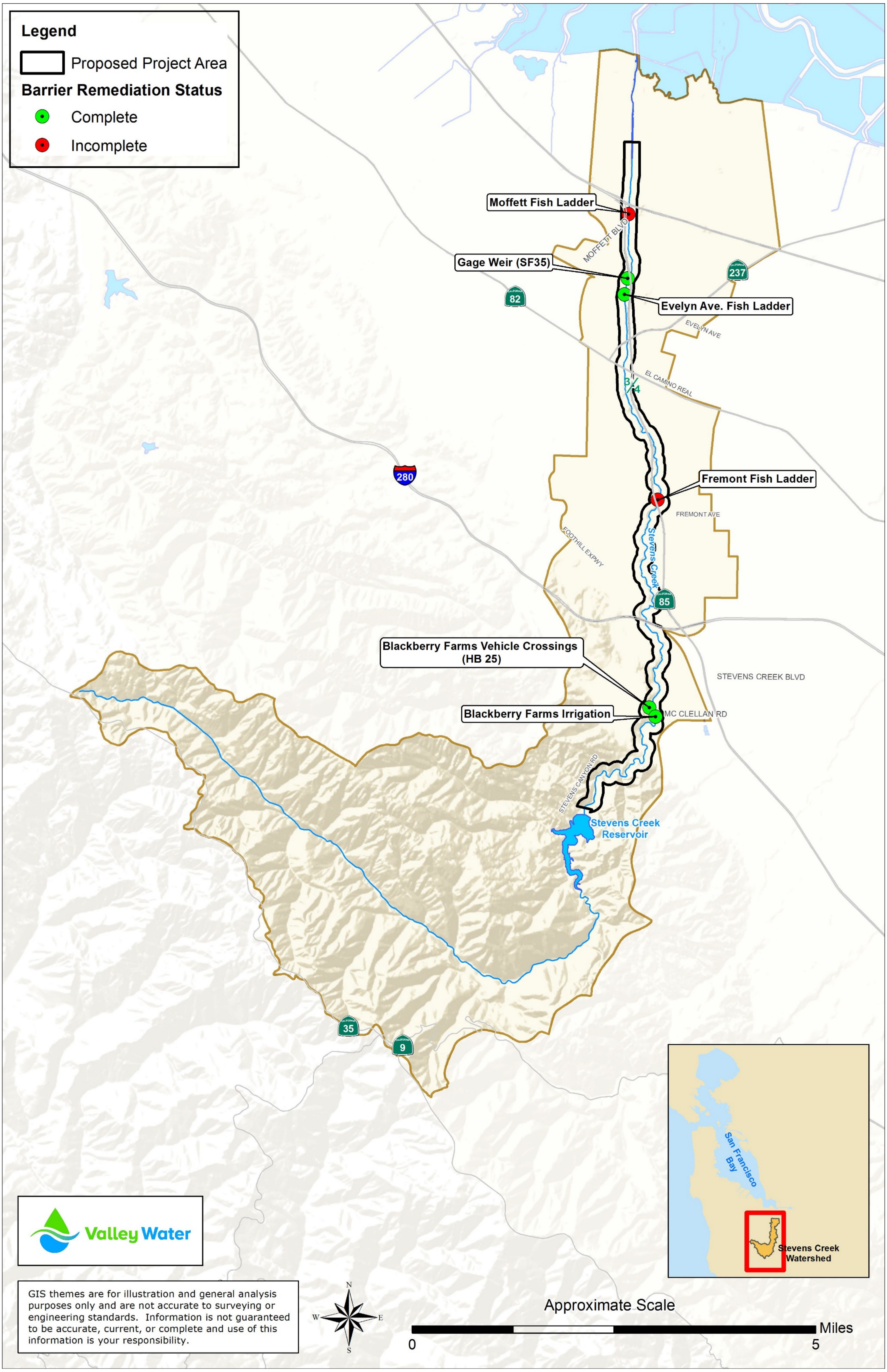
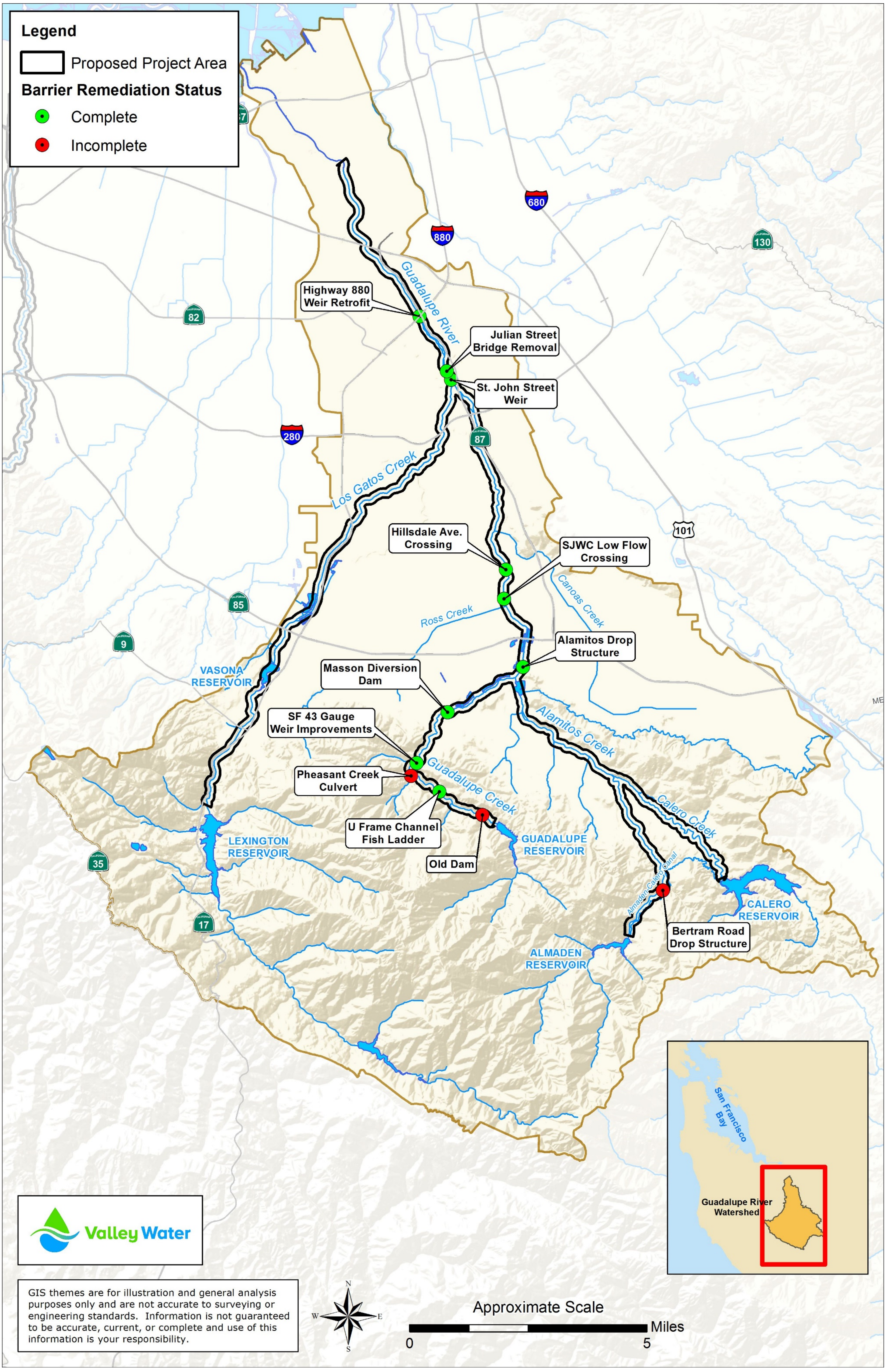


Figure 2.4-8. Proposed Guadalupe River Barrier Remediation Measure Locations



Work would typically occur during normal business hours, Monday through Friday, 7 a.m. to 5 p.m. in accordance with local ordinances. Construction crews would be sourced locally, small in size, and localized to specific work sites. Project construction activities would be completed during daylight hours and would not occur during nighttime hours except during emergency activities. Valley Water would maintain emergency access to individual work sites that are part of the Proposed Project and to adjacent areas during and following construction, and the Proposed Project would not substantially increase safety hazards.

In cases where Valley Water owns the facility, barriers would be remediated by modifying, replacing, or removing the existing barrier, and costs of remediation would be a responsibility of Valley Water. Where the facility is owned by another entity, Valley Water would make reasonable best efforts to partner with the owner of the facility to remove or remediate the fish barrier. In accordance with the Settlement Agreement Sections 6.4.2.1.2(B), 6.5.2.2(B), 6.6.2.1.2.2, and 6.6.2.1.3.2, "SCVWD will fund not more than 50 percent of the costs to remediate these passage barriers. However, SCVWD will undertake reasonable best efforts with the Parties and owners to secure the additional funds necessary to perform the remediation" (Appendix B).

Table 2.4-4. Remaining Fish Passage Barriers Identified in Settlement Agreement and Included in Fish Habitat Restoration Plan for Implementation

Watershed	Creek	Settlement Agreement Section Reference	Barrier Name	Ownership	Valley Water Role
Stevens Creek	Stevens Creek	6.5.2.2(A)	Moffett Fish Ladder	Valley Water	Lead
Stevens Creek	Stevens Creek	6.5.2.2(A)	Fremont Fish Ladder	Valley Water	Lead
Guadalupe River	Pheasant Creek	6.6.2.1.2.2	Pheasant Creek Culvert	To be determined	Reasonable best efforts to partner with owner to remediate barrier
Guadalupe River	Guadalupe Creek	6.6.2.1.2.2	Old Dam	Private	Reasonable best efforts to partner with owner to remediate barrier
Guadalupe River	Alamitos Creek	6.6.2.1.3.2	Bertram Road Drop Structure	Private	Reasonable best efforts to partner with owner to remediate barrier

2.4.2.2 Proposed Spawning and Rearing Habitat Improvements

Another proposed Phase 1 implementing measure common to both of the watersheds and identified in the FHRP focuses on improving spawning and rearing habitats. Valley Water would develop annual work plans for spawning gravel augmentation and rearing habitat enhancements for AMT review (Section 2.6.1), the first of which would be prepared following final Valley Water Board approval of the Project. Spawning habitat includes areas where eggs are deposited and fertilized, and where gravel emergence occurs. Rearing habitat is defined as areas where juvenile fish take up residence during some stage of development and utilize the area for feeding, shelter, and growth.

In cooperation with CDFW and NMFS, Valley Water developed the FHRP with a specific goal to specify techniques, locations, and implementation schedules to enhance spawning and rearing habitats for steelhead and Chinook salmon. The Proposed Project calls for developing a program for the placement of gravel to enhance existing spawning habitat. The program would include:

- identifying existing habitat that is suitable for spawning but does not contain adequate spawning gravel;
- establishing procedures to develop an annual work plan for the AMT's review; and
- Valley Water's commitment to implement the program, subject to periodic review and modification by the AMT.

Similarly, the Proposed Project calls for developing a program to enhance rearing habitat in accordance with the AMP. The program would include:

- identifying locations for appropriate placement of large organic debris, channel modifications (including berms), and riparian canopy enhancement;
- establishing procedures to develop an annual work plan for the AMT's review; and
- Valley Water's commitment to implement the program, subject to periodic review and modification by the AMT.

Ongoing evaluation of the impacts on instream habitat associated with implementation of the reservoir re-operation rule curves, along with monitoring efforts, would allow Valley Water to identify site-specific measures, locations, and timing for future spawning and rearing habitat improvements. The intent of these habitat improvements is to help meet the overall objectives of the Proposed Project.

Habitat restoration and enhancement restoration measures within the program would be implemented at those locations where the benefit to aquatic species is greatest. Restoration and enhancement activities focused on improving spawning and rearing would generally occur in the upper watershed (that is, CWMZs; Figure 2.2-1 and Figure 2.2-2). Valley Water has produced a study identifying specific potential restoration sites.[7] Valley Water would develop an annual work plan for review by the AMT. Restoration and enhancement sites included in each annual work plan would be selected based on data collected as part of the AMP monitoring. Site selection and project design would follow the methodologies and techniques of the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al. 2010).

The focus of these projects is to increase instream complexity within the Project area[8] by effectively modifying watershed hydrology and disrupting natural supply and transport of gravel, sediment, and LWD. Six representative gravel or LWD augmentation project sites have been identified, as noted on Table 2.4-5.

[7] *Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement, Santa Clara County, California*

[8] Project area waterways for spawning and rearing habitat improvements include Stevens Creek, Los Gatos Creek, Guadalupe Creek, Alamitos Creek, and Guadalupe River.

Table 2.4-5. Representative Sites Identified for Gravel and Large Woody Debris Augmentation

Waterway[a]	General Location
Stevens Creek Watershed	
Stevens Creek	In Stevens Creek County Park, just upstream and adjacent to Bay Tree Picnic Area
Guadalupe Watershed	
Guadalupe Creek 1-1	Just downstream of Guadalupe Dam and stream gage 5017
Guadalupe Creek 3-1	Near intersection of Hicks and Wagner Roads
Guadalupe River	Guadalupe River approximately 1,500 feet downstream of Alamitos Creek and Guadalupe Creek confluence, just downstream of Alamitos Percolation Pond Diversion
Los Gatos Creek 1-1	Just downstream of Camden Drop Structure, near intersection of Camden Avenue and Highway 17
Los Gatos Creek	Between Highway 17 bridge and Creekside Way bridge

[a] Watershed designations, including numbering, reference the corresponding designations in the *Countywide Gravel and Large Woody Debris Study* (Valley Water 2018b).

This EIR considers spawning and rearing habitat improvements in these six locations as representative for the program. The analysis remains at a programmatic level, and subsequent CEQA analysis may be required after further project definition.

Instream habitat enhancement projects may include, but not be limited to, installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover or velocity refuge, and placement of appropriately sized gravels within the limits of the bankfull channel (stage at which water is at the top of its banks and any further rise would result in water moving into the floodplain) to increase suitable spawning habitat. Specific methods and techniques for placement and anchoring would be made during restoration site design. Impacts associated with these restoration activities would be analyzed on a project-by-project basis in future CEQA reviews as design documents are prepared.

Instream work would be limited to the summer work season beginning June 15 and ending October 15. Flows in the Stevens Creek and Guadalupe River watersheds are lowest during this time, but dewatering would be necessary for most projects. Dewatering of the instream work area would consist of placing a cofferdam upstream of the work area to temporarily impound water. The impounded water would be piped around the active work area using either pumps placed in the impoundment pool or using a gravity fed inlet. The water would be released into the active channel below the Project area. Rock may be placed to the pipe outlet as an energy dissipation measure to reduce erosion of the channel bed.

When enhancement measures are conducted, portions of nearby trails or trail parking areas may have to be temporarily closed for the duration of the activity (from less than a day to up to several weeks, in limited instances) to maximize public safety while they are used as access corridors or staging areas for vehicles, supplies, and equipment. Work would typically occur during normal business hours, Monday through Friday, 7 a.m. to 5 p.m. in accordance with local ordinances.

2.4.2.3 Bank Stabilization Guidelines

The Proposed Project also includes developing general guidelines for bank stabilization projects undertaken by Valley Water and others. In accordance with the Settlement Agreement

Section 6.2.4.4.3, the guidelines would include techniques and strategies based on the ability of riparian vegetation to hold soil, protect banks, and otherwise stabilize the stream channel. They would also address use of structures to rebuild a streambank and offer stability until riparian vegetation is established. The bank stabilization guidelines would be completed during Phase 1. No physical changes to the environment would be caused by preparation of the bank stabilization guidelines. Impacts of guidelines implementation are too speculative to evaluate now and depend on the results of a future study. Therefore, impacts of this measure are not evaluated in this EIR because they are speculative in nature.

2.4.2.4 Completion of An Advanced Recycled and Other Urban Water Plan in Coordination with City of San José

This measure is limited to developing a plan for future water use options. The Plan would be developed during implementation of Phase 1, so details about the plan are not currently available. Therefore, impacts of this measure are not evaluated in this EIR because they are speculative in nature. No physical changes to the environment would be caused by preparation of the plan.

2.4.3 Non-flow Measures – Settlement Agreement Elements Specific to An Individual Watershed

2.4.3.1 Stevens Creek Watershed-specific Measures

Two additional measures, a portable multiport outlet proposed at the base of Stevens Creek Reservoir and a trap-and-truck feasibility study, are included in the FHRP and are discussed below.

Stevens Creek Reservoir Multiport Outlet

The FAHCE Technical Advisory Committee (Appendix B, *Settlement Agreement*) identified a limited opportunity for summer temperature management downstream of Stevens Creek Reservoir based on the relatively small storage capacity and thermal stratification of the reservoir. With a single outlet at the bottom of the reservoir (current conditions), the amount of available water to release cooler water downstream for cold-water fish such as steelhead is limited. The FAHCE Technical Advisory Committee proposed a multiport intake that draws water from multiple levels of the reservoir to allow for flow releases of cooler water from Stevens Creek Reservoir and to improve cold-water pool management in the reservoir during the summer.

In October 2009, Valley Water completed a temperature modeling study of Stevens Creek Reservoir and the downstream CWMZ to evaluate whether a multiport intake would allow for increased cool water releases from the reservoir to assist in attaining water temperature objectives in the CWMZ (Valley Water 2010a). The study found that a second intake port would allow for an increase in the flow rate of releases from the reservoir. Because the highest elevation in the reservoir that would generally remain below the thermocline through the summer is only 16 feet higher than the existing port, it was determined that a system with more than two ports would not be necessary. Based on modeling of water temperature in the reservoir and in the CWMZ, using an average year in terms of end-of-May storage (2001), a maximum of 3.5 cfs could be released from the reservoir through the summer while maintaining a 19°C or lower release temperature. Under a two-port system, a maximum total of 4 cfs could be released from the two ports while maintaining a 19°C or lower release temperature (Valley Water 2010a). Further, in the *Final Planning Study Report* dated January 2010, Valley Water found that installing an operable intake structure that draws water from the cold hypolimnion (existing lower-elevation intake) and simultaneously from the warm epilimnion (proposed upper-elevation intake) would provide the opportunity to mix the outlet blend to the managed target temperature of 19°C while preserving cold-water pool volume later in the summer (that is, during

September and October). This could provide an overall greater effective volume of water in the reservoir usable for the dual objectives of instream recharge and habitat management and would provide a buffer against abnormally warm weather (air temperature) conditions during September and October.

Based on the results of the temperature modeling completed in 2009 and the follow-up planning study of 2010 (Valley Water 2010b), implementation of this project is included as part of the Proposed Project, and impacts are evaluated at a programmatic level in this EIR because only concept-level design information is available. Construction of the portable multiport outlet would allow for increased flow releases during the summer from Stevens Creek Reservoir while facilitating instream water temperature objectives within the CWMZ, and would improve cold-water pool management in the reservoir. Performance measures for the multiport outlet would depend on how the operations of the outlet are defined, which would be carried out through the AMP. Operational rules would be defined to optimize the dual objectives of habitat management (including thermal habitat conditions) within the CWMZ and instream recharge. Performance measures for the multiport outlet would be associated with the performance measures for summer rearing flows.

Stevens Creek Reservoir Trap-and-truck Feasibility Study

The final Phase 1 measure included in the Proposed Project for this watershed is a feasibility study of trap-and-truck operations at Stevens Creek Reservoir regarding upstream and downstream migration of steelhead. The study would be designed to:

> … evaluate the suitability of spawning and rearing habitat for steelhead trout above the reservoir; the practicality of moving steelhead trout above the reservoir and achieving successful out-migration; and the potential effects of such movement on existing steelhead trout populations in Stevens Creek.

If found to be feasible in the Phase 1 study, implementation of a trap-and-truck operation at Stevens Creek could be one of the menu of additional measures available if deemed necessary through the AMP under Phase 2 or 3. Implementation of this measure, like other potential Phase 2 or 3 measures, would require additional CEQA review.

2.4.3.2 Guadalupe River Watershed-specific Measures

Under the Proposed Project, the Guadalupe River watershed-specific improvements also include two additional measures—the Alamitos Creek Facilities Plan, consisting of the Plan for Almaden Dam, and geomorphic function enhancement pilot projects.

Almaden Dam

A Plan for Almaden Dam would evaluate alternatives to:

- provide unimpeded fish passage, both upstream and downstream, at the existing dam and reservoir;
- eliminate increases to water temperature in the reservoir; and
- eliminate or minimize the methylation of mercury in the sediments behind the dam.

If a feasible alternative is identified, the plan could recommend action, including design and construction schedules for implementation of measures in future phases of adaptive management.

Preparing the Plan for Almaden Dam would not require physical changes to the environment. Recommendations arising from the study are unknown at this time and cannot be evaluated; therefore, no resource impacts were analyzed for this non-flow measure.

2.4.3.3 Geomorphic Functions Enhancement Pilot Projects

The geomorphic functions of a stream are dynamic and interrelated physical, chemical, and biological processes that create and maintain the character of a stream and its associated riparian habitat. The geomorphology of high-functioning streams supports habitat diversity, maintains channel equilibrium, and provides a sediment source and storage for riparian and aquatic habitat succession.

The Proposed Project includes preparation of a geomorphic functions study to include:

- identification of stream reaches where geomorphic functions necessary for channel maintenance or formation are impaired;
- evaluation of the feasibility of restoring geomorphic functions in those stream reaches identified as impaired; and
- development and implementation of one or more pilot projects based on the feasibility analysis noted above. The goal is a minimum of 2,000 linear feet of channel in the Guadalupe River watershed.

The geomorphic functions study and pilot projects are limited to the Guadalupe River watershed because a 2,100-linear-foot geomorphic function restoration project was already implemented in Stevens Creek in 2009. Pilot projects could include any of the following channel enhancements: modifying channel dimensions for carrying bankfull flow; varying the meander shape; planting riparian vegetation; removing culverts, riprap, and other structures; and stabilizing the area with the use of bioengineering techniques.

Geomorphic function restoration projects may occur along any major tributaries within the Guadalupe River watershed. Fish passage improvement projects may occur anywhere along the creeks and tributaries of Project area creeks. Project sites would be selected through a separate project based on data collected as part of the FAHCE FHRP monitoring. Site selection and project design would follow the methodologies and techniques of the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al. 2010).

Restoration of geomorphic function projects may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover and velocity refuge. Specific methods and techniques for placement and anchoring would be made during project design. Impacts associated with these restoration efforts would be analyzed on a project-by-project basis as design documents are prepared.

Instream work would be limited to the summer work season beginning June 15 and ending October 15. Flows in the two watersheds are lowest during this time, but dewatering would be necessary for most projects. Dewatering of the instream work area would consist of placing a cofferdam upstream of the work area to temporarily impound water. The impounded water would be piped around the active work area using either pumps placed in the impoundment pool or using a gravity fed inlet. The water would be released into the active channel below the Project area. Rock may be placed below the pipe outlet as an energy dissipation measure to reduce erosion of the channel bed.

Similar to the spawning and rearing habitat enhancement and restoration measures, when the geomorphic function enhancement measures are conducted, portions of nearby trails or trail parking areas may have to be temporarily closed for the duration of the activity (from less than a day to up to several weeks, in limited instances) to maximize public safety while they are used as access corridors or staging areas for vehicles, supplies, and equipment. Work would typically occur during normal business hours, Monday through Friday, 7 a.m. to 5 p.m. in accordance with local ordinances.

Given the preliminary stage of planning for these measures, geomorphic functions restoration is also assessed in this EIR at a programmatic level of detail and may require additional project-specific environmental review under CEQA prior to implementation. The FHRP provides guidance on developing a geomorphic functions study to better define the optimal locations and approach to these enhancements.

2.4.4 State Water Resources Control Board Water Rights Petitions for Change

In May 2015, Valley Water submitted Petitions for Change to SWRCB to address the technical aspects of the water rights subject to the Settlement Agreement. These petitions are intended to update the water rights held in the Project area in northern Santa Clara County. Technical changes include correcting the locations of points of diversion, updating maps, and changing the place of use to include the entire Valley Water service area to correctly reflect current operations. The petitions also request that Valley Water's water rights licenses be amended to add Fish and Wildlife Preservation and Enhancement as a purpose of use of the affected watersheds. The FHRP supports the petitions because it proposes modifying current operations to ensure that this beneficial use of water is achieved.

See Section 1.2.3, *Water Rights*, for a detailed description of proposed water rights amendments for the Stevens Creek and Guadalupe River watersheds included in the Proposed Project.

2.5 Summary of Proposed Project Phase 1 Measures by Watershed

Table 2.5-1 summarizes the measures proposed to occur as part of the Proposed Project and that are being evaluated in this EIR. For each measure, the table indicates potential physical changes.

Table 2.5-1. Summary of Phase 1 Measures and Anticipated Physical Changes

Waterways/ Measure Title	Flow Measure	Non-flow Measure[a]	Includes Dam Safety Operations Restrictions[b]	Potential Physical Change[c]
Common Elements				
Continuing Efforts to Improve Fish Passage – overview	N/A	X	N/A	▪ Removal or remediation of fish passage impediments ▪ Short-term disturbance to aquatic habitat, including dewatering and/or possible alteration to bed and bank of channel ▪ Short-term disturbance to adjacent terrestrial habitat including riparian vegetation removal ▪ Construction-related traffic, air emissions, and noise ▪ Possible closure or limited use of public trails needed for access ▪ Work within dry season
Spawning and Rearing Habitat Enhancement – overview (see Table 2.4-5)	N/A	X	N/A	▪ Short-term disturbance to aquatic habitat including dewatering and/or possible alteration to bed and bank of channel ▪ Short-term disturbance to adjacent terrestrial habitat ▪ Installation of approved habitat enhancement materials in channel or along bank to increase suitable spawning and rearing habitat ▪ Short-term increase in erosion and sedimentation ▪ Possible closure or limited use of public trails needed for access ▪ Importing and stockpiling new materials ▪ Noise and emissions related to small construction project ▪ Work within dry season
Bank Stabilization Guidelines[d]	N/A	X	N/A	▪ General stabilization with use of bioengineering techniques would result from guidelines implementation; however, development of the guidelines would not result in any physical change to the environment and therefore is not analyzed in this EIR.
Advanced Recycled and Other Urban Water Plan[d]	N/A	X	N/A	▪ The implementation of the plan may result in physical impacts; however, development of the plan would not result in any physical change to the environment and therefore is not analyzed in this EIR.

Waterways/ Measure Title	Flow Measure	Non-flow Measure[a]	Includes Dam Safety Operations Restrictions[b]	Potential Physical Change[c]
Stevens Creek Watershed				
Flow Releases[e] Winter base flows (November 1 – April 30): Stevens Creek Dam to Moffett Boulevard Pulse flows (February 1 – April 30) Summer flows (May 1 – October 31) Flow ramping	X	N/A	N/A	▪ Increase in streamflow in some reaches for brief periods during winter and spring pulse flows ▪ Increase in water depth (stage) in some reaches for brief periods, primarily during winter and spring due to pulse flows; no new wetted area ▪ Manage stream flow in Stevens Creek during summer to reserve cold water in reservoirs to maintain downstream CWMZ later in the season ▪ Increase in sedimentation, deposition, and/or erosion potential in some creeks ▪ Reduction in water available for groundwater recharge during summer in some reaches ▪ Generally similar or increased reservoir storage
Moffett Fish Ladder	N/A	X	N/A	▪ Removal or remediation of fish passage impediments ▪ Short-term disturbance to aquatic habitat including dewatering and/or possible alteration to bed and bank of channel ▪ Potential installation of energy dissipation or erosion control materials ▪ Short-term disturbance to adjacent terrestrial habitat including riparian vegetation removal ▪ Construction-related traffic, air emissions, and noise ▪ Possible closure or limited use of public trails needed for access ▪ Work within dry season
Fremont Fish Ladder	N/A	X	N/A	▪ Removal or remediation of fish passage impediments ▪ Short-term disturbance to aquatic habitat including dewatering and/or possible alteration to bed and bank of channel ▪ Potential installation of energy dissipation or erosion control materials ▪ Short-term disturbance to adjacent terrestrial habitat including riparian vegetation removal ▪ Construction-related traffic, air emissions, and noise ▪ Possible closure or limited use of public trails needed for access ▪ Work within dry season

Waterways/ Measure Title	Flow Measure	Non-flow Measure[a]	Includes Dam Safety Operations Restrictions[b]	Potential Physical Change[c]
Stevens Creek Portable Multiport Outlet	N/A	X	N/A	▪ Two ports would allow for an increase to a maximum total of 4 cfs while maintaining a 19°C or lower release temperature ▪ Installing an operable intake structure that draws water from the cold hypolimnion and simultaneously from the warm epilimnion would provide the opportunity to mix the outlet blend to the managed target temperature of 19°C while preserving cold-water pool volume later in the summer (that is, during September and October). ▪ Operational rules would be defined to optimize the dual objectives of habitat management (including thermal habitat conditions) within the CWMZ and instream recharge. ▪ Construction-related traffic, air emissions, and noise
Trap-and-truck Feasibility Study[d]	N/A	X	N/A	▪ None
Guadalupe Creek				
Flow Releases[e] Winter base flows (November 1 – April 30): Guadalupe Dam to Alamitos Diversion Pulse flows (February 1 – April 30) Summer flows (May 1 – October 31) Flow ramping	X	N/A	X	▪ Increase in streamflow in some reaches for brief periods, primarily during winter and spring pulse flows ▪ Increase in water depth (stage) in some reaches for brief periods primarily during winter and spring due to pulse flows; no new wetted area ▪ Manage stream flow in most of Guadalupe Creek during summer to reserve cold water in reservoirs to maintain downstream CWMZ later in the season ▪ Increase in sedimentation, deposition, and/or erosion potential in some creeks ▪ Reduction in water available for groundwater recharge during summer in some reaches ▪ Generally similar or increased reservoir storage in most reservoirs

Waterways/ Measure Title	Flow Measure	Non-flow Measure[a]	Includes Dam Safety Operations Restrictions[b]	Potential Physical Change[c]
Pheasant Creek Culvert	N/A	X	N/A	▪ Reasonable best efforts to work with barrier owner to remediate fish passage issues ▪ Improve and/or remove old culvert ▪ Install new culvert ▪ Temporary construction within creek and from bank ▪ Dewatering ▪ Potential installation of energy dissipation or erosion control materials ▪ Construction-related traffic, air emissions, and noise ▪ Vegetation removal ▪ Work within dry season
Old Dam	N/A	X	N/A	▪ Reasonable best efforts to work with barrier owner to remediate fish passage issues ▪ Temporary construction within creek and from bank ▪ Dewatering ▪ Potential installation of energy dissipation or erosion control materials ▪ Construction-related traffic, air emissions, and noise ▪ Vegetation removal ▪ Work within dry season

Waterways/ Measure Title	Flow Measure	Non-flow Measure[a]	Includes Dam Safety Operations Restrictions[b]	Potential Physical Change[c]
Geomorphic Functions Study and Pilot Projects	N/A	X	N/A	▪ Short-term disturbance to aquatic habitat including dewatering and/or possible alteration to bed and bank of channel ▪ Short-term disturbance to adjacent terrestrial habitat ▪ Modifying channel dimensions ▪ Varying the meander shape of channel ▪ Planting riparian vegetation ▪ Removing culverts, riprap, or other structures ▪ General stabilization with use of bioengineering techniques ▪ Installation of approved habitat enhancement materials in channel or along bank to provide fish cover ▪ Short-term increase in erosion and sedimentation ▪ Importing and stockpiling new materials ▪ Construction-related traffic, air emissions, and noise ▪ Work within summer months
Alamitos Creek				
Flow Releases[e] Winter base flows (November 1 – April 30): Almaden Dam to Alamitos Diversion Pulse flows (February 1 – April 30) Summer flows (May 1 – October 31) Flow ramping	X	N/A	X	▪ Increase in streamflow in some reaches for brief periods primarily during winter and spring pulse flows ▪ Increase in water depth (stage) in some reaches for brief periods primarily during winter and spring due to pulse flows; no new wetted area ▪ Increase in sedimentation, deposition, and/or erosion potential in some creeks ▪ Reduction in water available for groundwater recharge during summer in some reaches ▪ Generally similar or increased reservoir storage in most reservoirs

Waterways/ Measure Title	Flow Measure	Non-flow Measure[a]	Includes Dam Safety Operations Restrictions[b]	Potential Physical Change[c]
Bertram Road Drop Structure	N/A	X	N/A	▪ Reasonable best efforts to work with barrier owner to remediate fish passage issues ▪ Temporary construction within creek and from bank ▪ Possible dewatering ▪ Construction-related traffic, air emissions, and noise ▪ Vegetation removal ▪ Work within dry season
Plan for Almaden Dam	N/A	X	N/A	▪ None
Calero Creek				
Flow Releases[e] Winter base flows (November 1 – April 30): Calero Main Dam to Alamitos Diversion Pulse flows (February 1 – April 30) Summer flows (May 1 – October 31) Flow ramping	X	N/A	X	▪ Increase in streamflow in some reaches for brief periods primarily during winter and pulse flows ▪ Increase in water depth (stage) in some reaches for brief periods primarily during winter and spring due to pulse flows; no new wetted area ▪ Increase in sedimentation, deposition, and/or erosion potential in some creeks ▪ Reduction in water available for groundwater recharge during summer in some reaches ▪ Generally similar or increased reservoir storage in most reservoirs

Waterways/ Measure Title	Flow Measure	Non-flow Measure[a]	Includes Dam Safety Operations Restrictions[b]	Potential Physical Change[c]
Los Gatos Creek				
Flow Releases[e] Winter base flows (November 1 – April 30): Camden Drop structure to Los Gatos Creek Summer flows (May 1 – October 31)	X	N/A	N/A	▪ Increase in streamflow in some reaches for brief periods primarily during winter and pulse flows ▪ Increase in water depth (stage) in some reaches for brief periods primarily during winter and spring due to pulse flows; no new wetted area ▪ Increase in sedimentation, deposition, and/or erosion potential in some creeks ▪ Reduction in water available for groundwater recharge during summer in some reaches ▪ Generally similar or increased reservoir storage in most reservoirs

Note: N/A = not applicable
[a] Reviewed in this EIR at a programmatic level based on information available at the time of Draft EIR preparation. Additional environmental review and would be undertaken prior to implementation.
[b] These reservoirs are operated in accordance with DSOD-imposed storage restrictions, keeping water levels lower than normal to prevent overspilling until the water district assesses and conducts corrective action to restore the dam's full integrity.
[c] For non-flow measures, only potential physical changes that could cause adverse impacts are listed. Each potential physical activity would also result in environmental benefits.
[d] Noted plans and guidelines would be developed in Phase 1. Measures and activities prescribed in these plan and guidelines would be considered through the AMP.
[e] Water rights amendments must be approved by SWRCB before changed flow releases can be implemented.

2.6 Adaptive Management Program

Adaptive management is "a framework and flexible decision-making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvements in management planning and implementation of a project to achieve specified objectives" (California Water Code Section 85052). Section 7 of the Settlement Agreement stipulates that Valley Water implement specific measures contained in the Settlement Agreement "in an adaptive manner to effectively mitigate any adverse impacts on the steelhead trout and Chinook salmon fisheries and their habitat, resulting from Valley Water's water supply facilities and operations" (see Section 7.1) and "to maximize biological and physical benefits material to the Overall Management Objectives through the choice and implementation of the most cost-effective flow and non-flow measures" (see Section 7.3).

Section 7.3 of the Settlement Agreement outlines the key elements of the AMP:

> (A) Measurable objectives consistent with the Phase One, Two, and Three management objectives for the steelhead trout and salmon fisheries and their habitats in the watersheds subject to the Agreement. The measurable objectives will relate to those habitat qualities impacted by SCVWD's facilities and operations, given the Parties' recognition that SCVWD is not responsible under this Agreement for other environmental conditions that may limit the population or distribution of these fisheries. Measurable objectives will be developed for flow measures, including maintenance of suitable water temperatures for summer steelhead rearing, performance of fish passage facilities, and other non-flow measures.
>
> (B) Operation and maintenance procedures and performance standards for individual facilities to contribute to the achievement of such objectives.
>
> (C) Systematic monitoring of fish populations and actual habitat conditions affected by the measures implemented under this Agreement, to determine whether the measures are contributing to achievement of the measurable objectives. During each phase, and on the basis of these monitoring results, the AMT will also evaluate the performance of the entire program in maximizing habitat quality and availability for steelhead and salmon within the framework of this Agreement. The assessment will also evaluate the performance of the program at each phase in reducing or eliminating limiting factors affecting various life stages of steelhead and salmon directly attributable to SCVWD facilities and operations.
>
> (D) Modification of flow and non-flow measures and other requirements of paragraphs 6.2 through 6.7, as appropriate to remedy any continuing impairment of a beneficial use.

Valley Water has developed an AMP included in the FHRP that addresses its obligations as outlined in the Settlement Agreement (see Appendix A, *Draft Fish Habitat Restoration Plan*, Chapter 6). The AMP covers adaptive management of Phase 1 measures identified in Section 6 of the Settlement Agreement in the Three Creeks (Stevens Creek, Guadalupe River, and Coyote Creek). A critical component of the AMP is monitoring to determine whether the implemented flow and non-flow measures are meeting implementation objectives and measurable objectives. During subsequent evaluation of the monitoring data, Valley Water and the AMT must consider interannual and seasonal variation in hydrologic conditions and other constraints and limiting factors affecting achievement of the overall management objectives. Consistent with Article 7.3(A) of the Settlement Agreement, the measurable objectives relate to those habitat qualities affected by Valley Water's facilities and operations, given the Initialing Parties' recognition that Valley Water is not responsible for other environmental conditions that may limit the population or distribution of these fisheries.

The AMP is described in detail in Chapter 6 of the Draft FHRP (Appendix A). This section further introduces the AMT and defines its roles and responsibilities.

2.6.1 Adaptive Management Team

Section 7.2 of the 2003 Settlement Agreement stipulates Valley Water to “administer and staff an Adaptive Management Team (AMT) to assist with overseeing implementation of the fish habitat restoration effort.” The team is to consist of a representative from Valley Water, CDFW, USFWS, NMFS, and one representative of the NGOs (for example, Trout Unlimited, Pacific Coast Federation of Fishermen’s Associations, and California Trout, Inc.). Membership would be open to other interested parties with the consent of all parties. The AMT was convened on October 29, 2020.

Valley Water has designated a staff member to serve as the AMT chair who is responsible for:

- drafting and distributing a draft charter for review by the AMT;
- meeting logistics, including drafting meeting agendas, facilitating meetings, and compiling meeting notes;
- drafting annual reports;
- finalizing annual reports after incorporating comments;
- coordinating and seeking approval for items needing Valley Water Board decisions; and
- maintaining communication, including distributing annual reports, meeting notes, and documentation on dispute resolution among the AMT.

The AMT is responsible for:

- developing more detailed rules and procedures for the AMT within 60 days of its formation;
- providing comments on draft documents, including the draft AMT charter and annual reports;
- coordinating with other adaptive programs in the same watersheds, as appropriate;
- publishing and distributing the annual reports;
- collaborating with Valley Water in meetings; and
- following the established process when a dispute arises.

A key work element of the AMT is to provide input on findings and recommendations contained in an annual report prepared by Valley Water. The annual report would be water-year based (October 1 through September 30) and a draft would be provided to the AMT for review and comment by the end of the first quarter of the following year. The report would include the extent to which implemented FHRP measures met measurable objectives, findings and recommendations on how flow releases and reservoir management were executed each year, monitoring results, status of specific projects identified in the Settlement Agreement (for example, geomorphic channel restoration), water uses, and financial expenditures associated with Settlement Agreement implementation. The annual report would also include a work plan for the subsequent year and discussion of any adaptive actions for consideration by the AMT. The work plan would include actions to be continued, recommended changes to actions already contained in the Settlement Agreement or process improvements needed for effectiveness and efficiency, and responses to results of trend analysis, as appropriate. As shown below, the report would provide the information needed for the AMT’s review, input, and recommendations for adaptive management decision-making.

2.6.2 Potential Phases of Adaptive Management Program Implementation

As introduced in Section 1.2.4, Section 6 of the Settlement Agreement identifies four potential phases for implementation of the agreement, with Phases 2 and 3 being conditional. Each phase would last 10 years, which includes the period for implementing FHRP measures and monitoring the effects of those measures. Within each 10-year timeframe, Valley Water would record the monitoring results in an annual report that would be considered by Valley Water and the AMT. Interim adjustments to restoration measures could be considered by Valley Water and the AMT to better achieve desired results for each measure. The AMT would otherwise consider the 10-year dataset to evaluate the effectiveness and performance of the entire FAHCE program and determine whether additional measures are needed in a subsequent phase.

Potential actions being considered to meet measurable objectives would be screened and evaluated by the AMT through modeling, targeted studies, and/or pilot projects before permanent implementation of an adaptive management action is undertaken. The screening and evaluation process may also include separate CEQA review by Valley Water as appropriate.

2.6.2.1 Phase 1 Adaptive Management

The FHRP AMP is part of the Project, and the Draft EIR generally evaluates the impacts of foreseeable Phase 1 monitoring, maintenance, and adaptive actions for Stevens Creek and Guadalupe River Phase 1 measures that would be part of AMP implementation.

Because all Phase 1 measures for Coyote Creek are included as part of the ADSRP description, the impacts of these measures—including monitoring, maintenance, and adaptive actions—are addressed in the ADSRP EIR. In contrast to the FAHCE EIR, the ADSRP EIR would analyze Coyote Creek non-flow measures in greater detail. Monitoring, maintenance, and adaptive management for these measures would not be implemented until after the ADSRP EIR is certified and the ADSRP is approved.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting implementation objectives or measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

Phase 1 and subsequent phases of adaptive management would include maintenance and monitoring of Phase 1 barrier remediation measures, as well as maintenance and monitoring of certain barriers identified in the Settlement Agreement for which remediation is complete. Maintenance and monitoring of barrier remediation would include the development of a fish passage analysis (based on CDFW methodology) to determine whether the facility is operating as designed and can pass fish. Modifications could be made as necessary to meet operational requirements of design. The completed projects are listed in Table 2.6-1.

Table 2.6-1. Fish Passage Barriers Identified in Settlement Agreement – Remediation Complete

Watershed	Settlement Agreement Section Reference	Barrier Name	Ownership	Valley Water Role
Stevens Creek	6.5.2.2(A)	Evelyn Fish Ladder	Valley Water	Lead
Stevens Creek	6.5.2.2(A)	Stream Gage 35	Valley Water	Lead
Stevens Creek	6.5.2.2(B)	Blackberry Farms Barrier HB25	City of Cupertino	Partnered with owner to remediate barrier
Stevens Creek	6.5.2.2(B)	Blackberry Farms Barrier HB27	City of Cupertino	Partnered with owner to remediate barrier
Guadalupe River	6.6.2.1.1(A)	Alamitos Drop Structure (Barrier AB20)	Valley Water	Lead

Watershed	Settlement Agreement Section Reference	Barrier Name	Ownership	Valley Water Role
Guadalupe River	6.6.2.1.1(A)	St. John Street Gage Weir (Barrier AB7)	Valley Water	Lead
Guadalupe River	6.6.2.1.1(B)	Hillsdale Avenue Bridge (Barrier AB13)	City of San José	Partnered with owner to remediate barrier
Guadalupe River	6.6.2.1.1(B)	SJWC Low-flow Crossing (Barrier AB14)	SJWC	Partnered with owner to remediate barrier

2.6.2.2 Phase 2 and Phase 3 Adaptive Management

At the end of each phase, the AMT would evaluate the effectiveness and performance of implemented Settlement Agreement measures and determine whether Additional Measures (as described in the next paragraph) are needed. Phase 2 and 3 implementation generally would have beneficial long-term impacts on aquatic resources because Phase 2 and 3 watershed-specific management objectives would extend suitable fishery habitat beyond the Phase 1 watershed-specific management objectives, if necessary to achieve the Settlement Agreement's overall management objectives (see Settlement Agreement Sections 6.4.1, 6.5.1, and 6.6.1); these are reflected in the Proposed Project objectives. A monitoring program such as that described under Phase 1 would be conducted during subsequent phases, if necessary, and results would be considered by the AMT on an annual basis.

For Phase 2, the Settlement Agreement expressly provides that Additional Measures "will be defined" by the Phase 1 feasibility studies.[9] The Settlement Agreement presents menus of potential Additional Measures for Phase 2, but these are very generally stated (see Settlement Agreement Sections 6.4.2.2, 6.5.3, and 6.6.2.2). For Phase 3, the Settlement Agreement neither specifies how Phase 3 Additional Measures would be defined nor presents menus of potential measures.

Phase 2 and Phase 3 Additional Measures are uncertain at this juncture. Pursuant to Settlement Agreement Section 6.1.2, Valley Water would identify and implement Additional Measures only if all three of the following criteria are met:

- Overall management objectives for the preceding phase have not been met. This would be determined at the end of the 10-year monitoring period for the preceding phase.
- The proposed measures are deemed feasible under CEQA and NEPA.
- The proposed measures are determined to be cost-effective during implementation of the AMP.

At the time of this EIR's preparation, the specific feasible Additional Measures that might be used to achieve Phase 2 and Phase 3 management objectives are unknown. Valley Water would undertake future CEQA reviews when and if there are specific, fully-defined feasible Additional Measures proposed for implementation, and would only implement those Additional Measures if the above three criteria are met, provided that funding allocated to that applicable phase is available. This approach is consistent with established CEQA case law, which provides that where an EIR cannot provide meaningful information about a speculative future project that may result from initial project approval,

[9] Settlement Agreement Section 2.3 specifically defines Additional Measures as "measures that (A) SCVWD will implement in Phases Two or Three, (B) additional to those measures implemented in Phase I, (C) provided the criteria stated in paragraph 6.1.2 are met."

CEQA review may properly be deferred to future environmental documents. See *Rio Vista Farm Bureau v. County of Solano* (1992) 5 Cal. App. 4th 351,373.

2.6.2.3 Phase 4 Adaptive Management

Phase 4 is the final phase and could follow Phase 1, 2, or 3 once it is found that all Settlement Agreement objectives are met. Phase 4 would continue into perpetuity, or for as long as Valley Water diverts water under its licenses and permits. This last phase includes maintenance of instream flows in accordance with previous phases, long-term monitoring of measures implemented as part of the FHRP, and maintenance of facility improvements and other non-flow measures implemented in previous phases.

2.6.2.4 Other Potential Adaptive Management Measures

The Proposed Project also calls for Valley Water "… to make reasonable best efforts to assure that fish passage barriers other than those specifically listed in the Settlement Agreement are remediated" (Settlement Agreement Section 6.2.4.2). Besides those barrier remediation measures that were delineated in the Settlement Agreement, as part of the AMP, Valley Water would evaluate monitoring data, as described below, to assist in identifying other potential fish passage projects or additional habitat enhancement measures to incrementally improve instream habitat conditions. These measures would need to be identified, prioritized, and included in the annual report. If deemed necessary for implementation by Valley Water and the AMT, these projects would be evaluated in future CEQA reviews once the projects are identified and defined in enough detail to allow meaningful environmental review.

2.6.2.5 Monitoring Program

The AMP monitoring program is designed to track progress toward achieving the measurable objectives outlined above and has been organized into three categories: compliance monitoring, validation monitoring, and long-term trend monitoring.

Compliance monitoring includes administrative metrics such as reservoir releases and cold-water pool volume, compliance with the schedule for implementing a particular program element (such as a site-specific passage impediment remediation project) or progress on planning or feasibility studies.

Validation monitoring includes physical monitoring of instream flows, depth, velocity, water temperatures within each CWMZ, area of enhanced habitat, jump height and pool depth for passage impediments, habitat mapping to assess suitability for various life stages of salmonids, validating flow-habitat relationships, and other elements of the program.

Long-term trend monitoring includes evaluation of ecosystem responses to management actions and/or natural drivers, including monitoring adult fish abundance, juvenile fish density/migration, genetics, and species composition.

Validation and long-term trend monitoring would build on existing monitoring infrastructure (for example, Valley Water's hydrologic monitoring network), water quality monitoring (for example, water temperature monitoring network), habitat monitoring (for example, habitat mapping), and fishery monitoring (for example, Vaki Riverwatcher, Passive Integrated Transponder [PIT] tag detectors, genetics sampling, electrofishing surveys).

2.7 Best Management Practices

During Project implementation, Valley Water would implement a range of best management practices (BMPs) and VHP conditions to avoid or minimize adverse effects on the environment. These are introduced below and listed in Table 2.7-1. Full definition and detail for these BMPs and VHP conditions are provided in Appendices D and E, respectively.

- Valley Water BMPs are generally used by Valley Water for construction projects and are detailed in the 2014 *Best Management Practices Handbook* (Valley Water 2014b) and defined in Appendix D.
- Likewise, avoidance and minimization measures from the Santa Clara VHP conditions (ICF 2012) would also be applied to the Proposed Project, as applicable, to reduce specific biological impacts (Appendix E).
- For work in and near streams, Valley Water would employ other BMPs included in the *2014–2023 Stream Maintenance Program Manual* (Valley Water 2014a; Appendix D) as necessary to reduce impacts on specific resources not covered in Valley Water's general BMPs or in the VHP.
- And finally, as a project-specific avoidance and minimization measure, Valley Water would implement best management guidelines established by the Lamprey Technical Workgroup that include those for native lamprey during in-water work (Lamprey Technical Workgroup 2020).

Valley Water's BMPs are directly applicable to fish barrier remediation projects in Stevens Creek because Valley Water would implement these projects. However, for those remaining fish barrier remediation projects proposed in the Guadalupe River watershed, since Valley Water is not the owner of the facilities, Valley Water would add applicable measures similar to Valley Water BMPs as conditions of funding agreements with the implementing entities. Valley Water BMPs would be directly applicable to non-barrier remediation non-flow measures proposed in the Stevens and Guadalupe watersheds because Valley Water would implement these measures. Applicable Santa Clara VHP conditions would also be applied to barrier remediation projects at non-Valley Water sites to be implemented by the County and Cities. At non-Valley Water sites along Pheasant, Guadalupe, and Alamitos Creeks, Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those barrier-removal Project measures to be implemented by others.

Table 2.7-1. Relevant BMPs and VHP Conditions

Valley Water SMP/BMP No.	SMP/BMP Description
Hydrology	
Handbook BMPs	**Description**
WQ-6: Limit Impact of Concrete near Waterways	Would reduce runoff from increasing impervious surfaces and eliminate contact with uncured concrete
WQ-8: Minimize Hardscape in Bank Protection Design	Would reduce downstream or adjacent bank scour and erosion
WQ-10: Prevent Scour Downstream of Sediment Removal	Would decrease scour downstream of sediment removal by grading the channel transitions and ensuring that there are no rapid changes in the slope
WQ-15: Prevent Water Pollution	Would reduce impact to aquatic species and reduce transport of pollution in the channel network
WQ-16: Prevent Stormwater Pollution	Would reduce impact to aquatic species and reduce transport of pollution in the channel network

Valley Water SMP/BMP No.	SMP/BMP Description
SMP Manual BMPs	**Description**
GEN-1: In-channel Work Window	Would reduce impacts on special-status species and reduce scour or erosion from channel confinement during higher flows
SED-2: Prevent Scour Downstream of Sediment Removal	Would reduce the potential for scour by enforcing grading zones
SED-3: Restore Channel Features	Would effectively restore channel features by installing contouring within low-flow channels in non-tidal streams
VEG-1: Minimize Local Erosion Increase from In-channel Vegetation Removal	Would minimize the potential for localized erosion by protecting the toe of bank
VHP Condition	**Description**
Condition 3: Maintain Hydrologic Conditions and Protect Water Quality	Would improve conditions for aquatic species
Groundwater Resources	
SMP Manual BMPs	**Description**
SED-1: Groundwater Management	Would reduce mismanagement of groundwater supplies
Water Supply	
Handbook BMPs	**Description**
WQ-15: Prevent Water Pollution	Would protect water supply through long-term protections of water for beneficial use
SMP Manual BMPs	**Description**
GEN-1: In-channel Work Window	Would add protection from short-term disruptions for in-channel maintenance or disturbance
GEN-16: In-channel Minor Activities	Would add protection from short-term disruptions for in-channel maintenance or disturbance
SED-3: Restore Channel Features	Would protect water supply through long-term protections of water for beneficial use
VHP Condition	**Description**
Condition 3: Maintain Hydrologic Conditions and Protect Water Quality	Would affect water supply through long-term protections of sources of water for beneficial use and add protection from short-term disruptions for in-channel maintenance or disturbance.
Condition 5: Avoidance and Minimization Measures for Instream Operations and Maintenance	Would add protection from short-term disruptions for in-channel maintenance or disturbance
Water Quality	
Handbook BMPs	**Description**
WQ-15: Prevent Water Pollution	Would reduce impacts to water quality from pollution
WQ-16: Prevent Stormwater Pollution	Would reduce impacts to water quality from stormwater pollution

Valley Water SMP/BMP No.	SMP/BMP Description
SMP Manual BMPs	**Description**
GEN-3: Avoid Exposing Soils with High Mercury Levels	Would reduce impacts to water quality from mercury
GEN-21: Staging and Stockpiling of Materials	Would reduce impacts to water quality by preventing sediment-laden water from being released back into waterways
GEN-22: Sediment Transport	Would reduce impacts to water quality by preventing increased sediment levels in the waterways
GEN-27: Existing Hazardous Sites	Would minimize impacts to water quality from hazardous materials at a site
VEG-1: Minimize Local Erosion Increase from In-channel Vegetation Removal	Would minimize the potential for localized erosion by protecting the toe of bank
VHP Condition	**Description**
Condition 3: Maintain Hydrologic Conditions and Protect Water Quality	Would maintain hydrologic condition in an effort to protect water quality
Condition 4: Avoidance and Minimization for In-stream Projects	Would reduce impacts to water quality from construction-related pollution
Condition 5: Avoidance and Minimization Measures for In-stream Operations and Maintenance	Would reduce impacts to water quality from construction-related pollution
Recreation	
SMP Manual BMPs	**Description**
GEN-36: Public Outreach	Would specify measures to notify the public of Proposed Project measures and allow for public to adjust recreational use to other area facilities
GEN-37: Implement Public Safety	Would specify public safety measures to notify and warn the recreating public of Proposed Project measures and mitigate public safety at recreational facilities and trails
GEN-39: Planning for Pedestrians, Traffic Flow, and Safety Measures	Would schedule bicycle and pedestrian facility closures outside the peak morning and afternoon periods in order to minimize the impact of Proposed Project measures on recreational access and use
Aquatic Biological Resources	
Handbook BMPs	**Description**
WQ-1: Conduct Work from Top of Bank	Would reduce the effect of machinery on streambed and water quality
WQ-3: Limit Impact of Pump and Generator Operations and Maintenance	Would reduce impacts to water quality and aquatic species
WQ-4: Limit Impacts from Staging and Stockpiling Materials	Would reduce runoff and erosion and reduce impacts on instream biota and water quality
WQ-5: Stabilize Construction Entrances and Exits	Would reduce runoff and erosion and reduce impacts on instream biota and water quality

Valley Water SMP/BMP No.	SMP/BMP Description
WQ-6: Limit Impact of Concrete near Waterways	Would reduce runoff from increasing impervious surfaces and eliminate contact with uncured concrete
WQ-8: Minimize Hardscape in Bank Protection Design	Would reduce downstream or adjacent bank scour and erosion
WQ-10: Prevent Scour Downstream of Sediment Removal	Would decrease scour downstream of sediment removal by grading the channel transitions and ensuring that there are no rapid changes in the slope
WQ-15: Prevent Water Pollution	Would reduce impact to aquatic species and reduce transport of pollution in the channel network
WQ-16: Prevent Stormwater Pollution	Would reduce impact to aquatic species and reduce transport of pollution in the channel network
BI-3: Remove Temporary Fills	Would remove temporary fill material upon finishing work to reduce impacts to water quality
BI-9: Restore Riffle/Pool Configuration of Channel Bottom	Would enhance aquatic habitat and restore its functions to native biota
BI-11: Minimize Predator Attraction	Would reduce the likelihood of predation on native species
SMP Manual BMPs	**Description**
ANI-5: Slurry Mixture near Waterways	Would reduce impacts on terrestrial resources by ensuring that slurry does not enter waterways
GEN-1: In-Channel Work Window	Would reduce water quality impacts and impacts on anadromous special-status fish and other aquatic species
GEN-2: Instream Herbicide Application Work Window	Would reduce herbicide impacts on aquatic species
GEN-3: Avoid Exposing Soils with High Mercury Levels	Would reduce impacts to water quality from mercury
GEN-4: Minimize the Area of Disturbing	Would reduce impacts on terrestrial and aquatic habitats and species
GEN-15: Salvage Native Aquatic Vertebrates from Dewatered Channels	Would reduce the impacts on native aquatic vertebrates
GEN-17: Employee/Contractor Training	Would reduce impacts on biological resources because all appropriate Valley Water staff and contractors would receive annual training on SMP BMPs
GEN-20: Erosion and Sediment Control Measures	Would reduce impacts on aquatic resources by ensuring that erosion and sediment discharge into waterways and riparian vegetation is minimized
GEN-21: Staging and Stockpiling of Materials	Would reduce impacts to water quality by preventing sediment-laden water from being released back into waterways
GEN-22: Sediment Transport	Would reduce impacts on aquatic resources by preventing sediment-laden water from being released back into waterways
GEN-23: Stream Access	Would reduce impacts on aquatic resources by using existing access to streams where possible

Valley Water SMP/BMP No.	SMP/BMP Description
GEN-27: Existing Hazardous Sites	Would minimize impacts to water quality from hazardous materials at a site
GEN-30: Vehicle and Equipment Maintenance	Would reduce impacts on aquatic resources by maintaining vehicles in authorized areas
GEN-31: Vehicle Cleaning	Would reduce impacts on aquatic resources by maintaining vehicles in authorized areas
GEN-32: Vehicle and Equipment Fueling	Would reduce impacts on aquatic resources by preventing accidental spills
GEN-33: Dewatering for Non-tidal Sites	Would reduce impacts on water quality and aquatic resources by diverting water around the work area and incorporating recommendations by a qualified fisheries biologist (for example, relocating aquatic resources, screening pumps, installing energy dissipators, maintaining flow downstream of the work site, avoiding stranding of aquatic resources, reducing turbidity downstream of the work site, restoring work area to pre-project conditions)
GEN-35: Pump/Generator Operations and Maintenance	Would reduce water quality impacts by maintaining pumps and generators
SED-2: Prevent Scour Downstream of Sediment Removal	Would reduce the potential for scour by enforcing grading zones
SED-3: Restore Channel Features	Would effectively restore channel features by installing contouring within low-flow channels within non-tidal streams
VEG-1: Minimize Local Erosion Increase from In channel Vegetation Removal	Would minimize the potential effect of localized erosion and degradation of water quality
VEG-3: Use Appropriate Equipment for Instream Removal	Would reduce the effect of machinery on streambeds and riparian vegetation
REVEG-1: Seeding	Would reduce erosion and water quality impacts and promote native species
VHP Condition	**Description**
Condition 1: Avoid Direct Impacts on Legally Protected Plant and Wildlife Species	Would reduce the impacts on protected species
Condition 3: Maintain Hydrologic Conditions and Protect Water Quality	Would maintain hydrologic condition in an effort to protect water quality
Condition 4: Avoidance and Minimization for In-stream Projects	Would avoid and reduce impacts on instream biota and water quality
Condition 5: Avoidance and Minimization Measures for In-stream Operations and Maintenance	Would avoid and reduce impacts on instream biota and water quality
Condition 8: Avoidance and Minimization Measures for Rural Road Maintenance	Would minimize potential impacts on covered species and sensitive land cover types
Condition 10: Fuel Buffer	Would reduce the potential for fire damage to covered biota

Valley Water SMP/BMP No.	SMP/BMP Description
Condition 11: Stream and Riparian Setbacks	Would minimize and avoid impacts on aquatic and riparian land cover types, covered species, and wildlife corridors
Condition 12: Wetland and Pond Avoidance and Minimization	Would minimize potential impacts on these habitats and associated species
Lamprey Technical Workgroup BMP	**Description**
Best management guidelines for native lampreys during in-water work	As an avoidance and minimization measure, would reduce impacts to native lampreys during dewatering activities by relocating them to other areas
Terrestrial Biological Resources	
Handbook BMPs	**Description**
WQ-1: Conduct Work from Top of Bank	Would reduce the effect of machinery on streambed and water quality
WQ-4: Limit Impacts from Staging and Stockpiling Materials	Would reduce runoff and erosion and reduce impacts on instream biota and water quality
WQ-5: Stabilize Construction Entrances and Exits	Would reduce runoff and erosion and reduce impacts on instream biota and water quality
WQ-6: Limit Impact of Concrete near Waterways	Would reduce water quality impacts from concrete chemistry
WQ-10: Prevent Scour Downstream of Sediment Removal	Would reduce runoff and erosion and reduce impacts on instream biota and water quality
WQ-12: Manage Well or Exploratory Boring Materials	Would reduce runoff and erosion and reduce impacts on instream biota and water quality
WQ-15: Prevent Water Pollution	Would reduce impacts on instream biota and water quality
SMP Manual BMPs	**Description**
GEN-1: In-channel Work Window	Would reduce water quality impacts and impacts on anadromous special-status fish
GEN-2: Instream Herbicide Application Work Window	Would reduce herbicide impacts on aquatic species
GEN-3: Avoid Exposing Soils with High Mercury Levels	Would reduce water quality impacts and mercury impacts on biota
GEN-4: Minimize the Area of Disturbance	Would reduce impacts on terrestrial and aquatic habitats and species
GEN-6: Minimize Impacts to Nesting Birds via Site Assessments and Avoidance Measures	Would reduce impacts on nesting birds
GEN-6.5: Protection of Nesting Least Bell's Vireos (LBV)	Would reduce impacts on nesting LBV
GEN-8: Protection of Sensitive Fauna Species from Herbicide Use	Would reduce impacts on special-status wildlife

Valley Water SMP/BMP No.	SMP/BMP Description
GEN-9: Avoid Impacts to Special-status Plant Species and Sensitive Natural Vegetation Communities	Would reduce impacts on special-status plant species and sensitive natural vegetation communities
GEN-10: Avoid Impacts to Bay Checkerspot Butterfly (*Euphydryas editha bayensis*) and Associated Critical Habitat	Would reduce impacts on Bay checkerspot butterfly and its designated critical habitat
GEN-12: Protection of Special-status Amphibian and Reptile Species	Would reduce impacts on special-status amphibians and reptiles
GEN-13: Protection of Bat Colonies	Would reduce impacts on maternity and roosting bat colonies
GEN-14: Protection of San Francisco Dusky-footed Woodrat	Would reduce impacts on this species
GEN-15: Salvage Native Aquatic Vertebrates from Dewatered Channels	Would reduce the impacts on native aquatic vertebrates
GEN-19: Work Site Housekeeping	Would reduce impacts on terrestrial resources by ensuring that work sites are clean and maintained
GEN-20: Erosion and Sediment Control Measures	Would reduce impacts on terrestrial resources by ensuring that erosion and sediment discharge into waterways and riparian vegetation is minimized
GEN-21: Staging and Stockpiling of Materials	Would reduce impacts on terrestrial resources by ensuring that construction material is properly stored
GEN-22: Sediment Transport	Would reduce impacts on terrestrial resources by preventing sediment-laden water from being released back into waterways
GEN-23: Stream Access	Would reduce impacts on terrestrial resources by using existing access to streams where possible
GEN-30: Vehicle and Equipment Maintenance	Would reduce impacts on terrestrial resources by maintaining vehicles in authorized areas
GEN-31: Vehicle Cleaning	Would reduce impacts on terrestrial resources by maintaining vehicles in authorized areas
GEN-32: Vehicle and Equipment Fueling	Would reduce impacts on terrestrial resources by preventing accidental spills
GEN-33: Dewatering for Non-tidal Sites	Would reduce impacts on terrestrial resources by implementing multiple actions to limit the effects of dewatering on native plants and wildlife
SED-2: Prevent Scour Downstream of Sediment Removal	Would reduce potential erosion and water quality impacts
VEG-1: Minimize Local Erosion Increase from In-channel Vegetation Removal	Would minimize the potential effect of localized erosion and degradation of water quality
VEG-2: Nonnative Invasive Plant Removal	Would reduce occurrences of invasive plant species
VEG-3: Nonnative Invasive Plant Removal	Use Appropriate Equipment for Instream Removal – Would reduce the effect of machinery on streambeds and riparian vegetation

Valley Water SMP/BMP No.	SMP/BMP Description
REVEG-1: Seeding	Would reduce erosion and water quality impacts and promote native species
REVEG-2: Planting Material	Would reduce the potential for nonnative vegetation species to occur and reduce impacts on native vegetation
VHP Condition	**Description**
Condition 1: Avoid Direct Impacts on Legally Protected Plant and Wildlife Species	Would reduce the impacts on protected species
Condition 2: Incorporate Urban-reserve System Interface Design Requirements	Would reduce the effects of urbanization on biota
Condition 3: Maintain Hydrologic Conditions and Protect Water Quality	Would reduce impacts on water quality
Condition 4: Avoidance and Minimization for Instream Projects	Would avoid and reduce impacts on instream biota and water quality
Condition 5: Avoidance and Minimization Measures for Instream Operations and Maintenance	Would avoid and reduce impacts on instream biota and water quality
Condition 8: Avoidance and Minimization Measures for Rural Road Maintenance	Would minimize potential impacts on covered species and sensitive land cover types
Condition 10: Fuel Buffer	Would reduce the potential for fire damage to covered biota
Condition 11: Stream and Riparian Setbacks	Would minimize and avoid impacts on aquatic and riparian land cover types, covered species, and wildlife corridors
Condition 12: Wetland and Pond Avoidance and Minimization	Would minimize potential impacts on these habitats and associated species
Condition 13: Serpentine and Associated Covered Species Avoidance and Minimization	Would minimize potential impacts on serpentine habitats and associated species
Condition 14: Valley Oak and Blue Oak Woodland Avoidance and Minimization	Would minimize potential impacts on oak woodlands
Condition 15: Western Burrowing Owl	Would minimize potential impacts on this species
Condition 16: Least Bell's Vireo	Would minimize potential impacts on this species
Condition 17: Tricolored Blackbird	Would minimize potential impacts on this species
Condition 19: Plant Salvage When Impacts Are Unavoidable	Requires take notification to the Valley Habitat Agency with a salvage option
Condition 20: Avoid and Minimize Impacts on Covered Plant Occurrences	Would minimize potential impacts on covered plant species

Valley Water SMP/BMP No.	SMP/BMP Description
Cultural Resources	
Handbook BMPs	**Description**
CU-1: Accidental Discovery of Archaeological Artifacts or Burial Finds	Would formalize response and handling of accidental discovery so as to minimize the potential for disturbing previously recorded or newly discovered prehistoric or historic archaeological resources
SMP Manual BMPs	**Description**
GEN-40: Discovery of Cultural Remains or Historic or Paleontological Artifacts	Would formalize response and handling of accidental discovery so as to minimize the potential for disturbing previously recorded or newly discovered prehistoric or historic archaeological resources
GEN-41: Review of Projects with Native Soil	Would require the review and evaluation of those sites that would involve disturbance/excavation of native soil to determine their potential for affecting significant cultural resources
Tribal Cultural Resources	
Handbook BMPs	**Description**
CU-1: Accidental Discovery of Archaeological Artifacts or Burial Finds	Would formalize response and handling of accidental discovery so as to minimize the potential for disturbing previously recorded or newly discovered prehistoric or historic archaeological resources
SMP Manual BMPs	**Description**
GEN-40: Discovery of Cultural Remains or Historic or Paleontological Artifacts	Would formalize response and handling of accidental discovery so as to minimize the potential for disturbing previously recorded or newly discovered prehistoric or historic archaeological resources
GEN-41: Review of Projects with Native Soil	Would require the review and evaluation of those sites that would involve disturbance/excavation of native soil to determine their potential for affecting significant cultural resources
Geology and Soils	
SMP Manual BMPs	**Description**
GEN-20: Erosion and Sediment Control Measures	Would minimize and/or control erosion and sedimentation
GEN-21: Staging and Stockpiling of Materials	Would specify appropriate placement and management of staging and stockpile areas to protect on-site vegetation and water quality
GEN-22: Sediment Transport	Would prevent sediment-laden water from being released back into waterways
GEN-23: Stream Access	Would restrict development of new access routes or when necessary specify placement and management to minimize impacts and disturbance to streams
SED-1: Groundwater Management	Would specify appropriate groundwater management during pumping and water quality testing
SED-2: Prevent Scour Downstream of Sediment Removal	Would reduce the potential for scour by enforcing grading zones
SED-3: Restore Channel Features	Would effectively restore channel features by installing contouring within low-flow channels within nontidal streams

Valley Water SMP/BMP No.	SMP/BMP Description
VEG-1: Minimize Local Erosion Increase from In-channel Vegetation Removal	Would minimize the potential for localized erosion by protecting the toe of bank
Air Quality	
Handbook BMPs	**Description**
AQ-1: Use Dust Control Measures	Would install the BAAQMD-prescribed dust control measures for all construction projects
AQ-2: Avoid Stockpiling Odorous Materials	Would restrict the handling, storage, and disposal of odorous materials within 1,000 feet of sensitive land uses
SMP Manual BMPs	**Description**
GEN-29: Dust Management	Would implement the BAAQMD-required dust control measures
Greenhouse Gas (GHG) Emissions and Energy	
SMP Manual BMPs	**Description**
GEN-30: Vehicle and Equipment Maintenance	Would ensure that on-site equipment is operating properly through vehicle maintenance
Noise	
SMP Manual BMPs	**Description**
GEN-38: Minimize Noise Disturbances to Residential Areas	Would restrict construction and maintenance equipment to daytime hours and ensure that adequate mufflers are equipped
Utilities	
Not applicable	There are no applicable BMPs in reference to solid waste

2.8 Proposed Project Implementation Schedule

Appendix B of the Settlement Agreement outlined the four phases of implementation schedule. Phases 1 through 3 are proposed at a 10-year duration for each phase. Phase 4 is proposed to be ongoing starting from year 31 after the effective date. Effective date, schedule for remaining Phase 1 measures, and conditions for Phases 2 and 3 schedules are further discussed below.

The Draft FHRP (Appendix A) defines four phases. The first three are 10-year phases: Phase 1 implements actions for all FAHCE watersheds, as well as actions specific to each watershed. Phases 2 and 3 are backup plans; they would commence only if all objectives of the preceding phase are not satisfactorily achieved, as determined by the AMT. In Phase 4, Valley Water would continue to provide in perpetuity stream flows in accordance with the FHRP and would conduct ongoing monitoring. It is possible that Phase 4 would directly follow Phase 1. In addition, flow schedules or other plan actions may be temporarily modified for the purpose of protecting human health and safety. Likewise, repairs and maintenance on Valley Water facilities may temporarily interrupt and be given priority over any aspects of the plan.

Under Settlement Agreement Section 2.2.8, “effective date” means the when all “conditions precedent” stated in paragraphs 5.3 to 5.8 have been satisfied, and all parties have executed the Agreement. Valley Water’s and other parties’ obligations to implement the Settlement Agreement start on the effective date.

The Article V conditions precedent stated in the Settlement Agreement can be summarized as follows:

a. Valley Water completes CEQA compliance for Settlement Agreement implementation.

b. SWRCB amends Valley Water's licenses and permit in substantial conformity with the Settlement Agreement, and concludes that Valley Water's storage, diversion, and use of water in implementing the Agreement comply with all applicable laws within SWRCB's jurisdiction.

c. GCRCD indicates its support for the SWRCB's dismissal of GCRCD's water rights complaint with prejudice.[10]

d. CDFW issues any approvals required to adopt or implement the Settlement Agreement, including any necessary permits under CESA.

e. USFWS and NMFS complete any required Section 7 consultation and/or issue any required Section 10 incidental take permits, which, in turn, would require approval of an HCP.

f. A federal lead agency completes environmental review for Settlement Agreement implementation in accordance with NEPA.

The exact start date for implementing specific measures varies from measure to measure and watershed to watershed. Valley Water has already initiated or completed many Phase 1 non-flow measures to improve habitat conditions, even before the Settlement Agreement effective date. Also, in 2020 Valley Water convened the AMT and initiated pilot flow measures in Guadalupe and Stevens Creeks. However, full implementation of flow measures would need to start after all necessary environmental reviews are completed, after necessary water rights orders are issued to enable flows for environmental benefits, when the dams are safe to operate, and after there is adequate reservoir storage for flow releases in accordance with the FAHCE rule curves. The implementation dates for the remaining Phase 1 measures are listed in the AMP (Table 6-13).

2.9 Limitations of Implementation

Valley Water has designed the Proposed Project to achieve its objectives of restoring and maintaining healthy steelhead and Chinook salmon populations in the Stevens Creek and Guadalupe River watersheds, as appropriate, by providing suitable spawning and rearing habitat and adequate passage for adults and juveniles, while maintaining groundwater recharge and flexible and reliable current and future water supply and water deliveries. However, certain constraints could restrict or otherwise limit the effectiveness of Project implementation. Some of these limitations are discussed in this section.

2.9.1 Dam Safety Operations Restrictions

As described in Section 2.4.1.2, *Dam Safety Operations Restrictions*, DSOD has identified three Valley Water facilities within the Project area that would restrict full implementation of flow measures until safety retrofits are completed. This EIR considers both the impacts of limited implementation as a result of these dam safety restrictions, as well as fully implemented flow measures that would apply once the safety upgrades are completed at each of these three dams. Construction of these retrofit projects, each of which have independent utility, is not included in this EIR as part of the Proposed Project; however, construction impacts are evaluated in the cumulative effects analysis for each environmental resource.

[10] On June 9, 2020, GCRCD withdrew from the FAHCE Settlement Agreement.

2.9.2 Water Rights Changes

Section 1.2.3, *Water Rights*, describes the proposed water rights amendments for the 10 licenses held by Valley Water within the Stevens Creek and Guadalupe River watershed Project area. As noted, the proposed water rights changes are intended to resolve the complaint filed by GCRCD regarding Valley Water's reservoir and groundwater recharge operations, and to accommodate all Proposed Project flow measures. SWRCB is currently reviewing the proposed water right amendments. If any portion of these amendments is not approved, the Proposed Project flow measures within the affected area(s) may not be implemented.

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Chapter 3 – Environmental Setting and Impact Analysis

3 Environmental Setting and Impact Analysis

3.1 Introduction

Chapter 3, *Environmental Setting and Impact Analysis,* presents the environmental setting and evaluation of impacts of the Proposed Project for 14 resource topics. Section 3.1 introduces the common features used to assess impacts for each of these topic areas, including the regional environmental setting, the definition of the Project baseline, and the definition of the analytical time horizon. This section also describes the overall organization of the chapter and the approach to assessing impacts. Finally, based on an *Initial Study* completed in accordance with the CEQA Guidelines (Appendix F), this section identifies topic areas that were evaluated and found to have no potential for significant impacts based on the scope and nature of the Proposed Project activities, and provides the justification for eliminating them from detailed analysis in this EIR.

3.1.1 Regional Environmental Setting

As described in Section 2.1, *Project Location and General Environmental Conditions*, the Project area, as it pertains to the EIR analysis, includes portions of the Stevens Creek and Guadalupe River watersheds, including mainstem tributaries and Valley Water's water supply facilities. Both watersheds are located in Santa Clara County, and each watershed ultimately drains to the south region of the south bay. The Project area is defined as the reservoirs, creeks, and rivers where the Proposed Project would be implemented, together with immediately adjacent areas.

Sections 3.2, *Hydrology*, through 3.15, *Utilities*, include detailed descriptions of the environmental settings specific to individual resource topics. These descriptions are included in the respective environmental setting discussions. The environmental setting section for each resource topic defines the study area specific to that resource topic.

3.1.2 Baseline

In this chapter, the effects of Project implementation are compared with the current baseline conditions under each resource topic. The use of the resource-specific current baseline condition provides a basis for assessing the impacts of the Project in accordance with CEQA requirements.

Each of the resource topic sections (3.2 through 3.15) includes a description of the environmental setting for the resource topic in the vicinity of the Proposed Project, as well as the current baseline condition for the resource topic. Where resources would be potentially affected by proposed flow measures, two modeled baselines are defined, one being a "current baseline" and the other being a "future baseline."

Current baseline conditions are defined as follows:

- For the resource topics that would be materially affected by changes in flow conditions and therefore rely on modeling to determine the projected changes as a result of proposed rule curves, the current baseline condition is represented by a modeled projection of 2015 conditions using a hydrological period of record extending from 1990 through 2010. This represents existing conditions because 2015 reflects the latest published water demands and usage in Valley Water's 2015 *Urban Water Management Plan* (UWMP; Valley Water 2016a). In addition to 2015 supplies and demands, the current baseline incorporates seismic restrictions for dams in the Stevens Creek and Guadalupe River watersheds. Resource topics using this modeled baseline condition include hydrology, groundwater, water quality, water supply, aquatic biological resources, and recreation.

- For all other resource topics, the current baseline condition does not rely on modeling but rather on publicly accessible data and/or field observations. For these resource topics, the current baseline condition is existing conditions based on reasonably available information at the time of Draft EIR preparation. These resource topics include terrestrial biological resources, cultural resources, tribal cultural resources, geology and soils, air quality, GHG emissions and energy, noise, and utilities.

Future baseline conditions are also considered for the resource topics materially affected by changes in flow conditions (that is, hydrology, groundwater, water quality, water supply, aquatic biological resources, and recreation). Future baseline conditions are modeled using projected 2035 water demands and conditions and are used to assess long-term operational impacts that could result from implementing the Project measures once dam seismic restrictions are lifted. The future baseline conditions were also simulated using the Water Evaluation and Planning (WEAP) model with a hydrological period of record of 1990 through 2010. For these resource topics, the impacts of Project implementation as of 2035 are compared with the future baseline conditions.

The future baseline conditions represent projected conditions when dam safety improvements have been implemented at Project area dams (Section 2.4.1.2), permitting reservoirs to return to maximum storage capacities. The future baseline conditions also include projected 2035 water supplies and demands as defined in Valley Water's 2015 UWMP and *Water Supply Master Plan 2040* (Valley Water 2016a, 2019a).

3.1.3 Structure of the Environmental Setting and Impact Analysis

This chapter has sections analyzing the following resource topics:

- Section 3.2 – Hydrology
- Section 3.3 – Groundwater Resources
- Section 3.4 – Water Supply
- Section 3.5 – Water Quality
- Section 3.6 – Recreation
- Section 3.7 – Aquatic Biological Resources
- Section 3.8 – Terrestrial Biological Resources
- Section 3.9 – Cultural Resources
- Section 3.10 – Tribal Cultural Resources
- Section 3.11 – Geology and Soils
- Section 3.12 – Air Quality
- Section 3.13 – Greenhouse Gas Emissions and Energy
- Section 3.14 – Noise
- Section 3.15 – Utilities

Each resource topic analyzed in this chapter includes the following subsections:

- environmental setting
- regulatory setting
- methodology
- impact analysis

Chapter 3 – Environmental Setting and Impact Analysis

The impact analyses in each section are presented in three categories: flow measures; non-flow measures; and monitoring, maintenance, and adaptive management:

- **Flow measures impact analyses:** The sections on resources substantially affected by the proposed flow measures, Sections 3.2 through 3.7 (that is, hydrology, groundwater, water supply, water quality, recreation, and aquatic biological resources), provide a detailed "project-level" analysis of implementing the flow measures presented in Section 2.4.1, addressing the characteristics, timing, and locations of these measures and how they would affect the resources relative to current baseline and future baseline conditions. These resource sections evaluate impacts of the operational changes in non-emergency reservoir flow releases (that is, rule curves). Resources that would be minimally affected by flow measures (terrestrial biological resources, cultural, tribal cultural, geology and soils, air quality, GHG emissions and energy, noise, and utilities, as discussed in Sections 3.8 to 3.15) include a brief statement explaining that flow measures would have no significant impact to the resource.
- **Non-flow measures impact analyses:** As described in Sections 2.4.2 and 2.4.3, Phase 1 non-flow measures are grouped in five categories, as follows:
  - **Continued efforts to improve fish passage through priority barrier remediation**. The locations for fish barrier remediation have been identified; however, because specific designs and timing for barrier remediation design have not been fully defined, pending further analysis related to feasibility and effectiveness, this CEQA review for barrier remediation projects will be at a programmatic level. Additional environmental documentation under CEQA would be completed, as necessary, when engineering plans are developed and footprints of disturbance are defined.
  - **Measures to improve spawning and rearing habitat** for steelhead trout and Chinook salmon. Candidate locations have been proposed that are considered in this analysis; however, because specific locations have not been identified and project-level details have not yet been developed for this category of measures, CEQA review will be at a programmatic level, and these measures may be subject to additional CEQA review when measures are further defined.
  - **Bank stabilization guidelines.** No physical changes to the environment would be caused by preparation of the bank stabilization guidelines. Impacts of guidelines implementation are too speculative to evaluate now and depend on the results of a future study. Therefore, impacts of this measure are not evaluated in this EIR because they are speculative in nature.
  - **Completion of an advanced recycled and other urban water plan** in coordination with the City of San José. This measure is limited to development of a plan for future water use options; the plan would be developed during implementation of Phase 1, so details about the plan are not currently available. Therefore, impacts of this measure are not evaluated in this EIR because they are speculative in nature.
  - **Other non-flow measures specific to the two watersheds**. For the same reasons provided in the above item, impacts of the Stevens Creek trap-and-truck feasibility study are not evaluated in this EIR because they are speculative in nature. Impacts of a Stevens Creek Reservoir multiport outlet are evaluated programmatically. Impacts of a Plan for Almaden Dam within the Guadalupe River watershed are not evaluated because they are speculative in nature. Proposed measures to enhance and restore geomorphic functions within the Guadalupe River watershed include identification of potential pilot projects. Like spawning and rearing habitat improvements, these measures are evaluated at a programmatic level and may be subject to further CEQA review.

- **Monitoring, maintenance, and adaptive management**: As described in Section 2.6 and Chapter 6 of the Draft FHRP (Appendix A), these actions would occur during the adaptive management implementation, and include monitoring and adaptive management of the proposed flow measures, and maintenance, monitoring, and adaptive management of the proposed non-flow measures.

This EIR includes an evaluation of impacts from non-flow measures for all resources (Sections 3.2, *Hydrology*, to 3.15, *Utilities*) at a programmatic level because the detailed characteristics, timing, and/or locations of the proposed measures were not available at the time of EIR preparation. For measures that are reviewed at the programmatic level in this EIR, project-specific CEQA review would be undertaken in the future as necessary when specific projects are proposed and project-specific details are available.

The analyses of both flow measures and non-flow measures discuss the two watersheds in a consistent order—namely the Stevens Creek watershed and the Guadalupe River watershed.

Both the project-level and programmatic-level impact analyses in each resource topic section focus on the impacts of Proposed Project activities that would occur during and following implementation. Impacts are organized based on the thresholds of impact significance, as introduced in each section. For this reason, in most resources, if a topic area includes three thresholds of significance, there are three corresponding first-level impact headings (for example, Impacts TERR-1, TERR-2, and TERR-3). For the aquatic biological resources section, the impact heading, AQUA-1, is then further divided into a series of sub-impacts (Impacts AQUA-1a and AQUA-1b) for each watershed.

Where applicable, BMPs (as listed in Section 2.7, *Best Management Practices*, and detailed in Appendix D, *District Best Management Practices*) relevant to each resource topic are identified at the beginning of that section, and the subsequent impact analysis assumes inclusion of these BMPs as part of the Proposed Project. The BMPs are further discussed within the context of each evaluation when that BMP can effectively reduce a potential adverse impact that could occur in the absence of the BMP. A pre-mitigation impact significance finding is then provided that may rely on BMP implementation. While Valley Water BMPs apply to all Project measures to be implemented by Valley Water, Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those barrier-removal Project measures to be implemented by others. Applicable Santa Clara VHP conditions (Appendix E, *General Conditions of the Valley Habitat Plan Applicable to FAHCE FHRP*) would also be applied to measures to be implemented within the *Santa Clara Valley Plan* boundaries.

For significant impacts, feasible mitigation measures are proposed. Similar to the impact nomenclature, mitigation measures are denoted by the resource topic and numbered according to listing (for example, Mitigation Measure TERR-1). Note that a mitigation measure established under one resource topic might also reduce an impact for another resource. These occurrences are identified and cross-referenced. Similar to the BMPs discussed in the previous paragraph, for those barrier-removal measures that are proposed to be implemented by others, Valley Water would require application of the mitigation measures identified in this EIR as a condition for Project funding by Valley Water.

A statement of post-mitigation significance is provided based on applying the stated mitigation measures. If mitigation measures are unable to reduce an impact to less-than-significant levels, the impact analysis explains why no further mitigation is feasible.

3.1.4 General Methodology

CEQA requires a lead agency to determine the significance of all environmental impacts (California PRC Section 21082.2; CEQA Guidelines Section 15064). A threshold of significance for a given environmental impact defines the level of effect above which the lead agency will consider impacts to be significant and below which it will consider impacts to be less than significant. Thresholds of significance are identifiable, quantitative, qualitative, or performance levels for a particular environmental effect, whichever is most applicable to each specific type of environmental impact [CEQA Guidelines Section 15064.7(a)].

The following terminology is used in this EIR to describe the various levels and types of environmental impacts associated with the Proposed Project:

- **Significance threshold:** A significance threshold is a criterion used by Valley Water, as lead agency under CEQA, to determine whether the magnitude of an adverse physical environmental impact would be significant.
- **Less-than-significant impact:** An impact is less than significant if the analysis concludes that the implementation of the Proposed Project would not exceed the applicable significance threshold.
- **Significant impact:** An impact is significant if it could result in a substantial adverse change in the physical conditions of the environment, as determined by whether it exceeds the applicable significance threshold.
- **Significant and unavoidable impact:** An impact is significant and unavoidable if it would result in a substantial adverse physical change in the environment that cannot be feasibly mitigated to a less-than-significant level; that is, to a magnitude below the significance threshold.
- **Mitigation measure:** A mitigation measure is a feasible action that could be taken that would avoid or substantially lessen the magnitude of a significant impact. CEQA Guidelines Section 15370 defines mitigation as:
    - Avoiding the impact altogether by not taking a certain action or parts of an action;
    - Minimizing impacts by limiting the degree of magnitude of the action and its implementation;
    - Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
    - Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
    - Compensating for the impact by replacing or providing substitute resources or environments.
- **Feasibility:** *Feasible* means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (CEQA Guidelines Section 15364).

3.1.4.1 General Approach to Analyzing Impacts of Flow Measures

Hydrologic, hydraulic, water temperature, and fisheries habitat modeling provide a quantitative basis from which to assess the effects of the flow measures under the Proposed Project (and the alternatives), relative to the baseline scenarios. Models and other tools applied in the evaluation of the Proposed Project (and the alternatives) include:

- Hydrologic modeling (WEAP model) to simulate mean daily river flows at specific nodes downstream of study area reservoirs and average daily reservoir storage volumes.

- Water temperature modeling to simulate mean daily river water temperatures at specific points of interest (POIs) downstream of study area reservoirs.
- Hydraulic modeling using the USACE Hydrologic Engineering Center River Analysis System (HEC-RAS) model to simulate flows at specific POIs and within defined stream reaches and habitat types downstream of the study area reservoirs to determine water depth, water velocity, and wetted area.
- Fisheries habitat availability estimation modeling for steelhead and fall-run Chinook salmon lifestages to estimate the suitability and extent of physical habitat availability in defined reaches of each creek based on modeled flows, hydraulics, water temperatures, and habitat monitoring data.
- Fish passage modeling for steelhead and fall-run Chinook salmon to estimate the number of days when adults and juveniles would be able to pass designated POIs in each creek based on simulated water depths and water temperatures.

As noted in Section 1.2.2, *Evolution of FAHCE Environmental Impact Report*, the scope of the FAHCE EIR was originally planned to include three watersheds—Stevens Creek, Guadalupe River, and Coyote Creek. The integrated flow measure modeling was, therefore, completed with consideration of all three watersheds. This EIR retains all three watersheds in the model scenarios for each type of model described below so as to comprehensively evaluate the effectiveness of the proposed flow measures across the watersheds. Because the Coyote Creek watershed is physically separated from the Stevens Creek and Guadalupe River watersheds, and because the proposed flow measures can be implemented independently in each watershed, this EIR analysis considers the model results as they apply to the Stevens Creek and Guadalupe River watersheds only. Separately, in the ADSRP EIR, Coyote Creek watershed flow measures will be included in the Project description and assessed there, but are considered in the cumulative impact analysis in this EIR.

Application of Model Output

Computer simulation models and post-processing tools were used to assess changes in hydrology, hydraulics, and water temperature, and associated changes in habitat conditions that could occur under the Proposed Project (and alternatives), relative to existing and future baseline comparisons. Model assumptions and results were used for comparative purposes, and the analysis focused on differences in the results among comparative scenarios.

The models used in the analyses, although mathematically precise, should be viewed as having inherent uncertainty because of limitations in the theoretical basis of the models, underlying data availability, and the scope of the formulation and function for which each model is designed. Nonetheless, models developed for planning and impact assessment purposes are professionally accepted analytic tools with which to conduct environmental evaluations of the Proposed Project (and alternatives) impacts in the Project area.

Water Evaluation and Planning Hydrologic Model

Mean daily hydrologic modeling was developed for the FAHCE Program using the WEAP platform. The model was updated to a daily timestep from a monthly timestep version used by Valley Water in its long-term water supply planning processes. The model includes all study area reservoirs and study area creek reaches, and incorporates municipal and agricultural demands, groundwater recharge operations, water imports, water transfers, inflows/accretion from local tributaries, and urban runoff (SEI and Valley Water 2020; Appendix G, *Valley Water Daily WEAP Model Technical Memorandum*).

Hydrologic modeling scenarios were developed to represent both current baseline conditions and future baseline conditions. Model baseline conditions using existing conditions assumptions include water demands for 2015 and assume that existing dam safety reservoir storage capacity restrictions are in effect. Model scenarios representing future baseline conditions assume water demands for 2035 and assume that all existing dam safety reservoir storage restrictions have been lifted. A detailed description of the hydrologic model is provided in the *Valley Water Daily WEAP Model Technical Memorandum* (SEI and Valley Water 2020; Appendix G).

The WEAP model provides a quantitative basis to evaluate changes in reservoir storage volumes and flows in the study area associated with operations resulting from implementation of the Proposed Project (and alternatives) for the period of record extending from 1990 through 2010. This period was selected because it encompasses a range of WY conditions (that is, dry, average, wet) and reflects current/typical water supply operations, and because sufficient flow and temperature data were available. Flows were modeled at designated POIs within designated reaches of interest. The points and reaches of interest were developed in consultation with representatives from CDFW and NMFS to obtain flows in biologically relevant areas (see *Methods for Establishing Reaches of Interest and Points of Interest Technical Memorandum* [FAHCE Technical Workgroup 2020; Appendix H]).

The WEAP model results include daily average discharge flows in cubic feet per second at the downstream release point for each of Valley Water's primary reservoirs in the two watersheds for the period of record from 1990 to 2010. This includes:

- Stevens Creek Reservoir (Stevens Creek)
- Lexington Reservoir (Los Gatos Creek, Guadalupe watershed)
- Guadalupe Reservoir (Guadalupe Creek, Guadalupe watershed)
- Almaden Reservoir (Alamitos Creek, Guadalupe watershed)
- Calero Reservoir (Calero Creek, Guadalupe watershed)

The proposed rule curves were evaluated following a thorough assessment of the WEAP modeling output (see Section 2.4, *Project Components – Fish Habitat Restoration Plan Phase 1 Measures*, for more details on the rule curves); simulations were developed to characterize current baseline flow conditions and future baseline flow conditions with and without implementation of the Proposed Project. The flow-related impact analyses for hydrology, groundwater, water quality, water supply, aquatic biological resources, and recreation compare the two baseline conditions with the Proposed Project (Section 3.1.2).

Water Temperature Models

Mean daily water temperature was estimated at various locations in the study area creeks over the 1990 to 2010 period of hydrologic simulation. Least-squares regression analysis was conducted using historical daily flow, reservoir storage, mean daily water temperature, and daily maximum air temperature measured during the 2000 to 2014 calibration period. The resulting regression coefficients were applied to WEAP-modeled mean daily flow and end-of-day storage output to estimate mean daily water temperatures at each POI. For the two creeks with CWMZs (that is, Guadalupe and Stevens), historical water temperature profiles for the associated reservoirs (that is, Guadalupe and Stevens Creek) were used to simulate release water temperatures into the uppermost reaches of these creeks located downstream of the dams. Simulated mean daily water temperatures were reported at select locations generally corresponding to the POIs. Refer to the *Temperature Modeling Technical Memorandum* (Appendix I) for a detailed description of the water temperature estimation methodology.

Hydraulic Models

A suite of HEC-RAS models, developed by Valley Water for flood stage simulation, were updated with new transects surveyed in the vicinity of most of the POIs in specific areas where fish passage may be limiting (that is, at shallow riffles). These updates enabled estimation of wetted width, water depth, and velocity based on simulated daily flow management (see SEI 2020 Appendix J) at critical riffles near the POIs.

Fisheries Habitat Availability Estimation Models

Flow-dependent habitat availability indices were calculated by lifestage for steelhead and fall-run Chinook salmon based on hydraulic, water temperature, and structural habitat variables. The general steps to estimate and apply these indices to assess suitability of habitat are discussed in Section 3.7, *Aquatic Biological Resources,* and details are provided in the *Fisheries and Aquatic Habitat Technical Memorandum* in Appendix K.

Fish Passage Models

Adult steelhead and adult fall-run Chinook salmon upstream migrations were modeled at each POI on each day during the migration season based on modeled flows, water depth, and water temperature. Critical riffle analyses were conducted adjacent to POIs in 2016 (FAHCE Technical Workgroup 2020; Appendix H, *Methods for Establishing Reaches of Interest and Points of Interest Technical Memorandum*). Additional information on the development of the model and its application to this analysis is included in Appendix G, *Valley Water Daily WEAP Model Technical Memorandum.*

General Approach to Analyzing Impacts of Maintenance

Since no new facilities or changes to existing facilities are associated with implementation of the rule curves (flow measures), there are no associated future maintenance requirements; therefore, no assessment of maintenance impacts is included for flow measures.

3.1.4.2 General Approach to Analyzing Impacts of Non-flow Measures

As previously described, the non-flow measures impact analysis includes an assessment of fish passage barrier remediation, spawning and rearing habitat improvements, and bank stabilization guidelines; completion of a feasibility study for advanced recycled and other urban water; and implementation of other non-flow measures specific to each of the two watersheds. Impacts from fish passage barrier remediation and spawning and rearing habitat improvements are analyzed in Sections 3.2 through 3.15. In addition, this analysis includes assessments of monitoring, as well as potential impacts from ongoing maintenance of these facilities. The general methodology for resource analysis considers the activities associated with these non-flow measures, as described below.

Fish Passage Barrier Remediation

Activities associated with fish passage barrier remediation include use and staging of heavy equipment within the Project area and traffic on unpaved roads from hauling of heavy equipment and materials to and from the Project site, pruning or removal of riparian vegetation to access the work area, channel dewatering within the limits of the active work area, dredging and removal of barrier materials, disturbance of channel bed and bank, and closure or limited use of public trails during construction. Additionally, any work at constructed fish passage barriers would likely include concrete or asphalt demolition and removal as well as installation of new energy dissipation improvements or erosion control materials, including riprap or potentially concrete, where necessary. Permanent beneficial or adverse impacts related to groundwater recharge and terrestrial and aquatic biological resources could occur at and below the barrier locations as a result of implementation of these projects. Project-specific impacts and mitigation measures would be analyzed in future CEQA reviews when further design details are known for each barrier. Impacts from these activities are analyzed in Sections 3.2 through 3.15.

Instream work would be limited to the summer work season beginning June 15 and ending October 15. Flows in the two watersheds are lowest during this time, but dewatering would be necessary for most projects. Dewatering of the instream work area would consist of placing a cofferdam upstream of the work area to temporarily impound water. The impounded water would be piped around the active work area using either pumps placed in the impoundment pool or a gravity-fed inlet. The water would be released into the active channel below the Project area. Rock may be temporarily placed below the pipe outlet as an energy-dissipation measure to reduce erosion of the channel bed.

Work would typically occur during normal business hours, Monday through Friday, between 7 a.m. and 5 p.m., in accordance with local ordinances.

In cases where Valley Water owns the facility, barriers would be remediated by modifying, replacing, removing, or retrofitting the existing barrier, and the costs of remediation would be a responsibility of Valley Water. Where the facility is owned by another entity, Valley Water would make reasonable best efforts to partner with the owner of the facility to remove or remediate the barrier. In accordance with the Settlement Agreement Sections 6.5.2.2 (B), 6.6.2.1.1 (B), 6.6.2.1.2.2, and 6.6.2.1.3.2, "SCVWD will fund not more than 50 percent of the costs to remediate these passage barriers. However, SCVWD will undertake reasonable best efforts with the Parties and owners to secure the additional funds necessary to perform the remediation."

The intent of each remediation barrier design is to be self-maintaining. While there might be short-term impacts from these improvements, which are analyzed in this EIR, the intent of these measures is to improve conditions. Ongoing monitoring would confirm functionality, and any subsequent maintenance would be performed in line with Valley Water's SMP or as part of the AMP, as described in Section 2.6, *Adaptive Management Program*.

This EIR proposes mitigation measures for significant impacts of barrier remediation projects, with Valley Water responsible for implementation. Valley Water would directly implement mitigation measures for fish barrier remediation projects in Stevens Creek, since these projects would be directly implemented by Valley Water. For those fish barrier remediation projects proposed in the Guadalupe River watershed to be implemented by others, Valley Water would add similar mitigation measures as conditions of funding agreements with the implementing entities.

Spawning and Rearing Habitat Improvements

As noted in Section 2.4.2.2, spawning and rearing habitat improvement projects would generally occur in the upper watersheds (that is, at CWMZs below Stevens Creek and Guadalupe Reservoirs; see Figures 2.2-1 and 2.2-2). Six representative gravel or LWD augmentation project sites have been identified, as noted in Table 2.4-5, on which to base this programmatic analysis. These projects that have the potential to result in resource impacts include, but are not limited to, installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bankfull channel (the stage at which water is at the top of its banks and any further rise would result in water moving into the floodplain) to increase suitable spawning habitat. Specific methods and techniques for placement and anchoring would be made during Project design. Project-specific impacts and mitigation measures would be analyzed in future CEQA reviews when further design details are known.

Instream work would be limited to the summer work season beginning June 15 and ending October 15. Flows in these two watersheds are lowest during this time, but dewatering may be necessary for some projects. Dewatering of the instream work area would consist of placing a cofferdam upstream of the work area to temporarily impound water. The impounded water would be piped around the active work area using either pumps placed in the impoundment pool or a gravity-fed inlet. The water would be released into the active channel below the Project area. Rock may be temporarily placed near the pipe outlet as an energy-dissipation measure to reduce erosion of the channel bed. Ongoing monitoring would confirm functionality, and any subsequent maintenance would be performed in line with Valley Water's SMP or as part of the AMP, as described in Section 2.6, *Adaptive Management Program*.

Work would typically occur during normal business hours, Monday through Friday, between 7 a.m. and 5 p.m., in accordance with local ordinances. Ongoing monitoring would confirm functionality, and any subsequent maintenance or adaptive management measures would be performed in line with Valley Water's SMP or as part of the AMP, as described in Section 2.6, *Adaptive Management Program*.

Bank Stabilization Guidelines

No physical changes to the environment would be caused by preparation of the bank stabilization guidelines. Impacts of plan implementation are too speculative to evaluate now and depend on the results of a future study; therefore, no resource impacts were analyzed for this non-flow measure.

Completion of the Advanced Recycled and Other Urban Water Plan

No physical changes to the environment would be caused by preparation of a feasibility study regarding advanced recycled and other urban water. Impacts of plan implementation are too speculative to evaluate now and depend on the results of a separate study; therefore, no resource impacts were analyzed for this non-flow measure.

Other Watershed-specific Non-flow Measures

Stevens Creek Watershed-specific Measures: Portable Multiport Outlet and Trap-and-truck Feasibility Study

The Stevens Creek watershed-specific measures include the portable multiport outlet project and the trap-and-truck feasibility study. Construction of a portable multiport outlet would involve installing a portable pump that would sit on top of the dam with an intake line in the reservoir and an outlet pipe tied into the existing outlet works. Operational rules would be defined to optimize the dual objectives of habitat management (including thermal habitat conditions) and instream recharge. Performance measures for the multiport outlet would be associated with the performance measures for summer rearing flows.

No physical changes to the environment would be caused by preparation of the trap-and-truck feasibility study. Recommendations that come out of the study are unknown at this time and cannot be evaluated; therefore, no resource impacts were analyzed for this non-flow measure.

Guadalupe River Watershed-specific Measures: Almaden Dam Feasibility Study and Geomorphic Function Enhancement Pilot Projects

The Guadalupe River watershed-specific measures include the Almaden Dam feasibility study (also known as the Plan for Almaden Dam) and geomorphic functions enhancement pilot projects. The Almaden Dam feasibility study would not require physical changes to the environment.

Recommendations arising from the study are unknown at this time and cannot be evaluated; therefore, no resource impacts were analyzed for this study.

Geomorphic functions enhancements may occur along any reach of creek within the Guadalupe River watershed Project area and include implementation of pilot projects to enhance geomorphic functions. These projects may involve channel enhancements, including modifying channel dimensions for the purpose of carrying bankfull flow; varying the meander shape; planting riparian vegetation; removing culverts, riprap, and other structures; and stabilizing the area using bioengineering techniques. These techniques could include installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover.

Instream work would be limited to the summer work season beginning June 15 and ending October 15. Flows in this watershed are lowest during this time, but dewatering may be necessary for most projects. Dewatering of the instream work area would consist of placing a cofferdam upstream of the work area to temporarily impound water. The impounded water would be piped around the active work area using either pumps placed in the impoundment pool or a gravity-fed inlet. The water would be released into the active channel below the Project area. Rock may be temporarily placed below the pipe outlet as an energy dissipation measure to reduce erosion of the channel bed.

Work would typically occur during normal business hours, Monday through Friday, between 7 a.m. and 5 p.m., in accordance with local ordinances.

3.1.4.3 General Approach to Analyzing Impacts of Monitoring, Maintenance, and Adaptive Management

Given the degree of uncertainty and natural variability associated with ecosystems and their responses to management actions, Valley Water would implement the Phase 1 measures specified in the Proposed Project in an adaptive manner to effectively meet the objectives of the FHRP and to minimize adverse impacts to other resources (for example, water supply, groundwater levels, public health and safety, recreation, wildlife). As introduced in Section 2.6, *Adaptive Management Program*, the Proposed Project would also include monitoring for the purpose of complying with the Phase 1 measures and validating that habitat conditions are improved for fish passage, spawning, and rearing after implementation of proposed Phase 1 measures. The monitoring program could then trigger adaptive management actions implemented through subsequent phases that would relate to habitat qualities affected by Valley Water facilities and operations, recognizing that Valley Water is not responsible for other environmental conditions that may limit the population or distribution of fish species in the Stevens Creek or Guadalupe River watersheds. More details on the AMP and examples of these types of actions are provided in Section 2.6, *Adaptive Management Program*.

For the purpose of the EIR analysis, impacts of the monitoring program during Phase 1 are considered based on the physical impacts that might occur within the Project area. Monitoring applies to both the proposed flow and non-flow measures and involves such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives.

Maintenance applies to the proposed non-flow measures. Based on monitoring of these projects and functions, maintenance might involve repair or replacement of non-flow measure improvements during Phase 1 to maintain the proper working function of the non-flow measure.

As discussed in Section 2.6.2, the Draft EIR also generally evaluates the impacts of foreseeable Phase 1 adaptive actions for Stevens Creek and Guadalupe River Phase 1 measures that would be part of AMP implementation. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

This EIR does not evaluate impacts of Phase 2 or 3 additional measures because at the time of its preparation, the specific feasible additional measures that might be used to achieve Phase 2 and Phase 3 management objectives are unknown.

3.1.4.4 General Approach to Analyzing Proposed Water Rights Amendments

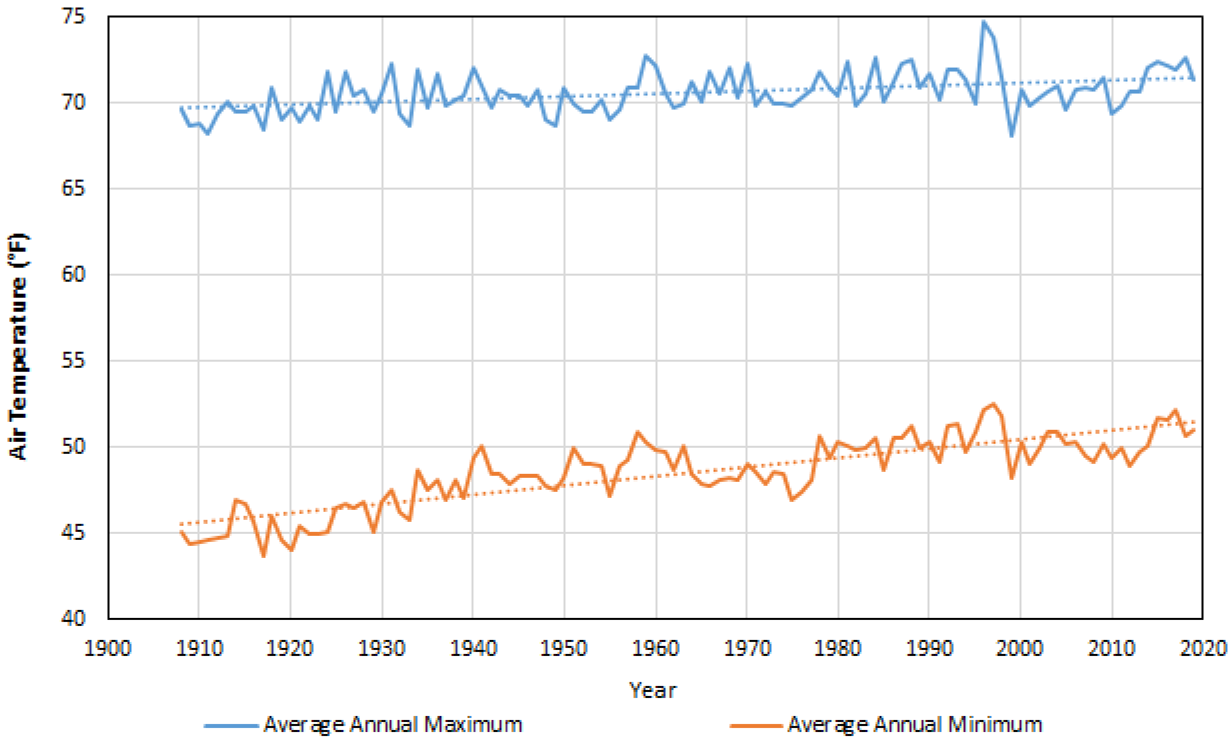
Valley Water is proposing changes to all of its currently held water rights in the Stevens Creek and Guadalupe River watersheds as part of the Proposed Project (Table 1.2-1). In addition, Valley Water's water rights applications also request a minor change in the point of diversion to reflect existing practices specific to Application 5653 (Alamitos Percolation Ponds). Details of these proposals are discussed in Section 1.2.3. The changed point of diversion in Application 5653 would not cause new environmental impacts because it reflects existing practices (that is, current baseline conditions). See Appendix L, *Proposed Petitions to Change Water Rights*.

3.1.4.5 General Approach to Analyzing Climate Change

The Project area is already experiencing the impacts of climate change. This change is becoming apparent in the observed record (Figure 3.1-1 through Figure 3.1-3), but climate projections anticipate this change to accelerate and its variability to increase.

Average annual maximum and minimum temperatures (Figure 3.1-1) have shown an increase of 2.2 degrees Fahrenheit (°F) and 6.2°F, respectively, during the period of record from 1908 to 2017 in the region. Much of the increase in minimum temperatures is a consequence of urbanization of the region, causing an increase in the urban heat island effect (U.S. Environmental Protection Agency [USEPA] 2018a).

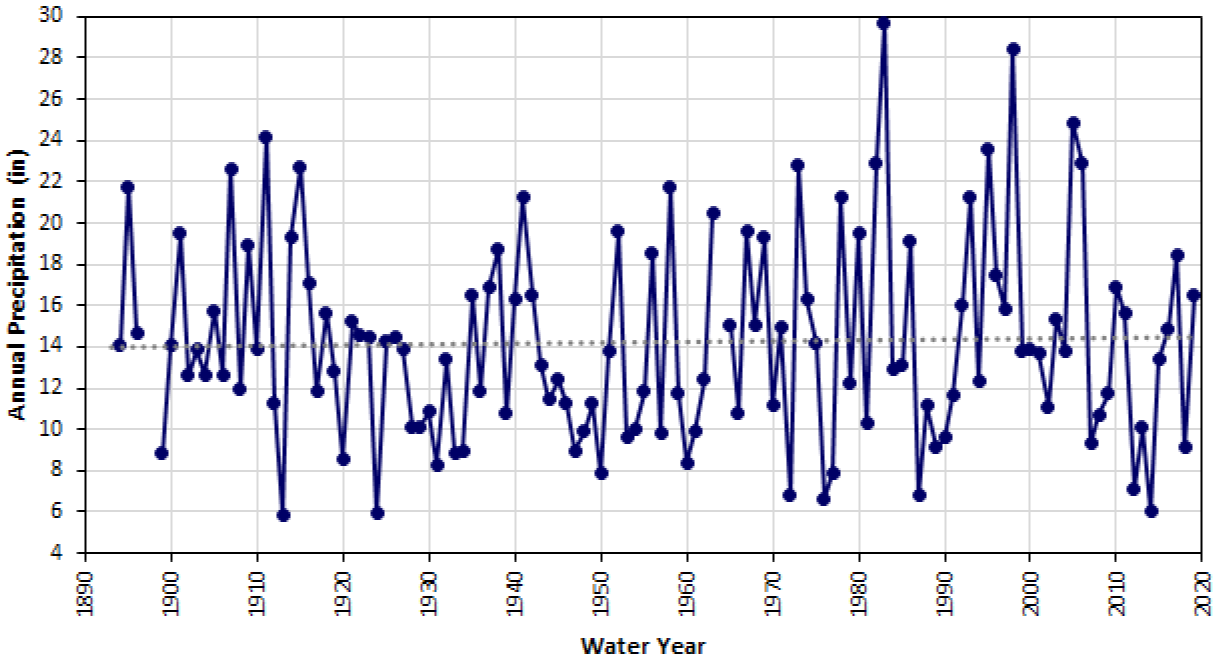
Figure 3.1-1. Observed Average Annual Maximum (orange) and Minimum Temperature (blue) near the San José International Airport (1908–2019)



Notes: The months of September and October are missing from the available record from 1999. Trendlines are in orange and blue. Data are from the National Climatic Data Center (2020).

Although the average annual precipitation in the region, shown in Figure 3.1-2, exhibits a general increase in precipitation for the period of record from 1893 to 2019, it also indicates significant annual variability.

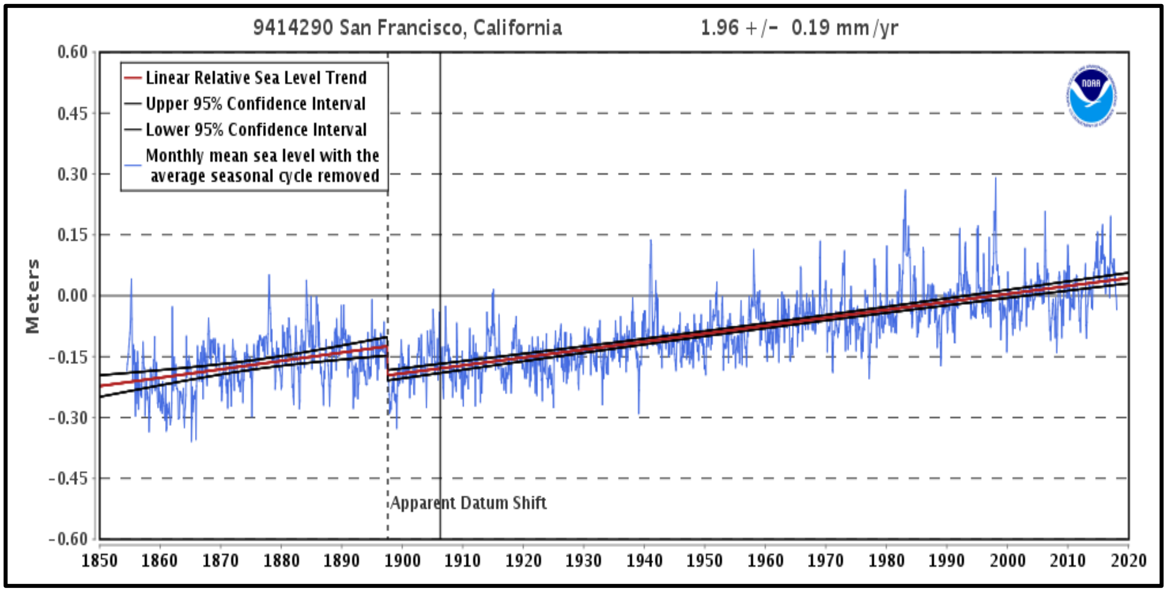
Figure 3.1-2. Observed Annual Precipitation at San José International Airport (1893–2019)



Notes: Trend line is shown in gray. Data are from the National Climatic Data Center (2020). The months of September and October are missing from the available record from 1999.

The southern San Francisco Bay, which represents the stream (creek)/tidal interface for the Project area and surrounding region, has undergone observed sea level rise during the last 150+ years as well. Although there is a tide gage in the middle of Coyote Creek at its interface with San Francisco Bay, this gage does not provide sea level trends. A gage at the Golden Gate Bridge at the opening of San Francisco Bay to the Pacific Ocean provides some insight into observed sea level rise in the bay itself (Figure 3.1-3) for the period of record from 1850 to present. The baseline rate of change at this site has been 0.08 inch/year, which is approximately 1 inch every 13 years.

Figure 3.1-3. Observed Sea Level Rise at the Golden Gate Bridge Tide Gage



Source: National Oceanic and Atmospheric Administration (NOAA) (2018)

California's Fourth Climate Change Assessment (Governor's Office of Planning and Research 2019) states, "Changes in temperature, precipitation, and sea level rise will produce substantial impacts on Bay Area social systems and the built environment." The *California Water Plan Update 2013* (DWR 2014) provides the following qualitative and quantitative descriptions of these impacts for the entire state:

- Mean annual air temperature across the state will be 3.4°F to 4.9°F warmer in 2060 to 2069 than in 1985 to 1994, with a greater increase in summer months than in winter months.
- Warmer air temperatures will shift some precipitation from snow to rain, resulting in a decrease in snowpack in the Sierra Nevada.
- Snowmelt runoff will shift earlier in the year, when reservoirs are typically operated for flood protection, not water supply.
- Precipitation events will be more intense, leading to more frequent and/or more extensive flooding.
- Droughts are likely to become more frequent and persistent during this century.

The Project area and surrounding region would likely undergo changes similar to those projected in the highlights from the *California Water Plan Update 2013* (DWR 2014). The projected impacts of climate change specific to this region would include:

- A decrease in imported water supplies as a result of potential reduction or changes in snowpack or snowmelt timing in the Sierra Nevada.
- Continued increases in air temperatures that will lead to more intense rainfall and flooding because, as the air warms, it gains the capability of holding more water (Trenberth 2011).
- Greater precipitation variability in the future with the potential for more extreme floods and longer periods of drought (Cvijanovic et al. 2017).
- Surface water quality and groundwater resources changes attributable to variable precipitation and rising temperature (National Climate Assessment 2018).

- Changes in stream flow terminus region salinity resulting from intrusion from higher sea levels (California Natural Resources Agency 2018a).
- Increased wildfire activity attributable to warming temperatures and drought cycles, which is projected to exacerbate flooding, debris flows, and water quality (University of California Los Angeles 2018).

To address these consequences of a changing climate and analyze their impacts, Valley Water used qualitative and quantitative assumptions based on the findings from *California's Fourth Climate Change Assessment* (Governor's Office of Planning and Research 2019) regarding future projections for climate change in its WEAP model development and the County's *Raw Water Plan*. Modeling for the flow measures component of the Proposed Project is based on a 21-year hydrologic cycle, from 1990 to 2010. Valley Water has good rain and river data from this period. No changes to these data are included in the current baseline to account for climate change. For the future baseline, imported water input is based on CalSim modeling, which includes 2030 emissions scenarios in regard to temperature and sea level rise (6 inches) and changes to Central Valley inflows reflecting changes to precipitation patterns and snow melt. Local supplies do not include any climate change differences in 2035. This is consistent with Valley Water water supply planning efforts that also do not include climate change modifications for the 2040 planning horizon.

Valley Water has considered climate change impacts to local water supplies. As part of the update to the *Water Supply Master Plan*, Valley Water analyzed various climate models downscaled to the county level for the late-century period (2070 to 2100; Valley Water 2019a). The analysis concluded that Valley Water's service area could experience a greater intensity of wet and dry periods, but, on average, local runoff may experience only a minor increase.

3.1.5 Resources Eliminated from Further Analysis

This section describes those resources that were found in the *Initial Study* (Appendix F) to have a *less-than-significant impact* or *no impact* and explains the rationales for these findings.

Nine resource topics have been eliminated from further analysis: aesthetics, agriculture, hazardous materials, land use, minerals, population and housing, public services, transportation and traffic, and wildfire. A brief summary of the excluded resources, and the rationale for their exclusion, follows. For a more detailed description of the Proposed Project's impacts to these resources, see Appendix F, *Initial Study*. In addition, for some resource topics, only selected impact significance thresholds are analyzed; Appendix F, *Initial Study*, explains why other potential thresholds suggested by CEQA Guidelines Appendix G were determined to have a *less-than-significant impact* or *no impact*.

3.1.5.1 Aesthetics

The Project area does not include remarkable landscape elements that create scenic vistas or areas designated as scenic vistas by the California Department of Transportation Scenic Route Project or the County's *General Plan* (Santa Clara County 1994). There are no State Scenic Highways in the Project area. Views of the Project area are largely limited to the immediate vicinity because the surrounding topography is at a low elevation and views are screened with vegetation. Project construction activities would be completed during daylight hours and would not occur during nighttime hours except during emergency activities. Project implementation would not include installation of any new permanent sources of light or glare. Moreover, because reservoirs would be operated within their current authorized capacity, there would be no noticeable change to the visual aspects of the area. Because the Proposed Project would not result in a permanent adverse effect on a scenic vista, construction activities associated with non-flow measures would be temporary and short-term views of the Project sites would be limited, no nighttime lighting would be required, and no new sources of permanent light or glare are proposed, there would be a less-than-significant regional impact as a result of Project implementation.

3.1.5.2 Agriculture

The Project area covers a large portion of the County (Figure 1.2-1), which contains a substantial amount of land in agricultural uses. Project implementation would not result in a conversion of farmland, forest land, or timberland uses and would not preclude the continued use of adjacent properties for such uses. Implementation of the Proposed Project would cause no conflict with existing zoning for agriculture or forest land or with a Williamson Act contract. Finally, because the Proposed Project would not involve other changes in the existing environment that could result in conversion of farmland to nonagricultural use or conversion of forest land to non-forest use, no impact would occur with Project implementation.

3.1.5.3 Hazardous Materials

None of the areas that would be subject to construction activity are known to contain hazardous materials or are listed under the provisions in Government Code Section 65962.5, on what is commonly referred to as the “Cortese List” (California Environmental Protection Agency [CalEPA] 2018). In some cases, however, the individual sites in the Project area could be located adjacent to or in the vicinity of listed hazardous materials sites. Valley Water would comply with all relevant federal, state, and local statutes and regulations related to the transport, use, storage, or disposal of hazardous materials associated with construction activities, and all materials designated for disposal would be evaluated for appropriate state and federal hazardous waste criteria and properly disposed of according to their classifications. Construction activities would incorporate Valley Water standard BMPs listed in the *Initial Study* to avoid a significant hazard to the public or the environment resulting from existing hazardous materials and/or sites.

The Proposed Project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. The Proposed Project is not within the boundaries of an airport land use plan or within 2 miles of a public, public use, or private airport. The Proposed Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, nor would the Proposed Project expose people or structures to increased risk of loss, injury, or death involving wildland fires. There would be no or less-than-significant impacts associated with hazardous materials with Project implementation.

3.1.5.4 Land Use

The Project area is located on land owned by Valley Water, the County, the Cities, or private parties. Based on the extensive reach of the Project area watersheds throughout the county, the Project area is characterized by a wide range of surrounding land uses, which include residential and recreational land uses. The Proposed Project land use changes would not significantly affect other types of land uses near and downstream of the affected resources, nor would they cause a significant environmental impact because of a conflict with any existing land use plans, policies, or agency regulations.

3.1.5.5 Minerals

Mineral resources of regional or statewide significance found and extracted in the County include construction aggregate (crushed stone, sand, and gravel), deposits of limestone, and, to a lesser extent, salt derived from evaporation ponds at the edge of San Francisco Bay. These resources are not known to be present in the Project area. The California Geological Survey (CGS) *Guidelines for*

Classification and Designation of Mineral Lands contain guidelines for classifying and designating mineral land for determining suitability as aggregate resources areas. The Proposed Project would not affect the availability of known mineral resources and would not result in the loss of any designated, locally important mineral resource recovery sites.

3.1.5.6 Population and Housing

The proposed construction activities would occur primarily on property owned by either Valley Water or the County. The Proposed Project involves flow changes and limited physical changes to existing Valley Water facilities. The Proposed Project would not affect the distribution of people living or working in the Project area and would not displace housing or people.

3.1.5.7 Public Services

The Proposed Project would not require the construction of new or expanded public service facilities or infrastructure. Flow and non-flow measures would not affect the local demand for fire protection, which relies on a prescribed and maintained water supply to serve emergency services. Likewise, flow and non-flow measures would not affect the local law enforcement services and would not cause the need for new or expanded school, park, or other public facilities, the construction of which could cause significant environmental impacts.

3.1.5.8 Transportation and Traffic

The Proposed Project would not generate substantial amounts of construction or operational traffic, cause significant increases in the number of vehicle miles traveled, or have adverse impacts to any transportation facilities (such as roads, site access points, bicycle and pedestrian facilities, and transit routes). The Proposed Project would not conflict with a plan, ordinance, or policy regarding the performance of local traffic circulation systems, including transit, roadways, bicycle lanes, and pedestrian paths, and would not conflict with the Santa Clara Valley Transportation Authority's congestion management program. Valley Water would maintain emergency access to individual work sites that are part of the Proposed Project and to adjacent areas during and following construction, and the Proposed Project would not substantially increase safety hazards.

3.1.5.9 Wildfire

The Proposed Project study area includes areas mapped as very high fire hazard severity zones in the upper reaches of the Stevens Creek and Los Gatos Creek watersheds, including the southern shore of Stevens Creek Reservoir and the northern shores of Lexington Reservoir (California Department of Forestry and Fire Protection 2007). As compared with the CEQA Guidelines Appendix G questions, the Proposed Project would not impair any emergency response plans or emergency evaluation plans, exacerbate wildfire risk, require the installation or maintenance of associated infrastructure, or expose people or structures to significant wildfire risks or impacts. Wildfire impacts would, therefore, be less than significant.

3.2 Hydrology

This section describes the hydrology resources of the study area, including those areas in which the Proposed Project could affect hydrologic flows, drainage patterns, and/or the potential for flood damage in the Stevens Creek and Guadalupe River watersheds. In addition, this section discusses the Proposed Project's impacts to hydrology in the study area.

The study area used to assess the impacts of the Proposed Project on hydrology is limited to portions of the Stevens Creek and Guadalupe River streams, rivers, and reservoirs within the watersheds described in Chapter 2, *Project Description* (Figures 2.2-1 and 2.2-2). Specifically, for Stevens Creek, the study area is generally downstream of the Stevens Creek Dam and upstream of the tidally influenced section of the creek (approximately midway between Highway 101 and the Crittenden Lane pedestrian bridge). The study area in the Guadalupe River watershed used to assess the impacts of the Proposed Project on hydrology is defined as the four specific waterways in the Guadalupe River watershed: Alamitos Creek, Guadalupe Creek, Los Gatos Creek, and the Guadalupe River. The study areas generally begin below each waterway's associated dam and upstream of the tidally influenced section of the Guadalupe River (located approximately at the pedestrian bridge downstream of the Montague Expressway).

3.2.1 Environmental Setting

The environmental setting represents the existing conditions of hydrology resources in the study area. This setting is also referred to as the current baseline conditions and refers to the 2015 model set. As such, although the current baseline year for the analysis of hydrology resources is 2015, more recent data sources are included in the environmental setting where available. It forms the basis for comparison of Proposed Project impacts. The future baseline conditions for hydrology resources are described for comparison of impacts related to flow measures using a 2035 model set; assumptions include an increase in water supply, water demand, and maximum reservoir capacities in the Stevens Creek and Guadalupe River watersheds caused by remediation of reservoir safety restrictions (Section 2.2, *Proposed Project Area*).

Major floods have struck the county in 1952, 1955, 1982, 1986, 1995, 1997, 1998, and 2017. The amount of urban development in floodprone areas has dramatically increased in the past 20 years, and thus the potential for property damage from major flooding has also increased.

This section discusses the general hydrology and historical flows in the study area. The primary channels are Stevens Creek and the Guadalupe River. This section also includes secondary tributaries to the Guadalupe River (that is, Calero Creek, Alamitos Creek, Guadalupe Creek, and Los Gatos Creek).

3.2.1.1 Stevens Creek

The Stevens Creek watershed covers 29 square miles in western Santa Clara County. Flows in Stevens Creek originate from the Santa Cruz Mountains and travel along the San Andreas Fault for approximately 5 miles. Flows then travel northeast for approximately 3 miles, enter Stevens Creek Reservoir, and continue north for approximately 13 miles before discharging into San Francisco Bay. The approximate maximum controlled outlet capacity of Stevens Creek Reservoir is 410 cfs, and the estimated downstream flood capacity is 5,000 cfs (Xu 2021). In addition to reservoir releases, inflows to Stevens Creek include flow from the Permanente Diversion, Heney Creek, and local or imported flow from the Stevens Creek Pipeline. Losses along Stevens Creek are attributable to instream percolation.

Some water in Stevens Creek is transmitted to the Santa Clara groundwater subbasin through a recharge zone between streamflow station 5044 (downstream of Stevens Creek Reservoir) and Fremont Avenue. After inflows from the Permanente Diversion, Heney Creek, and the Stevens Creek Pipeline, the remaining water flows to San Francisco Bay (Figure 3.2-1). Historical stream gage information along Stevens Creek downstream of the Stevens Creek Reservoir Outlet (gage 5044) summarizes historical peak flows. Table 3.2-1 provides monthly peak flows at the gage for the period of record from January 1, 1990, to December 31, 2019.

Table 3.2-1. Monthly Historic Maximum Peak Flow (cfs) Data at Stevens Creek Reservoir Gauge

Location (Gage)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Stevens Creek Reservoir (5044)	708	1,390	1,060	316	66	44	14	16	82	12	15	274

Source: Valley Water – personal communication from Jack Xu on October 6, 2020
Note: Period of record is January 1, 1990, through December 31, 2019.

3.2.1.2 Guadalupe River

The Guadalupe River watershed, covering 170 square miles, begins in the Santa Cruz Mountains on the west side of Santa Clara County (Figure 3.2-2). The Guadalupe River has four major tributaries in the study area (that is, Calero, Alamitos, Guadalupe, and Los Gatos Creeks), and each creek is regulated by a storage reservoir. The creeks and the upstream reservoirs are listed below:

- Calero Creek (Calero Reservoir)
- Alamitos Creek (Almaden Reservoir)
- Guadalupe Creek (Guadalupe Reservoir)
- Los Gatos Creek (Lake Elsman, Lexington, and Vasona Reservoirs)

Calero Creek flows into Alamitos Creek downstream of Almaden Reservoir. Alamitos Creek then flows into Guadalupe Creek downstream of Guadalupe Reservoir, and the combined flow forms the Guadalupe River. At the confluence with Alamitos Creek, Guadalupe Creek becomes the Guadalupe River. Last, Los Gatos Creek flows into the Guadalupe River approximately 12 miles downstream of Lexington Reservoir.

Alamitos Creek

Alamitos Creek originates in the Santa Cruz Mountains, crossing the foothills before flowing into Almaden Reservoir in the upper watershed (Figure 3.2-2). The approximate maximum controlled outlet capacity of Almaden Reservoir to Alamitos Creek is 190 cfs (as well as an additional 60 cfs to Almaden-Calero Canal), and the estimated downstream flood capacity is 5,000 cfs (Xu 2021). Below Almaden Reservoir, Alamitos Creek joins Guadalupe Creek to form the Guadalupe River. Controlled outlet and uncontrolled spillway flows from Almaden Reservoir are measured at Alamitos Creek below the Almaden Reservoir gage (gage 5016). Table 3.2-2 provides monthly maximum peak flows for the gage's period of record.

Table 3.2-2. Monthly Historic Maximum Peak Flow (cfs) Data at Alamitos Creek below Almaden Reservoir Stream Gage

Location (Gage)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Alamitos Creek below Almaden Reservoir (5016)	1,420	1,090	1,130	655	93	36	36	18	23	168	76	417

Source: Valley Water – personal communication from Jack Xu on October 6, 2020
Note: Period of record is June 19, 1990, through December 31, 2019.

Calero Creek

Calero Creek begins in the eastern Santa Cruz Mountains and flows into Calero Reservoir (Figure 3.2-2). The approximate maximum controlled outlet capacity of Calero Reservoir is 185 cfs, and the estimated downstream flood capacity is 200 cfs (Xu 2021). Downstream of Calero Reservoir, Calero Creek flows northwest and joins Alamitos Creek. Releases from Calero Reservoir are measured at its outlet (gage 5013). Table 3.2-3 provides monthly maximum peak flows at this gage for its period of record. Calero Creek experienced flooding at McKean Road in San José during the January 9 to 10, 1995, storm that also caused flooding along the Guadalupe River (Valley Water 1995).

Table 3.2-3. Monthly Historic Maximum Peak Flow (cfs) Data at Calero Creek below Calero Reservoir Stream Gage

Location (Gage)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Calero Creek below Calero Reservoir (5013)	119	129	690	33	46	39	33	28	25	28	27	59

Source: Valley Water – personal communication from Jack Xu on October 6, 2020
Note: Period of record is July 1, 1990, through December 31, 2019.

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Figure 3.2-1. Stevens Creek Watershed

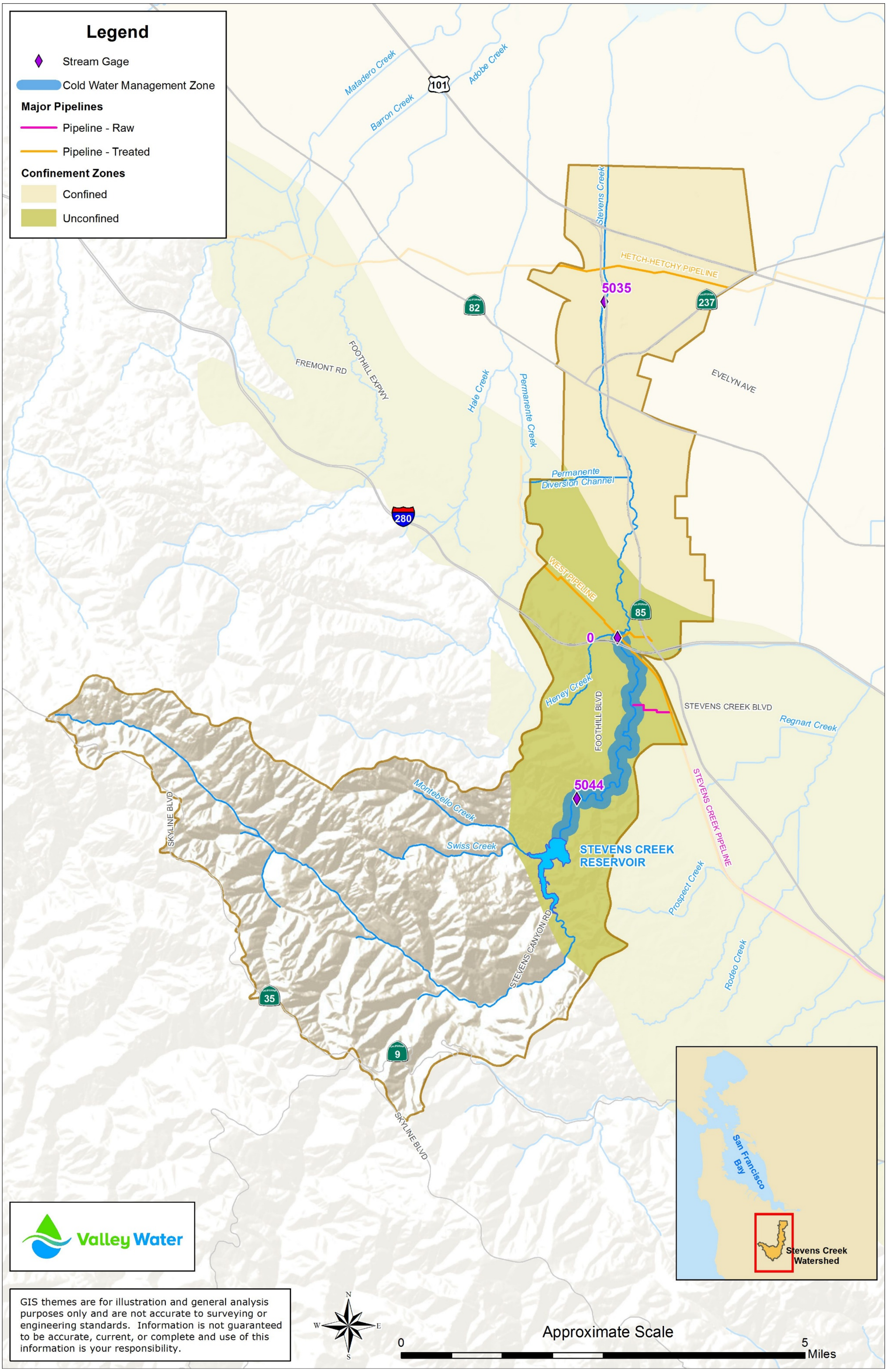
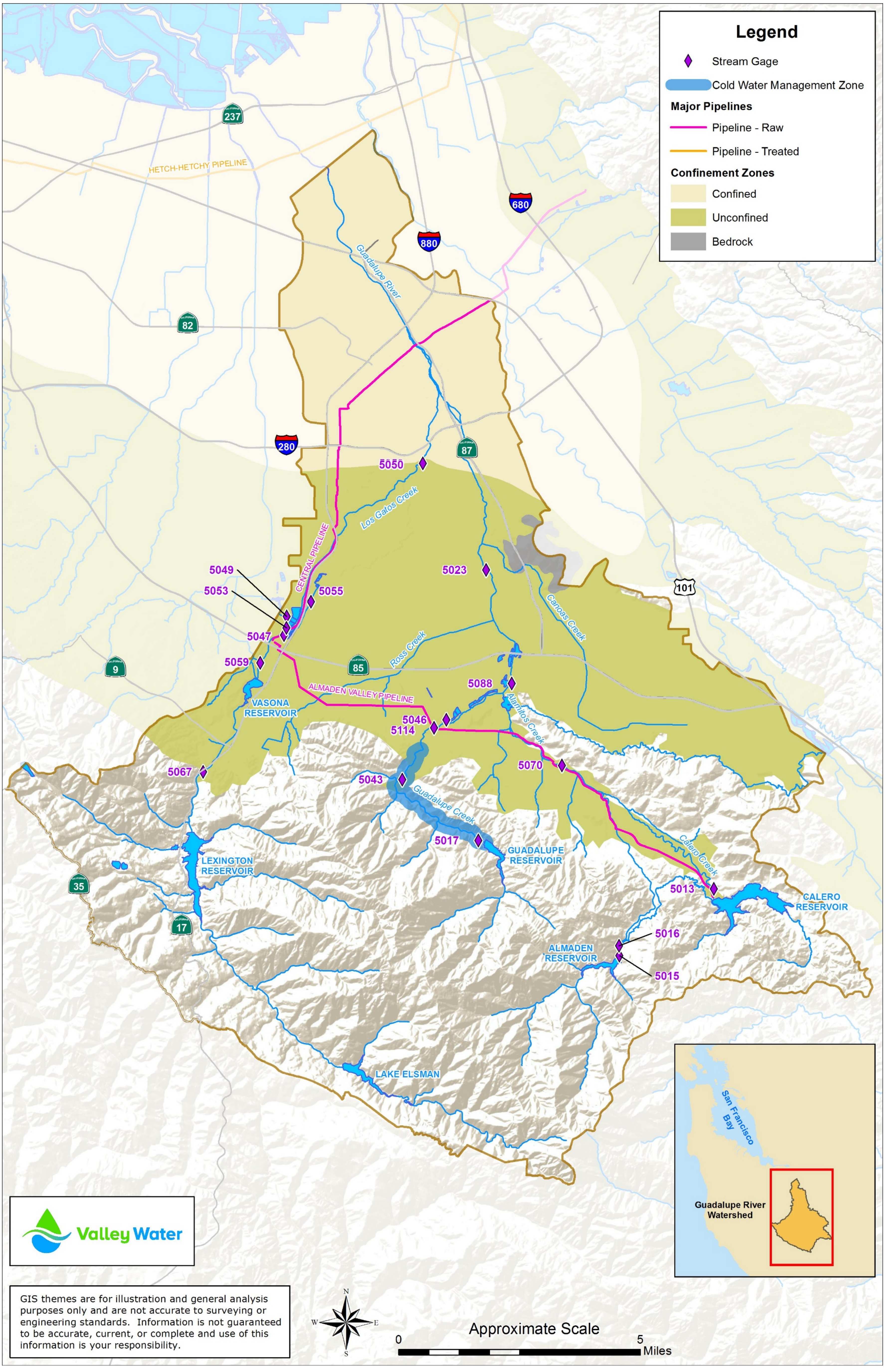


Figure 3.2-2. Guadalupe River Watershed



Los Gatos Creek

Los Gatos Creek originates in the Santa Cruz Mountains and flows through three reservoirs: Lake Elsman, Lexington Reservoir, and Vasona Reservoir. Of the three reservoirs, Lexington Reservoir is the largest. The approximate maximum controlled outlet capacity of Lexington Reservoir is 400 cfs, and the estimated downstream flood capacity is 5,000 cfs (Xu 2021) for all of Los Gatos Creek downstream of Lexington Reservoir. Below Vasona Reservoir, Los Gatos Creek flows into the Guadalupe River. Flows from Los Gatos Creek can be diverted at Kirk Dam to groundwater recharge in the Budd Avenue, Camden, McGlincy, Oka, Page, and Sunnyoaks Ponds. Los Gatos Creek flows downstream of Lexington Reservoir are measured at Los Gatos Creek below Lexington Reservoir (gage 5067). Table 3.2-4 provides historic monthly maximum peak flows at the gage for its period of record.

Table 3.2-4. Monthly Historic Maximum Peak Flow (cfs) Data at Los Gatos Creek below Lexington Reservoir Gage

Location (Gage)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Los Gatos Creek below Lexington Reservoir (5067)	1,900	1,890	1,910	714	245	107	96	448	88	379	86	386

Source: Valley Water – personal communication from Jack Xu on October 6, 2020
Note: Period of record is January 1, 1990, through December 31, 2019.

Guadalupe Creek

Guadalupe Creek also originates in the Santa Cruz Mountains and is impounded by Guadalupe Reservoir. Although historically ephemeral in the reaches below the dam, Guadalupe Creek has become a perennial stream because of the operation of Guadalupe Reservoir. The approximate maximum controlled outlet capacity of Guadalupe Reservoir is 235 cfs, and the estimated downstream flood capacity is 5,000 cfs (Xu 2021) for the channel downstream of Guadalupe Reservoir. Flows from Guadalupe Creek can be diverted at Masson Dam to groundwater recharge ponds at Los Capitancillos Ponds. Guadalupe Reservoir controlled outlet releases and uncontrolled spillway flows are measured at the Guadalupe Creek below the Guadalupe Reservoir gage (gage 5017). Table 3.2-5 shows monthly maximum peak flows for the gage's period of record.

Table 3.2-5. Monthly Historic Maximum Peak Flow (cfs) Data at Guadalupe Creek below Guadalupe Reservoir Gage

Location (Gage)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Guadalupe Creek below Guadalupe Reservoir (5017)	427	355	648	207	56	24	20	16	24	18	19	152

Source: Valley Water – personal communication from Jack Xu on October 6, 2020
Note: Period of record is January 1, 1990, through December 31, 2019.

Guadalupe River

Guadalupe and Alamitos Creeks meet downstream of Lake Almaden to form the headwaters for the Guadalupe River; the Guadalupe River flows for approximately 6 miles before joining Los Gatos Creek, subsequently flowing out to San Francisco Bay. Flows from the Guadalupe River can be diverted at Alamitos Dam to groundwater recharge at the Alamitos and Guadalupe Ponds. Post-1990 flooding has occurred on the Guadalupe River in 1995 and 1998 (Valley Water 1995, 1998). The Guadalupe River flooded twice in 1995, first during the storm of January 9 to 10, when it spilled over its banks in three locations in San José, and again caused flooding during the March 10 storm in San José (Valley Water 1995). Transportation infrastructure flooding along the Guadalupe River also occurred during the February 2 to 7, 1998, storm in San José (Valley Water 1998).

3.2.2 Regulatory Setting

This section summarizes the federal, state, regional, and local laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to hydrology resources.

3.2.2.1 Federal

National Flood Insurance Act of 1968 and Flood Disaster Protection Act of 1973

The National Flood Insurance Act of 1968 (42 U.S. Code [USC] 4001 et seq.) provides federally backed flood insurance to communities that enact and enforce floodplain regulations. As part of its flood insurance program, the Federal Emergency Management Agency (FEMA) has developed a Community Rating System, which rewards communities that practice proactive flood management and educational activities above and beyond the minimum requirements of the National Flood Insurance Program (NFIP). The reward is an across-the-board reduction in insurance premiums for residents and businesses in a participating community. The Flood Disaster Protection Act of 1973 (42 USC 4001 et seq.) expanded the NFIP by increasing limits of coverage and by requiring known floodprone communities to participate in the NFIP.

FEMA Levee Design and Maintenance Regulations (44 Code of Federal Regulations 65.10)

Guidance and criteria for levees included in the NFIP are provided in the FEMA Levee Design and Maintenance Regulations (44 Code of Federal Regulations [CFR] 65.10). Major criteria include freeboard, closure structures, embankment protection, embankment and foundation stability, settlement, interior drainage, and other design criteria. Operation and maintenance requirements are also discussed. Each of these criteria includes specific design guidelines that must be met in order for the levee to remain in the NFIP.

3.2.2.2 State

Water Code Sections 6075 to 6157

Water Code Division 3, Sections 6075 to 6157, outlines the powers of DWR's DSOD over general activities, maintenance and operations, emergency work, investigations and studies, and actions and procedures that may be taken to restrain violations. DSOD regulates all state-owned dams (and federal dams if specifically identified in the Code), including applications for new dams. DSOD has imposed storage restrictions on several Valley Water reservoirs because of dam safety risks (Section 2.4.1.2), keeping water levels lower than normal until Valley Water conducts corrective actions to restore the full integrity of restricted dams and associated facilities.

State Authority under Clean Water Act Section 402 (33 U.S. Code Section 1342)

General Permit for Construction Activities

The State of California adopted the Construction General Permit, Order No. 2012-0006-DWQ, amending Order No. 2009-0009-DWQ, effective July 17, 2012. SWRCB Water Quality Order 2012-0006-DWQ (Construction General Permit) regulates construction site stormwater management. Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the general permit for discharges of stormwater associated with construction activity. This requirement includes linear projects that disturb 1 or more acres. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

Permit applicants are required to submit a Notice of Intent to SWRCB and to prepare a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP identifies BMPs that must be implemented to reduce construction effects on receiving water quality based on pollutants. The BMPs identified are directed at implementing both sediment- and erosion-control measures and other measures to control chemical contaminants. The SWPPP must also include descriptions of the BMPs to reduce pollutants in stormwater discharges after all construction phases have been completed at the site (post-construction BMPs). The SWPPP must contain a visual monitoring program, a chemical monitoring program for “nonvisible” pollutants to be implemented if there is a failure of BMPs, and a sediment monitoring plan if the site discharges directly to a waterbody listed on the CWA 303(d) list for sediment.

3.2.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies those relevant to hydrology.

Valley Water Stream Maintenance Program

Valley Water has an SMP to remove sediment, invasive vegetation, and trash and debris so its waterways are able to carry floodwater safely. Routine stream maintenance includes activities such as:

- levee safety
- sediment removal
- bank protection
- trash removal
- fence and access repair
- site revegetation maintenance
- tree preservation
- watershed vegetation management

The SMP includes BMPs. Some of the SMP BMPs are also applicable to the Proposed Project because activities included in the SMP and Proposed Project would be similar (for example, sediment removal).

Safe, Clean Water and Natural Flood Protection Program[1]

In November 2020, Measure S was approved by voters, extending the assessment that was established in the Safe, Clean Water and Natural Flood Protection Program (Valley Water 2020a). This program replaced the Safe, Clean Water and Natural Flood Protection Program, which voters approved in November 2012. The program is designed with five priorities, including the following: (1) ensure a safe, reliable water supply; (2) reduce toxins, hazards, and contaminants in our waterways; (3) protect our water supply and dams from earthquakes and other natural disasters; (4) restore wildlife habitat and provide open space; and (5) provide flood protection to homes, businesses, schools, streets, and highways. Valley Water prepares an annual report providing a progress update for each of these program priorities, along with fiscal year (FY) accomplishments.

Santa Clara County General Plan (Part 2, Resource Conservation Chapter)

The Santa Clara County *General Plan*, 1995 to 2010 (1994), Part 2, the Resource Conservation element, relates to the proposed program. The *General Plan* identifies the need to improve water quality and watershed management by reducing non-point source pollution and implementing comprehensive water management plans. The *General Plan* (1994) reads:

Strategy #1 Reduce non-point source pollution.

Policy C-RC 23 Countywide Stormwater Management Plan should be routinely reviewed and updated to increase the effectiveness of prescribed control measures.

Strategy #3 Prepare and implement comprehensive watershed management plans.

Policy C-RC 26 Comprehensive watershed management plans should be developed and implemented through intergovernmental coordination. Water supply watersheds should receive special consideration and additional protection.

City of Mountain View General Plan (Chapter 5, Infrastructure and Conservation)

The Mountain View 2030 *General Plan* (2012), Chapter 5, *Infrastructure and Conservation*, lists several policies related to watershed and floodplain management. The following policies are relevant to the Proposed Project:

Goal INC-17 A healthy and well-managed watershed that contributes to improved water quality and natural resource protection.

Policy INC 17.1 Flood Prevention Provide and maintain City infrastructure to reduce localized flooding and protect community health and safety.

Policy INC 17.2 Natural Hydrology in Watersheds Promote an ecologically sensitive approach to flood protection, encouraging natural hydrology and preserving habitat and ecology within watercourses.

Policy INC 17.3 Floodway Preservation Preserve floodways as a natural flood control mechanism.

Policy INC 17.4 National Flood Insurance Program Participate in the National Flood Insurance Program administered by the Federal Emergency Management Agency.

[1] Measure S, the Safe, Clean Water and Natural Flood Protection Program: https://www.valleywater.org/safecleanwater

City of Sunnyvale General Plan (Chapter 6, Safety and Noise)

The Sunnyvale *General Plan* (2011), Chapter 6, *Safety and Noise*, includes the following policies that address flooding:

Policy SN-1.2 Take measures to protect life and property from the effects of a 1 percent (100-year) flood.

SN-1.2a Encourage the Santa Clara Valley Water District to reevaluate the capacity of Stevens Creek, Calabazas Creek, Sunnyvale East, West and El Camino Flood Control Channels in relation to a 1 percent (100-year) flood.

SN-1.2b Encourage Santa Clara Valley Water District to maintain its dikes and levees at least 3 feet above the 1 percent flood level and to provide continued inspection and repair from damage caused by burrowing animals.

SN-1.2c Participate in the National Flood Insurance Program.

City of Cupertino General Plan (Chapter 7, Health and Safety Element)

The City of Cupertino 2040 *General Plan* (2014), Chapter 7, *Health and Safety Element*, lists the following goals and policies relating to management of creeks to reduce flooding:

Goal HS-7 Protect people and property from risks associated with floods.

Policy HS-7.4 Construction in Floodplains Continue to implement regulations limiting new construction in the already urbanized flood hazard areas.

Policy HS-7.6 Stability of Existing Water Storage Facilities Work with owners of water storage facilities to develop and implement a program to monitor the stability of all existing water storage facilities.

Town of Los Gatos General Plan (Part 9, Environment and Sustainability Element, and Part 11, Safety Element)

The Town of Los Gatos 2020 *General Plan* (2010), Part 9, *Environment and Sustainability Element*, and Part 11, *Safety Element*, identify the following goals and policies to protect watersheds and riparian habitats:

Goal ENV-5 To protect and preserve watersheds and water quality.

Policy ENV-5.2 Apply land use regulations, scenic easements, or others appropriate measures to keep the maximum amount of land immediately contiguous to reservoirs and stream channels undeveloped and undisturbed.

Policy ENV-5.3 Cooperate with the Santa Clara Valley Water District and other agencies to protect watersheds and riparian habitats from degradation.

Policy ENV-5.4 Preserve existing creeks and avoid disturbances to these areas.

Policy ENV-5.5 When a development project is adjacent to a designated creek, the approval shall include a condition that the creek be dedicated to the Town in fee with a maintenance easement granted to the Santa Clara Valley Water District.

Goal SAF-4 To reduce the potential for injuries, damage to property, economic and social displacement, and loss of life resulting from flood hazards.

Policy SAF-4.1 Adopt designated floodways for all major streams utilizing the full floodplain concept as a first priority and the modified floodplain concept as a second priority for floodplain development.

Policy SAF-4.2 Limit the intensity of land use in floodplain areas.

City of San José General Plan (Chapter 3, Environmental Leadership, as Amended)

The City of San José 2040 *General Plan* (2011), Chapter 3, *Environmental Leadership*, Part 3, *Environmental Considerations/Hazards*, outlines several policies that address flooding. The following goals and policies are relevant to the Proposed Project:

Goal EC-5 Protect the community from flooding and inundation and preserve the natural attributes of local floodplains and floodways.

Policy EC-5.1 The City shall require evaluation of flood hazards prior to approval of development projects within a FEMA designated floodway.

Policy EC-5.10 Encourage the preservation and restoration of urban creeks and rivers to maintain existing floodway storage and use bio-engineering.

City of Santa Clara General Plan (Chapter 5.10.4)

The City of Santa Clara 2010 to 2035 *General Plan* (2010), Chapter 5, *Goals and Policies*, Environmental Quality element, also identifies several goals and policies related to the Proposed Project and riparian areas along the Guadalupe River that define the City's northeast boundary:

Goal 5.10.1-G1 The protection of fish, wildlife, and their habitats.

Goal 5.10.1-G2 Conservation and restoration of riparian vegetation and habitat.

Policy 5.10.1-P1 Require environmental review prior to approval of any development with the potential to degrade the habitat of any threatened or endangered species.

Policy 5.10.1-P2 Work with Santa Clara Valley Water District and require that new development follow the "Guidelines and Standards for Lands near Streams" to protect stream and riparian habitats.

City of Los Altos General Plan (Part 7, Natural Environment and Hazards Element)

The Los Alto *General Plan 2002–2020* (2002), Part 7, *Natural Environment and Hazards Element*, lists the following goal and policies related to flooding:

Goal 2 Reduce the potential for flooding along creeks that traverse Los Altos.

Policy 2.1 Work with other jurisdictions to regulate land uses in flood-prone areas and allow development in those areas only with appropriate mitigation.

Policy 2.2 Identify and seek sources of funding to be used toward the prevention of flooding.

Policy 2.3 Continue to discourage concrete lining of creek beds, and encourage the Santa Clara Valley Water District to use environmentally sensitive solutions to control local erosion problems.

3.2.3 Methodology

This section presents an overview of the methods used in the analysis of the effects of the Proposed Project relative to the baseline scenarios, with reservoir safety constraints assumed for existing conditions modeling scenarios and with updated estimated levels of water supply demand and removal of reservoir safety constraints assumed for future conditions modeling scenarios.

3.2.3.1 Flow Measures Impact Analysis Methodology

This section discusses how the effects of flow-related measures were evaluated.

Water Evaluation and Planning System Model

As discussed in Section 3.1.4.1, the FAHCE WEAP model (Appendix G, *Valley Water Daily WEAP Model Technical Memorandum*) was used to compare the Proposed Project and FAHCE-plus alternative hydrology to the hydrology in the current and future baselines. The FAHCE WEAP model results include daily discharge flows in cubic feet per second for the downstream release point for each of Valley Water's primary reservoirs in the Stevens Creek and Guadalupe River watersheds, including for the period of record from 1990 to 2010:

- Stevens Creek Reservoir (Stevens Creek)
- Lexington Reservoir (Los Gatos Creek, Guadalupe watershed)
- Guadalupe Reservoir (Guadalupe Creek, Guadalupe watershed)
- Almaden Reservoir (Alamitos Creek, Guadalupe watershed)
- Calero Reservoir (Calero Creek, Guadalupe watershed)

More detailed descriptions of the WEAP model and its assumptions can be found in Section 3.1, *Introduction*, and in Appendix G, *Valley Water Daily WEAP Model Technical Memorandum*.

Changes in Flows

Impacts to hydrology were assessed by comparing conditions of the Proposed Project with the current baseline with reservoir safety constraints (existing conditions modeling scenarios) and the future baseline with updated levels of demand and reservoir safety constraints removed (future conditions modeling scenarios), and whether the Proposed Project would:

- substantially increase the daily peak flow, and
- substantially exceed the existing conditions downstream channel flood capacity.

These impact indicators are described below.

Increase in Maximum Annual Peak Flow and Exceed Downstream Channel Capacity

Daily peak discharge that substantially exceeds the baseline and exceeds downstream channel capacity was selected as an appropriate indicator of Proposed Project effects. Daily peak flows resulting from implementation of the Proposed Project that substantially exceed the baseline modeling scenarios and exceed the channel capacity could cause flooding, alter channel course, or increase polluted runoff that would damage Valley Water facilities or private residences, alter drainage patterns, or cause erosion or siltation that can degrade fish habitat. Estimated channel capacities for streams downstream of Valley Water reservoirs are included in the environmental setting (Section 3.2.1). Estimated channel capacities cover the entire length of each channel.

Impacts were assessed for the Stevens Creek and Guadalupe River watersheds, with results summarized for each creek immediately downstream of Valley Water reservoirs (Section 3.2.4). An assessment of erosion and sedimentation associated with implementation of the Proposed Project is included in Section 3.5, *Water Quality*.

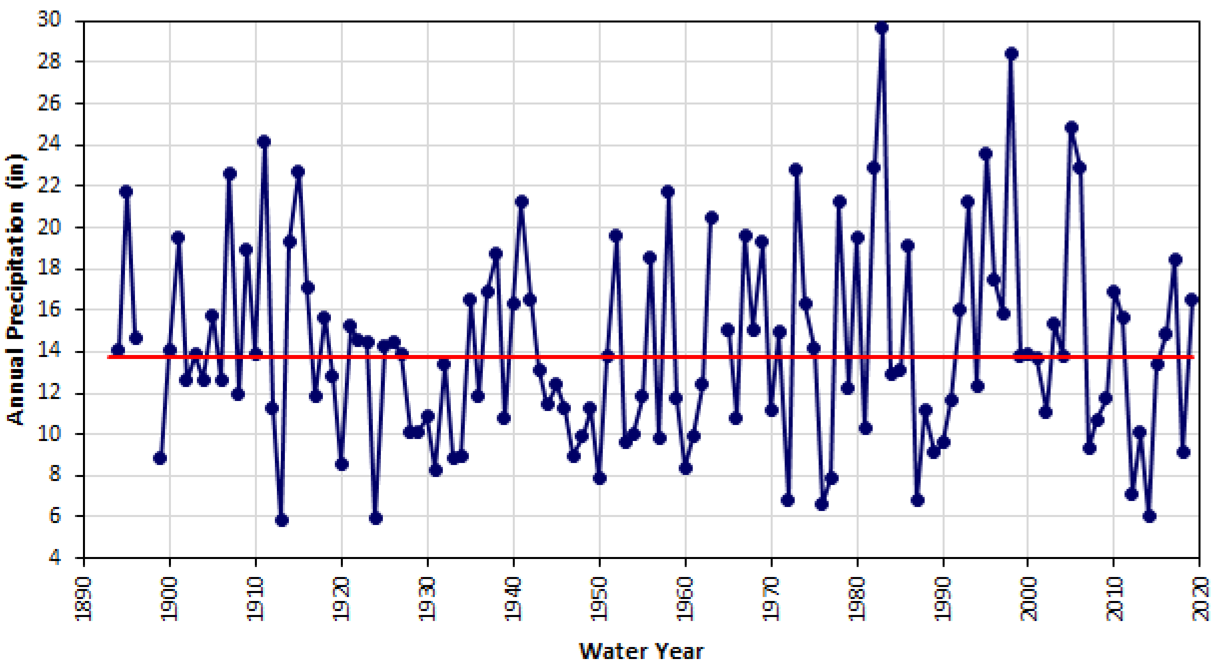
Climate Change

The region's hydrology is projected to experience an increase of year-to-year variability between wet year and dry years attributable to climate change. In an environment that already sees a significant trend in the variability of annual precipitation (Figure 3.2-3), according to *California's Fourth Climate*

Change Assessment from the Governor's Office of Planning and Research (2019), these trends or cycles of wet and dry periods are projected to become very wet and very dry periods, being further exacerbated by climate change. In addition to the increased annual variability in precipitation events, individual storm events are projected to increase in intensity as well. Atmospheric theory and climate models both indicate that the largest individual storms are becoming more intense with climate change (Prein et al. 2017).

While the potential for change in the flood hydrology of the Stevens Creek and Guadalupe River basins exists because of changes in the nature of precipitation, so does the nature of drought in the region. According to *California's Fourth Climate Change Assessment* (Governor's Office of Planning and Research 2019), future increase in temperature, regardless of whether total precipitation goes up or down, will likely cause longer and deeper California droughts, posing major problems for water supplies, natural ecosystems, and agriculture. As discussed in Section 3.1.4.5, the CalSim II model that was used to represent future conditions imported water supplies to Valley Water included a 2030 emissions scenario in regard to temperature and sea level rise (15 centimeters [cm]), and changes to Central Valley inflows reflecting changes to precipitation patterns and snow melt.

Figure 3.2-3. Observed Water Year (Annual) Precipitation (inches) at San José Airport (1893 to 2019)



Notes: Median WY precipitation in red. Data are from National Climatic Data Center (2020).[2,3]

3.2.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure, as introduced in Section 3.1.4.2, was considered in this analysis as it pertains to hydrology.

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2 https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00047821/detail

3 https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USW00023293/detail

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation that could affect hydrology include removal of riparian vegetation to access the work area, use and staging of heavy equipment within the channel, channel dewatering within the limits of the active work area, modification of channel bed and bank dimensions, and installation of new structures. The impact analysis considered whether these construction and corresponding future monitoring and maintenance activities could result in significant impacts to hydrology.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects that could affect hydrology include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Six representative gravel or LWD augmentation project sites have been identified, as noted on Table 2.4-5, on which to base this programmatic analysis. One site is within the Stevens Creek study area, while five are in the Guadalupe River study area. Impacts were assessed based on the whether these activities could result in significant impacts to hydrology by modifying the channel dimensions and slope. The impact analysis considered whether these construction and corresponding future maintenance activities could result in substantial impacts to hydrology. In addition, consideration is given to the potential impacts from implementing the monitoring program under the Proposed Project.

Other Watershed-specific Non-flow Measures

Stevens Creek Watershed-specific Measures: Portable Multiport Outlet

Construction of a portable multiport outlet would allow for flow releases of cooler water during the summer from Stevens Creek Reservoir, to meet instream water temperature objectives and improve cold-water pool management in the reservoir. Impact analysis of the portable multiport outlet would consider whether the facility would affect releases from Stevens Creek Reservoir at times when releases were already high.

Guadalupe River Watershed-specific Measures: Geomorphic Function Enhancement Pilot Projects

The Guadalupe River watershed-specific measures include the proposed enhancements and restoration of geomorphic functions. This would involve channel modification, such as the removal of culverts and structures, and installation activities. The impact analysis considered whether these construction and corresponding future maintenance activities could result in substantial impacts to hydrology. In addition, consideration was given to the potential impacts from implementing the monitoring program under the Proposed Project.

3.2.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect hydrology.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives.

Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.2.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to hydrology resources if it would:

- **Impact HYD-1**: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site.
- **Impact HYD-2**: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream runoff in a manner that would result in flooding on or off site.
- **Impact HYD-3**: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

CEQA Guidelines Appendix G also suggests that a project may have a significant environmental effect if it would impede or redirect flood flows, or risk release of pollutants because of project inundation in flood hazard, tsunami, or seiche zones. These criteria were considered, but not evaluated in detail based on the conclusions of the *Initial Study* (Appendix F) for the following reasons.

While non-flow measures would include structural modifications to the channel, the Project is intended to help manage flows and improve fish passage within the Valley Water area and its watersheds. Spawning and rearing enhancement measures would include different combinations of placement of gravel and large organic debris, channel modification, possibly including berms, and riparian canopy enhancement. However, any of these actions would require implementation consistent with the District Act guidance to “Provide control and conservation of flood and storm water, and the protection of water courses, watersheds, public highways, life and property from damage or destruction from such waters.” Therefore, based on the CEQA *Initial Study* analysis regarding impacts related to placement of structures that could impede or redirect flow, this impact would be less than significant. Based on the CEQA *Initial Study* analysis regarding the release of pollutants resulting from project inundation in flood hazard, tsunami, or seiche zones, this impact would be less than significant because the Proposed Project would not have any impact in tsunami or seiche hazard zones; inundation in flood hazard zones is more generally addressed in Impact HYD-2.

3.2.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs to avoid and minimize adverse effects on the environment that could result from Proposed Project measures. Valley Water BMPs, VHP conditions, and SMP BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and applicable Santa Clara VHP conditions (Appendix E, *General Conditions of the Valley Habitat Plan Applicable to FAHCE FRHP*) are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions.

BMPs, VHP conditions, and SMP BMPs relevant to this analysis of hydrology resources (along with a brief discussion of their effects on Project activities) include the following:

- **WQ-6**: Limit Impact of Concrete near Waterways – Would reduce runoff from increasing impervious surfaces and eliminate contact with uncured concrete.
- **WQ-8**: Minimize Hardscape in Bank Protection Design – Would reduce downstream or adjacent bank scour and erosion.
- **WQ-10**: Prevent Scour Downstream of Sediment Removal – Would decrease scour downstream of sediment removal by grading the channel transitions and ensuring that there are no rapid changes in the slope.
- **WQ-15**: Prevent Water Pollution – Would reduce impact on aquatic species and reduce transport of pollution in the channel network.
- **WQ-16**: Prevent Stormwater Pollution – Would reduce impact on aquatic species and reduce transport of pollution in the channel network.
- **VHP-3**: Maintain Hydrologic Conditions and Protect Water Quality – Would improve conditions for aquatic species.
- **GEN-1**: In-channel Work Window – Would reduce impacts on special-status species and reduce scour or erosion from channel confinement during higher flows.
- **SED-2**: Prevent Scour Downstream of Sediment Removal – Would reduce the potential for scour by enforcing grading zones.
- **SED-3**: Restore Channel Features – Would effectively restore channel features by installing contouring within low-flow channels within low-flow channels within non-tidal streams.
- **VEG-1**: Minimize Local Erosion Increase from In-channel Vegetation Removal – Would minimize the potential for localized erosion by protecting the toe of bank.

3.2.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur during implementation. For flow measures, this section evaluates the effects of implementation of Proposed Project on hydrology using 2015 and 2035 modeled projections, as compared with current and future baseline conditions. For non-flow measures, conditions following implementation of the Proposed Project are compared with current baseline conditions.

As noted in Section 3.2.3.1, WEAP modeling output (SEI and Valley Water 2020; Appendix G, *Valley Water Daily WEAP Model Technical Memorandum*) is reported in average daily discharge downstream of each Project reservoir. Daily average flows in urban streams understate the peak discharge observed in the channel that cause the greatest impact. To convert the daily average flows reported in the WEAP model to daily peak flows, a regression analysis was conducted using historical daily average and daily peak discharge data for each of the Project creeks. Daily average and peak discharge data were developed by Valley Water downstream of Valley Water reservoirs for the period of record from January 1, 1990, to December 31, 2019, except for Calero Creek, with a period of record of June 19, 1990, through December 31, 2019, since data for January 1, 1990, through June 18, 1990, were not available. The resulting regression equations, with a standard form of Daily Peak Flow = Coefficient × Daily Average Flow, were developed for each creek and were applied to the WEAP daily average discharge to calculate daily peak discharge. Table 3.2-6 shows the coefficients used to scale the daily average flow to the daily peak flow for each tributary.

Table 3.2-6. Scaling Factors to Convert Daily Average Flow to Daily Peak Flow

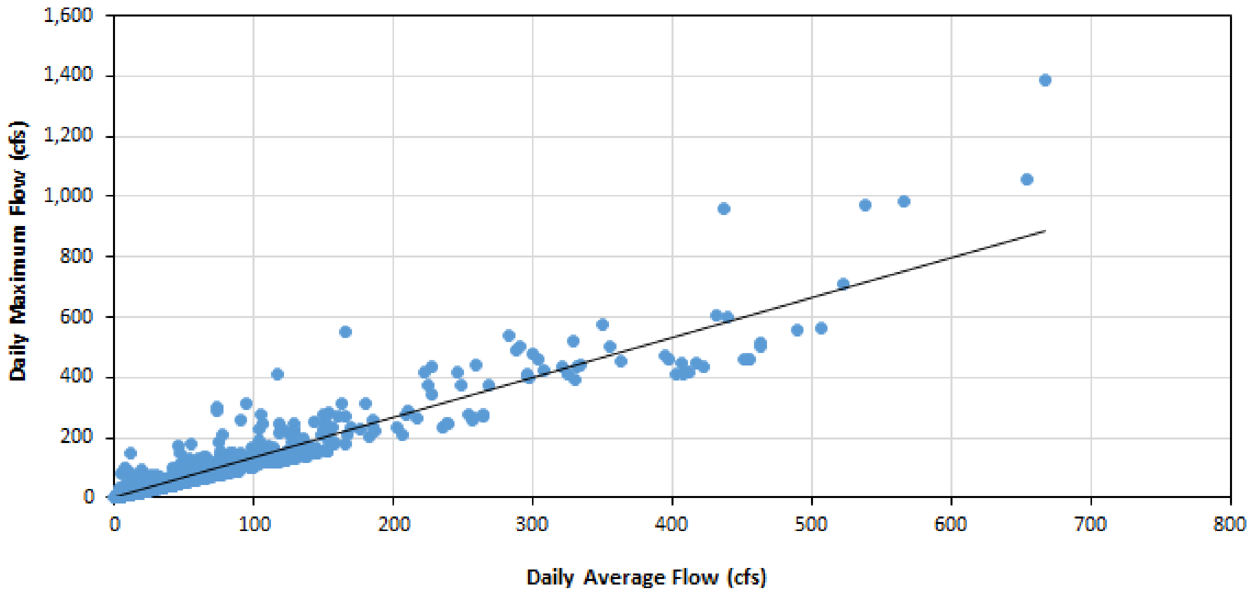
Creek	Coefficient[a]
Stevens Creek	1.3338
Los Gatos Creek	1.2694
Guadalupe Creek	1.3341
Alamitos Creek	1.4494
Calero Creek	1.2509

[a] Scaling coefficients based on a regression analysis comparing average daily flow to maximum daily flow. Mean daily and 15-minute flow data are for period of record of 1990 to 2019 (Xu 2020).

Figure 3.2-4 shows the linear regression developed for Stevens Creek Reservoir using daily average and daily peak discharge. Similar relationships were developed for each of the other reservoirs, and the peak flows for each reservoir were assumed to flow throughout each reach downstream of the reservoir. Relationships were not developed downstream of confluences, and flow was not accumulated downstream of confluences. Similar relationships were developed for each of the other reservoirs, and the peak flow for each reservoir was assumed to flow throughout the entire creek, not just below the dam. The daily peak discharge was calculated from the WEAP output for the current and future baseline and 2015 and 2035 Proposed Project model scenarios. Projected daily peak flows that significantly exceeded the baseline daily peak flows were then compared with the channel capacity developed by Valley Water and are included in the environmental setting (Section 3.2.1).

Projected Proposed Project flows were determined to significantly exceed the baseline daily peak flows by selecting a natural break in the histogram of the differences between baseline and Proposed Project daily peak flows. The majority of the differences between the baselines and Proposed Project flows fell within a range of 0 to 100 cfs for Alamitos Creek, 0 to 70 cfs for Stevens Creek, and 0 to 30 cfs for Calero, Guadalupe, and Los Gatos Creeks. The differences between the baselines and the Proposed Project that occurred outside of the ranges above were investigated further. The differences between the baselines and the Proposed Project outside of this range were counted to determine the number of days that the baseline's daily peak flow was exceeded by the Proposed Project daily peak flow (distribution of differences in the histogram).

Figure 3.2-4. Linear Regression for Stevens Creek Downstream of Stevens Creek Reservoir Using Historical District Flow Data



3.2.4.1 Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site (less than significant)

Flow Measures Impact Analysis

The impacts to hydrological resources that would result from implementation of the proposed flow measures are provided by watershed in the following subsections.

Stevens Creek Watershed

Stevens Creek downstream of Stevens Creek Reservoir was assessed for this impact analysis. Peak daily flows that exceed the baseline conditions are unlikely to alter the course of Stevens Creek unless the channel capacity is exceeded and the channel banks are breached. According to the WEAP model output converted to daily peak flows (Section 3.2.3.1), the 2015 and 2035 Proposed Project scenarios would exceed the corresponding baseline conditions' daily peak flows by greater than 70 cfs on 2 days over the 20-year period. Table 3.2-7 shows the number of days that the peak flow associated with the current and future baseline conditions would be exceeded. The range of daily peak flows that exceed the current and future baselines were significantly below the channel capacity of 5,000 cfs (Xu 2021). The increase in daily peak flows that are well below the channel capacity are unlikely to result in the alteration of the course of the Stevens Creek and would not result in substantial erosion or siltation on or off site. The Proposed Project's modeled peak flow as compared with current and future baseline conditions would increase by 389 cfs under both conditions. However, the highest daily average peak flow of 939 cfs is significantly below the estimated channel capacity of 5,000 cfs; therefore, impacts would be less than significant in terms of channel alteration.

Guadalupe River Watershed

For the Guadalupe River watershed, each of the four tributaries discussed in the environmental setting was assessed to determine impacts. According to the calculated WEAP model 2015 peak daily flows, under the 2015 Proposed Project, flows for Los Gatos Creek would exceed the current baseline peak daily flows by 30 cfs for 13 days and 16 days for the 2035 Proposed Project compared with the future baseline. For Guadalupe Creek, the 2015 Proposed Project modeled condition for daily peak flows exceeds the current baseline modeled condition for daily peak flows by 30 cfs for 1 day and 89 days for the 2035 Proposed Project modeled condition compared with the future baseline modeled condition. At Alamitos Creek, the 2015 Proposed Project modeled condition for daily peak flows exceeds the current baseline modeled condition for daily peak flows by 100 cfs for 11 days and 49 days for the 2035 Proposed Project compared with the future baseline. For Calero Creek, the 2015 Proposed Project modeled condition for daily peak flows exceeds the current baseline daily peak flows by 30 cfs on 17 days but no days for the 2035 Proposed Project at Calero Creek relative to the future baseline (Table 3.2-7 and Table 3.2-8). Maximum daily peak flows for Los Gatos Creek, Guadalupe Creek, and Alamitos Creek are significantly under the estimated channel capacity (Table 3.2-7 and Table 3.2-8; Xu 2021). Impacts would be less than significant for Los Gatos Creek, Guadalupe Creek, and Alamitos Creek for the 2015 and 2035 Proposed Project.

For Calero Creek, the impact would also be less than significant under the current baseline because, while the modeled 2015 Proposed Project conditions exceed the current baseline flows by more than 30 cfs on 17 days and both the current baseline and 2015 Proposed Project flows would exceed the estimated channel capacity (Table 3.2-7 and Table 3.2-8; Xu 2021), Calero Creek flows under the 2015 Proposed Project would exceed the channel capacity on 4 additional days compared with the current baseline condition. However, since there is no increase in the peak flows, the peak flow on the 4 days in question exceeds the channel capacity by only 31 cfs, and the peak flow calculation is based on a regression comparing historical peaks to historical daily average flows, a 4-day increase in the number of days the channel capacity would not be considered substantial. While the future baseline and 2035 Proposed Project daily peak flows exceed the channel capacity of Calero Creek, there would be no impact since the modeled 2035 Proposed Project scenario does not increase the daily peak flows by more than 30 cfs relative to the future baseline scenario, and there would be 3 fewer days of Calero Creek flows exceeding the channel capacity under the 2035 Proposed Project scenario, relative to the future baseline condition.

Table 3.2-7. Number of Days the WEAP Current Baseline Modeling Peak Flows Are Exceeded by the Proposed Project Flows

Creek	Channel Capacity (cfs)	Flow Threshold (cfs)	Days of Increase in Peak Daily Flows Over Threshold	Max. Peak Daily Flow (cfs): Current Baseline	Max. Peak Daily Flow (cfs): 2015 Proposed Project
Stevens	5,000	70	2	550	939
Los Gatos	5,000	30	13	1,804	1,804
Guadalupe	5,000	30	1	314	314
Alamitos	5,000	100	11	940	995
Calero	200	30	17	231	231

Source: Post-processed WEAP model output from Exhibit G

Table 3.2-8. Number of Days the WEAP Future Baseline Modeling Peak Flows Are Exceeded by the Proposed Project Flows

Creek	Channel Capacity (cfs)	Flow Threshold (cfs)	Days of Increase in Peak Daily Flows Over Threshold	Max. Peak Daily Flow (cfs): Future Baseline	Max. Peak Daily Flow (cfs): 2035 Proposed Project
Stevens	5,000	70	2	550	939
Los Gatos	5,000	30	16	1,804	1,804
Guadalupe	5,000	30	89	450	390
Alamitos	5,000	100	49	850	956
Calero	200	30	0	402	254

Source: Post-processed WEAP model output from Exhibit G

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the Proposed Project analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watersheds. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation that could affect hydrology include removal of riparian vegetation to access the work area, use and staging of heavy equipment within the channel, channel dewatering within the limits of the active work area, modification of channel bed and bank dimensions, and installation of new structures. Fish passage barrier modification design would require an assessment of flood flows and require no net rise in flood elevations. Changes in channel dimensions or bed slope would also be resolved through the fish passage barrier design. Other short-term impacts from construction-related activities such as staging equipment and channel dewatering would not affect the course of Project channels.

Implementation of Valley Water's BMPs and VHP conditions at Valley Water-owned facilities, including WQ-8 (Minimize Hardscape in Bank Protection Design), VHP-3 (Maintain Hydrologic Conditions and Protect Water Quality), GEN-1 (In-channel Work Window), SED-3 (Restore Channel Features), and VEG-1 (Minimize Local Erosion Increase from In-channel Vegetation Removal), would reduce impacts related to the construction measures at Valley Water sites. At non-Valley Water sites along Pheasant, Guadalupe, and Alamitos Creeks, Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those barrier-removal Project measures to be implemented by others. Therefore, Project measures would still not result in impacts that would change the course of Valley Water channels.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects at the six representative sites that could affect hydrology include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Enhancement of spawning and rearing habitat designs will require an assessment of flood flows and require no net rise in flood elevations. Changes in channel dimensions or bed slope may result from enhancement of spawning and rearing habitat design. Other short-term impacts from construction-related activities such as bank modification would not affect the course of Project channels.

Implementation of Valley Water's BMPs and VHP conditions at Valley Water-owned facilities, including WQ-8 (Minimize Hardscape in Bank Protection Design), VHP-3 (Maintain Hydrologic Conditions and Protect Water Quality), GEN-1 (In-channel Work Window), SED-3 (Restore Channel Features), and VEG-1 (Minimize Local Erosion Increase from In-channel Vegetation Removal), would reduce impacts related to the construction measures at Valley Water sites. Additionally, SED-2 (Prevent Scour Downstream of Sediment Removal) and WQ-10 (Prevent Scour Downstream of Sediment Removal) would reduce impacts from enhancement of spawning and rearing habitat. Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those Project measures to be implemented by others. Therefore, Project measures would still not result in impacts that would change the course of Valley Water channels.

Other Non-flow Measures

The Stevens Creek Multiport Project would allow for flows of cooler water during summer months from Stevens Creek Reservoir; however, flows during summer months would not exceed channel capacity, and the channel capacity impacts would be less than significant.

Phase 1 non-flow measures in the Guadalupe River watershed include projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, the geomorphic function enhancement measures would not affect peak hydrology flows or change channel conditions that would change the course of Project area channels.

Implementation of Valley Water's BMPs and VHP conditions at Valley Water-owned facilities, including WQ-8 (Minimize Hardscape in Bank Protection Design), VHP-3 (Maintain Hydrologic Conditions and Protect Water Quality), GEN-1 (In-channel Work Window), SED-3 (Restore Channel Features), VEG-1 (Minimize Local Erosion Increase from In-channel Vegetation Removal), SED-2 (Prevent Scour Downstream of Sediment Removal), and WQ-10 (Prevent Scour Downstream of Sediment Removal), would reduce impacts related to the non-flow measure construction.

There would be no significant direct impacts to hydrology resources from the non-flow measures because the non-flow measures would not measurably increase flows in the Project creeks to a level that would change the course of the channels. Additionally, temporary impacts from fish barrier removal and fish habitat enhancement would be reduced by implementation of BMPs and VHP conditions described above. Project-associated construction impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect hydrology. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

As such, proposed monitoring activities would not result in impacts to hydrology. Impacts from the maintenance activities under the Proposed Project would be similar to the proposed non-flow measures. The impact to hydrology from proposed construction activities, maintenance, or monitoring would be less than significant. Since the maintenance and AMP measures are anticipated to be similar in nature to the proposed flow and non-flow measures, impacts to hydrology would be less than significant.

Significance Conclusion Summary

The modeled 2015 and 2035 Proposed Project flows would increase daily peak flows in all channels in the study area (except for Calero Creek for the 2035 Proposed Project) relative to the current and future baseline conditions, but these increases in daily peak flows are substantially under the channel capacities for Stevens, Los Gatos, Guadalupe, and Alamitos Creeks and would therefore not result in flooding that could cause a change in channel course. While peak flows on Calero Creek under both current and future baseline conditions and 2015 and 2035 Proposed Project conditions would exceed the channel capacity, the changes in peak flows would not be at a magnitude or frequency to result in flooding that could cause a change in channel course. There would be no impacts to hydrology from monitoring, and the impacts from maintenance and adaptive management implementation would be similar to those described for the proposed Phase 1 measures. Accordingly, the impacts to Stevens, Los Gatos, Guadalupe, Alamitos, and Calero Creeks would be **less than significant**.

Mitigation

No mitigation would be required for Impact HYD-1.

3.2.4.2 Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream runoff in a manner that would result in flooding on or off site (less than significant)

Flow Measures Impact Analysis

See Impact HYD-1 for a detailed impact analysis of the potential for implementation of flow measures to alter existing drainage patterns in the study area.

Stevens Creek Watershed

The potential for implementation of flow measures to alter existing drainage patterns in the study area is assessed in Impact HYD-1. Flooding impacts would be less than significant.

Guadalupe River Watershed

The potential for implementation of flow measures to alter existing drainage patterns in the study area is assessed in Impact HYD-1. Flooding impacts would be less than significant for Los Gatos, Guadalupe, and Alamitos Creeks. Flooding impacts would be less than significant for Calero Creek for the modeled 2015 Proposed Project relative to the current baseline, and there would be no impact for Calero Creek for the modeled 2035 Proposed Project scenario compared with the future baseline since there are no days with increases in peak flow over 30 cfs.

Non-flow Measures Impact Analysis

There would be no direct significant impacts to streamflows from the non-flow measures because the non-flow measures would not measurably increase or decrease flows in either the Stevens Creek or the Guadalupe River watershed. Additionally, temporary impacts from fish barrier removal and fish habitat enhancement would be reduced by implementation of BMPs and VHP conditions described above. Project-associated construction impacts would be less than significant because they would not increase peak flows in the Project channels that would exceed the channel capacity and potentially increase flooding on any of the Project channels.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect hydrology. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. Monitoring would not affect existing drainage patterns. Since maintenance specific to the non-flow measures and AMP measures are anticipated to be similar in nature to the proposed flow and non-flow measures, impacts to hydrology would be less than significant.

Significance Conclusion Summary

The modeled 2015 and 2035 Proposed Project scenarios relative to current and future baseline conditions show increases in daily peak flows in all channels in the study area (except for Calero Creek for the 2035 Proposed Project flows), but these increases in daily peak flows are substantially under the channel capacities for Stevens, Los Gatos, Guadalupe, and Alamitos Creeks and, therefore, would not result in flooding. While peak flows on Calero Creek under both current and future baseline conditions and 2015 and 2035 Proposed Project conditions would exceed the channel capacity, the changes in peak flows under the 2015 Proposed Project would not be at a magnitude or frequency to result in flooding that could cause an increase in off-channel flooding relative to the current baseline conditions. There would be no impacts to existing drainage patterns from monitoring, and the impacts from maintenance and adaptive management implementation would be similar to those described for the proposed Phase 1 measures. Therefore, the impacts to Stevens, Los Gatos, Guadalupe, Alamitos, and Stevens Creeks would be **less than significant.**

There would be **no impact** to Calero Creek for the modeled 2035 Proposed Project compared with the future baseline.

Mitigation

No mitigation would be required for Impact HYD-2.

3.2.4.3 Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (less than significant)

Flow Measures Impact Analysis

The impacts to hydrology resources that would result from implementation of the proposed flow measures are provided by watershed in the following subsections. See Sections 3.2.4.1 and 3.2.4.2 regarding Impacts HYD-1 and HYD-2, respectively, for a detailed impact analysis.

Stevens Creek Watershed

The potential for implementation of flow measures to affect flooding or increase runoff in the study area is assessed in Impact HYD-1. Impacts from increased flooding or increased additional sources of polluted runoff would be less than significant.

Guadalupe River Watershed

The potential for implementation of flow measures to affect flooding or increase runoff in the study area is assessed in Impact HYD-1. Flooding or additional sources of polluted runoff impacts would be less than significant for Los Gatos, Guadalupe, Alamitos, and Calero Creeks for the modeled 2015 and 2035 Proposed Project scenarios relative to the current and future baselines.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures and adds to the assessment completed for Impact HYD-1. The non-flow measures included in the Proposed Project are fish barrier remediation, enhancement of spawning and rearing habitat, completion of the advanced recycled and other urban water plan, and implementation of other non-flow measures specific to each of the watersheds. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation that could affect hydrology include removal of riparian vegetation to access the work area, use and staging of heavy equipment within the channel, channel dewatering within the limits of the active work area, modification of channel bed and bank dimensions, and installation of new structures. Fish passage barrier modification design will require an assessment of flood flows and require no net rise in flood elevations. Changes in channel dimensions or bed slope will also be mitigated in the fish passage barrier design. Other short-term impacts from construction-related activities such as staging equipment and channel dewatering would not affect the course of Project channels.

In addition to Valley Water's BMPs and VHP conditions discussed in Impact HYD-1, WQ-6 (Limit Impact of Concrete near Waterways), WQ-15 (Prevent Water Pollution), and WQ-16 (Prevent Stormwater Pollution) would reduce impacts related to the construction measures at Valley Water sites. At non-Valley Water sites along Guadalupe and Alamitos Creeks, Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those Project measures to be implemented by others. Therefore, Project measures would still not result in impacts that would cause flooding or increase pollution from runoff related to construction activities. The impact to hydrology specific to flooding and runoff from proposed construction activities related to proposed fish barrier remediation would be less than significant.

Enhancement of Spawning and Rearing Habitat

As discussed in Impact HYD-1, instream habitat enhancement projects at the six representative sites that could affect hydrology include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Enhancement of spawning and rearing habitat designs would require an assessment of flood flows and require no net rise in flood elevations. Changes in channel dimensions or bed slope would also be mitigated through enhancement of spawning and rearing habitat design. Other short-term impacts from construction-related activities such as bank modification would not affect flooding or increase polluted runoff along Project channels.

In addition to Valley Water's BMPs and VHP conditions discussed in Impact HYD-1, WQ-6 (Limit Impact of Concrete near Waterways), WQ-15 (Prevent Water Pollution), and WQ-16 (Prevent Stormwater Pollution) would reduce impacts related to the construction measures at Valley Water sites and would reduce impacts from enhancement of spawning and rearing habitat. Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those Project measures to be implemented by others. Therefore, Project measures would still not result in impacts that would cause flooding or increase pollution from runoff related to construction activities. The impact to hydrology from proposed construction activities related to proposed enhancement of spawning and rearing habitat would be less than significant.

Other Non-flow Measures

The Stevens Creek Multiport Project would allow for cooler flows during summer months from Stevens Creek Reservoir; however, it would not cause flooding or increase pollution from runoff related to construction activities.

As discussed in Impact HYD-1, implementation of the Phase 1 measures in the Guadalupe River watershed includes projects to restore geomorphic function. These may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, the geomorphic function enhancement measures would not affect peak hydrology flows and increase flooding or increase polluted runoff along Project channels.

In addition to implementation of Valley Water's BMPs and VHP conditions at Valley Water-owned facilities in HYD-1, WQ-6 (Limit Impact of Concrete near Waterways), WQ-15 (Prevent Water Pollution), and WQ-16 (Prevent Stormwater Pollution) would reduce impacts at Valley Water sites. Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those Project measures to be implemented by others. Therefore, Project measures would still not result in impacts that would cause flooding or increase pollution from runoff related to construction activities. The impact to hydrology from proposed construction activities would be less than significant.

In summary, there would be no significant direct impacts to hydrology resources from the non-flow measures because the non-flow measures would not measurably increase flows in the Project creeks to a level that would increase flooding or polluted runoff along Valley Water channels. Additionally, temporary impacts from fish barrier removal and fish habitat enhancement would be reduced by implementation of BMPs and VHP conditions described above. Project-associated construction impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect hydrology. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. Proposed monitoring activities would not result in impacts to hydrology. Impacts from the maintenance activities under the Proposed Project would be similar to the proposed non-flow measures. Since the maintenance and AMP measures are anticipated to be similar in nature to the proposed flow and non-flow measures, impacts to hydrology would be less than significant.

Significance Conclusion Summary

The modeled 2015 and 2035 Proposed Project scenario relative to current and future baseline conditions would increase daily peak flows in all channels in the study area (except for Calero Creek for the modeled 2035 Proposed Project scenario), but these increases in daily peak flows are significantly under the channel capacities for Stevens, Los Gatos, Guadalupe, and Alamitos Creeks, and while Calero Creek flows would exceed the channel capacity under the current and future baseline scenarios and 2015 and 2035 Proposed Project scenarios, the peak flows would not increase and, therefore, would not result in flooding and an increase in polluted runoff. While peak flows on Calero Creek under both current and future baseline conditions and the 2015 and 2035 Proposed Project would exceed the channel capacity, the changes in peak flows under the 2015 Proposed Project would not be at a magnitude or frequency to result in flooding that could cause an increase in an increase in polluted runoff relative to the current baseline conditions. Hydrology impacts of all non-flow measures would also be less than significant. There would be no impacts to hydrology from monitoring, and the impacts from maintenance and adaptive management implementation would be similar to those described for the proposed Phase 1 measures. Therefore, the impacts to creeks and streams within the hydrology study area would be **less than significant.**

There would be **no impact** to Calero Creek for the 2035 Proposed Project compared with the future baseline conditions.

Mitigation

No mitigation would be required for Impact HYD-3.

3.2.4.4 Hydrology Impacts Summary

Table 3.2-9 summarizes the hydrology impacts of the Proposed Project.

Table 3.2-9. Hydrology Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
HYD-1	Flow Measures	LTS	N/A	LTS	N/A
HYD-1	Non-flow Measures	LTS	N/A	LTS	N/A
HYD-2	Flow Measures	LTS	N/A	LTS	N/A
HYD-2	Non-flow Measures	LTS	N/A	LTS	N/A
HYD-3	Flow Measures	LTS	N/A	LTS	N/A
HYD-3	Non-flow Measures	LTS	N/A	LTS	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A= not applicable

3.3 Groundwater Resources

This section describes the groundwater resources of the study area and discusses the Proposed Project's potential impacts to such resources.

Within that larger Project area described in Chapter 2, *Project Description*, the study area used to assess the impacts of the Proposed Project on groundwater is limited to groundwater subbasins underlying the Project area, which consists of portions of the streams, rivers, and reservoirs within the Stevens Creek and Guadalupe River watersheds (Figures 2.2-1 and 2.2-2).

3.3.1 Environmental Setting

The environmental setting represents the existing conditions of groundwater resources in the study area. This setting is also referred to as the current baseline conditions and refers to the 2015 model set. As such, although the current baseline year for the analysis of groundwater resources is 2015, more recent data sources are presented in the environmental setting where available. It forms the basis for comparison of Proposed Project impacts. The future baseline conditions for groundwater resources are described for comparison of impacts related to flow measures using a 2035 model set; assumptions include an increase in water supply levels of demand and maximum reservoir capacities in the Stevens Creek and Guadalupe River watersheds caused by remediation of reservoir safety restrictions (Section 2.2, *Proposed Project Area*).

As the groundwater management agency for the County, Valley Water protects and replenishes local groundwater supplies to provide water supply reliability for the County. Valley Water groundwater management activities include replenishing groundwater with local and imported surface water, monitoring and protecting groundwater from pollutants, and constructing, operating, and maintaining facilities that help sustain groundwater supplies.

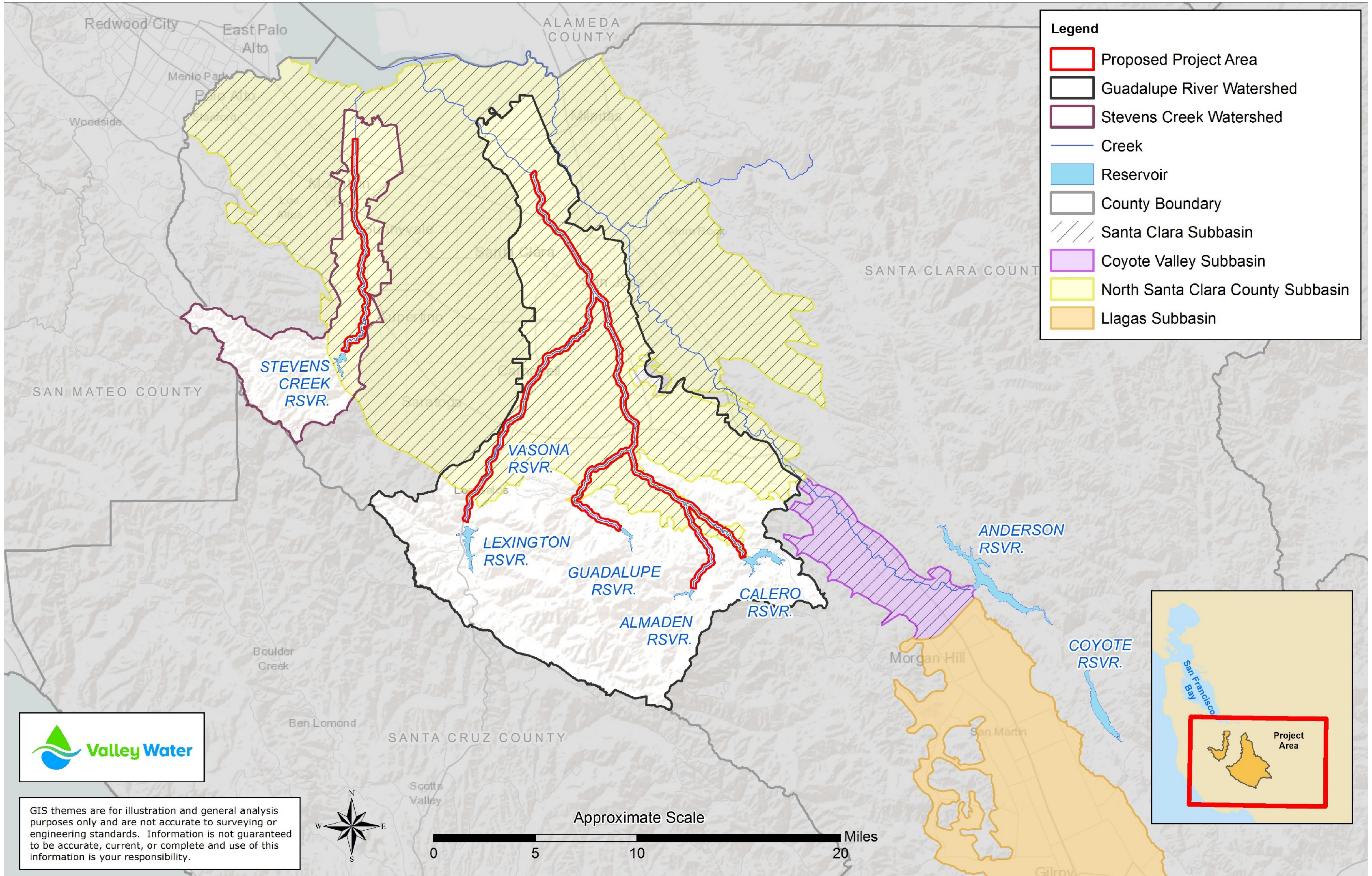
3.3.1.1 Santa Clara Groundwater Subbasin

The Stevens Creek and Guadalupe River watersheds are a part of the Santa Clara Plain Subbasin, and therefore are also connected to the larger Santa Clara Valley Basin [Santa Clara Subbasin (Basin 2-9.02) (DWR 2003)]. See Figure 3.3-1.

Groundwater movement through the subbasin generally follows the topography and the direction of surface flows. Water flows from the surrounding hills and collects at the valley floor, then continues north toward San Francisco Bay.

For management purposes, Valley Water separates the Santa Clara Subbasin into two distinct management areas separated at the narrows near Metcalf Road at the northern end of the Coyote Valley. One subarea is the Santa Clara Plain, which extends from San Francisco Bay to Metcalf Road. Another subarea is the Coyote Valley, which contains the remainder of the Santa Clara Subbasin south of Metcalf Road. While the two management areas are hydrologically connected at depth, different surface conditions and management needs are created because of surface topography, land use, and population density. For this evaluation, operations of reservoirs within the Guadalupe River and Stevens Creek watersheds would not affect the Coyote Valley Subbasin management area, so it is not discussed further in this EIR.

Figure 3.3-1. Groundwater Subbasins



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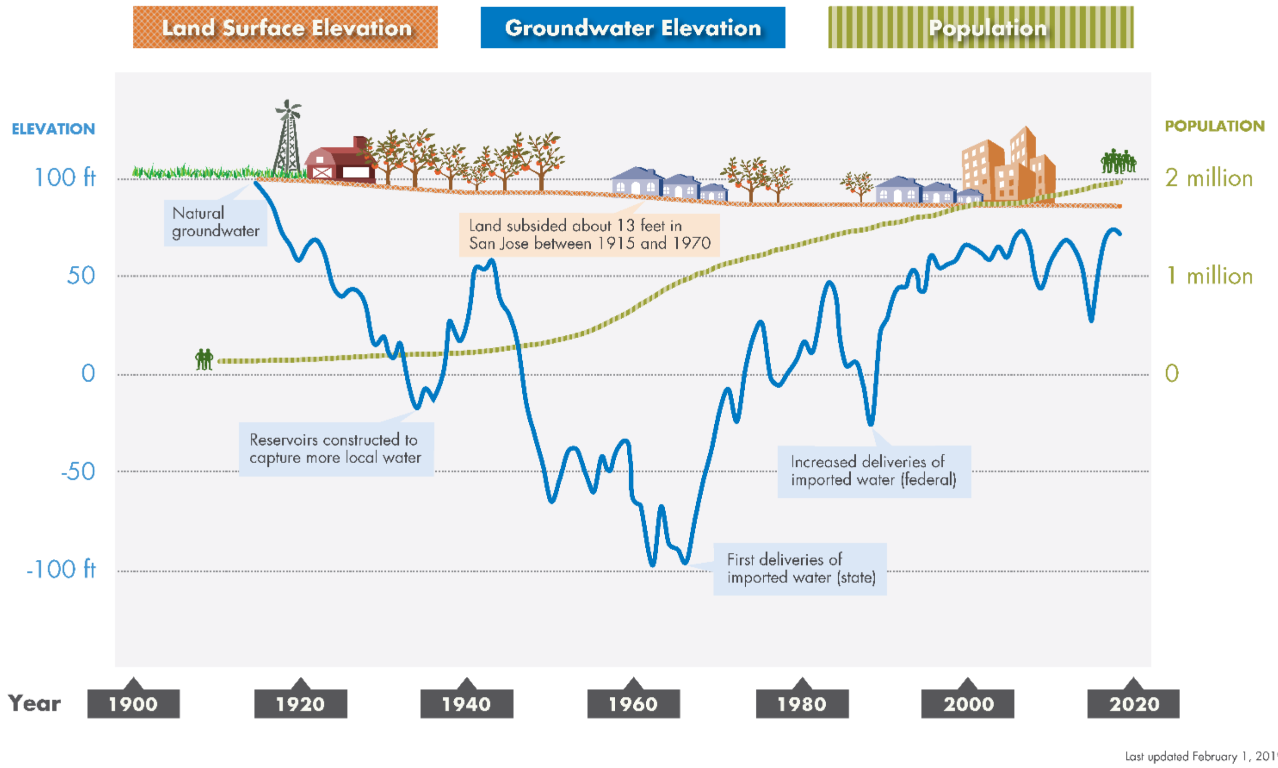
3.3.1.2 Groundwater Level and Storage Trends

Since the early 1900s, groundwater served as a major water source for private and domestic use throughout the County. Increased population growth, urban development, and agricultural production led to increased groundwater extraction in the early twentieth century. This brought about the formation of the Santa Clara Valley Water Conservation District in 1929 as the groundwater management agency for the County to help reverse groundwater overdraft and land subsidence. The County's economic and urban growth continued to outpace groundwater supplies in the Santa Clara Plain Subbasin, resulting in saltwater intrusion from San Francisco Bay into the subbasin starting in the 1950s (Valley Water 2016b), which required additional monitoring and management to protect potable supplies. From about 1915 to 1969, groundwater pumping in the Santa Clara Plain increased dramatically because of growing agricultural use and population growth, resulting in a decline of groundwater levels by as much as 200 feet and long-term overdraft, and downtown San José observed about 13 feet of inelastic (permanent) subsidence. In 1967, Valley Water started delivering treated surface water to North County residents, thus reducing the need for pumping in the Santa Clara Plain. This helped lead to a recovery of groundwater levels and reduced the rate of land subsidence (Valley Water 2016b).

To address these drastic subsidence conditions in the subbasin, water supplies from the State Water Project (SWP) and the federal Central Valley Project (CVP) are imported and used for groundwater recharge and treated water deliveries to slow the rate of subsidence. See Figure 3.3-2 for a historical representation of how groundwater levels generally declined as population increased until deliveries of state and federal water imports reversed the trend (Valley Water 2016b). Additional water treatment plants were constructed to treat surface water supplies for potable use. As a result, by the mid-1980s, groundwater extraction accounted for just half of the total water use in the county, and the rate of subsidence was reduced to about 0.01 foot per year (Valley Water 2016b). Valley Water's 2017 *Annual Groundwater Report* stated that 100 percent of the wells used for monitoring were above the subsidence threshold (Valley Water 2017a). Valley Water continues to focus on sustainable water supply management to minimize the risk of overdraft and subsidence conditions.

Natural recharge of the subbasin occurs through infiltration from creeks and rivers, and percolation of precipitation throughout the valley floor and the alluvial fan regions where the lower flanks of the Santa Cruz Mountains and Diablo Range meet the valley floor. Recharge areas typically contain highly permeable soils and geologic units consisting of sands and gravels. However, urban development and the covering of natural recharge areas with impervious surfaces, coupled with high extraction rates, could create a groundwater supply deficit if groundwater recharge is not actively managed.

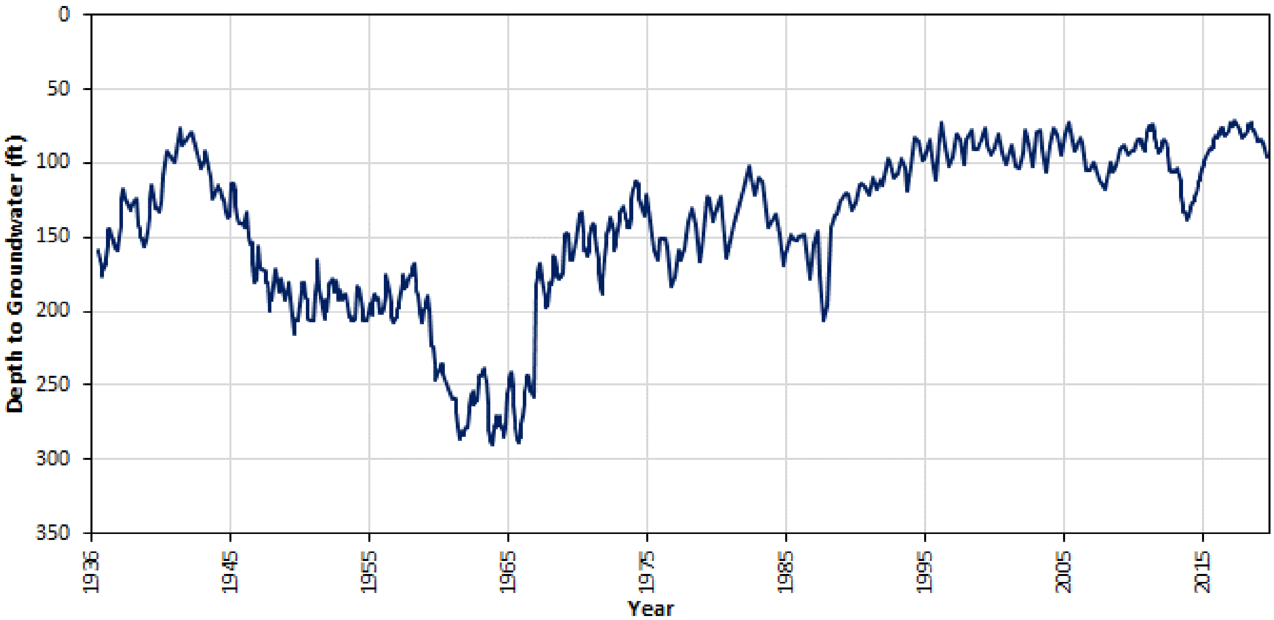
Figure 3.3-2. Santa Clara County Groundwater History



Source: *Santa Clara Valley Water District Water Supply Master Plan 2040*

Groundwater supplies are currently replenished through a Valley Water recharge program in which Valley Water uses both captured surface runoff and water deliveries from the SWP and CVP to recharge the aquifer in the groundwater basins. Recharge program facilities include 390 acres of recharge percolation ponds and over 90 miles of local creeks (Valley Water 2016b). Additionally, the managed recharge program uses the subbasin for natural storage, allowing supplies to be used during dry periods, and for conveyance, enabling imported water deliveries to be delivered downstream so they can be extracted downgradient. Releases of local and/or imported water from reservoirs are made when in-basin runoff decreases (generally summer and fall). Representative historical groundwater elevations for the Santa Clara Plain are presented in Figure 3.3-3. Valley Water estimates operational storage capacity (that is, the amount of water that can be stored given constraints related to subsidence or nuisance high groundwater) of the Santa Clara Plain to be 350,000 AF (Valley Water 2016b).

Figure 3.3-3. Depth to Groundwater in Santa Clara Plain Regional Index Well



Source: California Water Data Library, State Well Number 07S01W25L001M

Although the infrastructure is not operational yet, Valley Water is also considering infrastructure to transport and use highly treated (purified) recycled water to recharge the groundwater basin. Valley Water has started a planning effort to construct pipelines to support this effort, although construction has not started (M. Martin, personal communication, December 10, 2018). Purified recycled water may be available for groundwater recharge within 10 years. Recharge from potential infrastructure is not included in the impact analysis below.

As stated previously, the Santa Clara Subbasin has an estimated operational (usable) storage capacity of 350,000 AF, although the total storage capacity is higher (Valley Water 2016b). To further long-term sustainability of subbasin groundwater supplies, the *Groundwater Management Plan* (GWMP) establishes an action threshold level of 278,000 AF to be maintained (Valley Water 2016b). This threshold is the basis of Valley Water's *Water Shortage Contingency Plan* (WSCP), which bases shortage stages and related actions on groundwater storage. Valley Water regularly monitors groundwater levels and subbasin storage to track to this threshold goal. If groundwater supplies fall below the threshold level, Valley Water implements conservation measures and other actions, based on the WSCP.

3.3.1.3 Groundwater Quality

Valley Water monitors water quality at wells throughout the county and evaluates data from local water suppliers to assess regional groundwater quality and identify potential threats so that they can be appropriately addressed. Valley Water also monitors the quality of water used for groundwater recharge to confirm that groundwater resources are protected. Most wells in the County produce high-quality water that meets drinking water standards without the need for treatment (Valley Water 2017a). Groundwater quality remains generally good; the median principal aquifer zone values for total dissolved solids (TDS) were below 400 milligrams per liter (mg/L) for all groundwater management areas. Median nitrate values were well below the drinking water standard of 10 mg/L in the Santa Clara Plain (3.06 mg/L). As described below, Valley Water continues to work with regulatory and land use agencies to ensure that the groundwater quality is adequately protected.

Nitrate is a contaminant of historical concern that Valley Water has been working to address since the 1990s (Valley Water 2016b). Fertilizers, septic systems, and livestock waste contribute additional nitrate, so elevated nitrate is most often found in rural and agricultural areas. Since the Santa Clara Valley has a long history of agricultural production and septic systems are still in use in some areas, nitrate is an ongoing groundwater protection challenge.

Valley Water has implemented many programs and worked with stakeholders and other agencies to:

- Define the extent and severity of nitrate contamination.
- Identify potential sources of nitrate.
- Reduce nitrate loading to groundwater.
- Reduce customer exposure to elevated nitrate.

Current Valley Water efforts include continued groundwater recharge (which helps to dilute nitrate), groundwater monitoring, public outreach, and collaboration with other agencies. Valley Water also led efforts to develop regional salt and nutrient management plans.

3.3.2 Regulatory Setting

This section summarizes the federal, state, regional, and local laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to groundwater resources.

3.3.2.1 Federal

Safe Drinking Water Act [42 U.S. Code 300(f) et seq.]

The federal Safe Drinking Water Act (SDWA) regulates public water systems that supply drinking water. The main components of the federal SDWA ensure that water from the tap is potable, prevent contamination of groundwater aquifers that are the main source of drinking water for a community, regulate the discharge of wastes into underground injection wells, and regulate distribution systems. USEPA sets federal drinking water standards pursuant to the federal SDWA.

3.3.2.2 State

With the exception of the Sustainable Groundwater Management Act (SGMA) described below, state laws and regulations related to groundwater also apply to surface water quality. Multiple laws and regulations listed in Section 3.5, *Water Quality*, also apply to groundwater resources. These laws and regulations include:

- SWRCB Appropriative Water Rights Permits and Licenses (Water Code 1200 et seq.)
- California SDWA (Health & Safety Code 116270 et seq.)
- State Water Conservation Programs

The San Francisco Bay Basin Plan (SWRCB 2020) establishes objectives for groundwater quality for the Santa Clara Plain and Coyote Valley (collectively the Santa Clara Subbasin), which are subject to both municipal and agricultural objectives, as outlined in Table 3.3-1 and Table 3.3-2, respectively.

Table 3.3-1. San Francisco Bay Basin Plan Water Quality Objectives for Municipal Supply

Parameter	Objective (in mg/L)
Physical	See below
Color (units)	15.0
Odor (number)	3.0
Turbidity (NTU)	5.0
pH	6.0–8.5
TDS	500.0
EC (mmhos/cm)	900
Corrosivity	non-corrosive
Inorganic Parameters	See below
Aluminum	1.0/0.2
Antimony	0.006
Arsenic	0.05
Asbestos	7 MFL
Barium	1.0
Beryllium	0.004
Chloride	250.0
Cadmium	0.005
Chromium	0.05
Copper	1.0
Cyanide	0.15
Fluoride	0.6–1.7g
Iron	0.3
Lead	0.05
Manganese	0.05
Mercury	0.002
Nickel	0.1
Nitrate (as NO_3)	45.0
Nitrate + Nitrite (as N)	10.0
Nitrite (as N)	1.0
Selenium	0.05
Silver	0.1
Sulfate	250.0
Thallium	0.002
Zinc	5.0

Parameter	Objective (in mg/L)
Inorganic Parameters	See below
MBAS (foaming agents)	0.5
Oil and grease	none
Phenols	0.001
Trihalomethanes	0.1
Chlorinated Hydrocarbons	See below
Endrin	0.002
Lindane	0.0002
Methoxychlor	0.03
Toxaphene	0.003
2,3,7,8-TCDD (Dioxin)	3 x 10^8
2,4-D	0.07
2,4,4-TP Silvex	0.05
Synthetic Organic Chemicals	See below
Alachor	0.002
Atrazine	0.001
Bentazon	0.018
Benzo(a)pyrene	0.0002
Dalapon	0.2
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Ethylene dibromide	0.00005
Glyphosate	0.7
Heptachlor	0.00001
Heptachlor epoxide	0.00001
Hexachlorecyclopentadiene	0.001
Molinate	0.02
Oxarnyl	0.05
Pentachlorophenol	0.001
Picloram	0.5
Polychlorinated biphenyls	0.0005
Simazine	0.004
Thiobencarb	0.07/0.001
Volatile Organic Chemicals	See below
Benzene	0.001

Parameter	Objective (in mg/L)
Carbon tetrachloride	0.005
1,2-Dibromo-3-chloropropane	0.0002
1,2-Dichlorobenzene	0.6
1,4-Dichlorobenzene	0.005
1,1-Dichloroethane	0.005
1,2-Dichloroethane	0.0005
cis-1,2-Dichloroethlyene	0.006
trans-1,2-Dichloroethylene	0.01
1,1-Dichloroethylene	0.006
Dichloromethane	0.005
1,2-Dichloropropane	0.005
1,3-Dichloropropene	0.0005
Ethylbenzene	0.7
Methyl-tert-butyl ether	0.013/0.005
Monochlorobenzene	0.07
Styrene	0.1
1,1,2,2-Tetrachloroethane	0.001
Tetrachloroethylene	0.005
1,2,4-Trichlorobenzene	0.005
1,1,1-Trichloroethane	0.200
1,1,2-Trichloroethane	0.005
Trichloroethylene	0.005
Trichlorofluoromethane	0.15
1,1,2-Trichloro-1,2,2 trifluoromethane	1.2
Toluene	0.15
Vinyl chloride	0.0005
Xylenes (single or sum of isomers)	1.750
Radioactivity	See below
Combined Radium-226 and Radium-228	5
Gross alpha particle activity	15
Tritium	20,000
Strontium-90	8
Gross beta particle activity	50
Uranium	20

Source: SWRCB (2020)
Notes: NTU = nephelometric turbidity unit, mmhos/cm = millimhos per centimeter

Table 3.3-2. San Francisco Bay Basin Plan Water Quality Objectives for Agricultural Supply

Parameter	Threshold	Limit	Limit for Livestock Watering
Physical	See below	See below	See below
pH	5.5–8.3	4.5–9.0	Not applicable
TDS	Not applicable	Not applicable	10,000.0
EC (mmhos/cm)	Not applicable	0.2–3.0	Not applicable
Inorganic Parameters	See below	See below	See below
Aluminum	5.0	20.0	5.0
Arsenic	0.1	2.0	0.2
Beryllium	0.1	0.5	Not applicable
Boron	0.5	2.0	5.0
Chloride	142.0	355.0	Not applicable
Cadmium	0.01	0.5	0.05
Chromium	0.1	1.0	1.0
Cobalt	0.05	5.0	1.0
Copper	0.2	5.0	0.5
Fluoride	1.0	15.0	2.0
Iron	5.0	20.0	Not applicable
Lead	5.0	10.0	0.1
Lithium	Not applicable	2.5	Not applicable
Manganese	0.2	10.0	Not applicable
Molybdenum	0.01	0.05	0.5
Nickel	0.2	2.0	Not applicable
NO_3 + NO_2 (as N)	5.0	30	100.0
Selenium	Not applicable	0.02	0.05
Sodium adsorption ratio (adjusted)	Not applicable	3.0	9.0
Vanadium	0.1	1.0	0.1
Zinc	2.0	10.0	25

Source: SWRCB (2020)

Sustainable Groundwater Management Act (Water Code Sections 10720 to 10736.6)

In September 2014, Governor Brown signed the SGMA, which includes the provisions of the following three California bills: Senate Bill (SB) 1319, SB 1168, and AB 1739. SGMA provides the framework for sustainable management of groundwater resources through locally created and controlled Groundwater Sustainability Agencies. Local Groundwater Sustainability Agencies must develop and adopt Groundwater Sustainability Plans (GSPs) or prescribed alternatives, as described under SGMA, for groundwater basins or subbasins that DWR designates as medium or high priority. The priority rating system is determined by DWR based on various criteria, including population, groundwater reliance, and irrigated acreage. Sustainable groundwater management, as defined by SGMA, is the management and use of groundwater in a manner that can be maintained during planning and implementation without causing undesirable results. Undesirable results are defined as:

- Chronic lowering of groundwater levels (not including overdraft during a drought if a basin is otherwise managed);
- Significant reduction of groundwater storage;
- Significant seawater intrusion;
- Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies;
- Significant and unreasonable land subsidence that substantially interferes with surface land uses; or
- Depletion of interconnected surface water that has significant and unreasonable adverse impacts to beneficial uses of the surface water.

The Santa Clara Subbasin was rated in 2015 as a medium-priority basin under SGMA. SGMA lists Valley Water as the exclusive groundwater management agency within its statutory boundary, which includes all of Santa Clara County. Following public notice and a public hearing on May 24, 2016, the Valley Water Board of Directors adopted a resolution to become the Groundwater Sustainability Agency for the Santa Clara Subbasin. In January 2019, DWR reprioritized 458 basins across the state and changed the priority of the Santa Clara Subbasin from medium to high priority. DWR clearly states that the prioritization is meant to indicate the relative importance of groundwater in a basin, rather than to assess groundwater management.

SGMA requires preparation of a GSP for all medium- and high-priority basins. Recognizing that groundwater is already well-managed in many areas, SGMA also allows specified alternatives to a GSP. While GSPs must be completed by 2022 (or 2020 if the basin is in critical overdraft), alternatives were required to be submitted to DWR by January 1, 2017. Valley Water submitted its 2016 GWMP (Valley Water 2016b) for the Santa Clara Subbasin to DWR in December 2016 as an alternative to a GSP, which was accepted by DWR in July 2019. Valley Water has also been submitting required yearly compliance reports to DWR.

3.3.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies those plans and ordinances relevant to groundwater.

Santa Clara Valley Water District Groundwater Management Plan (Chapters 1 to 8)

The 2016 GWMP (Valley Water 2016b) describes Valley Water's comprehensive groundwater management framework, including existing and potential actions to achieve basin sustainability goals and ensure continued sustainable groundwater management. The GWMP covers the Santa Clara Subbasin, located entirely in Santa Clara County and identified by DWR as Basin 2-9.02.

Valley Water's prior GWMP was adopted by the Board of Directors in 2012 and described Valley Water's comprehensive groundwater management framework, including basin management objectives, strategies, groundwater management programs, and outcome measures. The 2016 GWMP updates and expands on technical information provided in the 2012 GWMP. Basin management goals, strategies, programs, and outcome measures in the 2016 GWMP are very similar to those in the 2012 plan because they have proven effective in ensuring sustainable conditions.

The following sustainability goals related to groundwater supply reliability and protection were developed by Valley Water for the GWMP:

- Groundwater supplies are managed to optimize water supply reliability and minimize land subsidence.
- Groundwater is protected from contamination, including saltwater intrusion.

Basin management strategies used to meet the sustainability goals include:

1. Manage groundwater in conjunction with surface water.
2. Implement programs to protect and promote groundwater quality.
3. Maintain and develop adequate groundwater models and monitoring networks.
4. Work with regulatory and land use agencies to protect recharge areas, promote natural recharge, and prevent groundwater contamination.

Valley Water's GWMP describes the following outcome measures to gauge performance in meeting the basin sustainability goals:

- Projected end-of-year groundwater storage is greater than 278,000 AF in the Santa Clara Plain.
- Groundwater levels are above subsidence thresholds at the Santa Clara Plain subsidence index wells.
- At least 95 percent of county-wide water supply wells meet primary drinking water standards.
- At least 90 percent of wells have stable or decreasing concentrations of nitrate, chloride, and TDS.

Santa Clara County General Plan (Part 2, Resource Conservation Chapter)

As originally introduced in Section 3.2.2, the County's *General Plan*, 1995 to 2010 (1994), Part 2, the Resource Conservation element, relates to the proposed program. The *General Plan* identifies the need to employ a GWMP to best allocate water resources for future needs. The current *General Plan* reads (1994):

Strategy #4: Maintain drought contingency and groundwater basin management plans.

Policy C-RC 17 Drought contingency plans and groundwater basin management programs should be reviewed and updated to prepare for the likelihood of future periods of short-term drought and to minimize:

a. The potential adverse impacts of drought upon households, business, and industry; and
b. The possibility of groundwater overdraft and land subsidence.

City of Mountain View General Plan (Chapter 5, Infrastructure and Conservation)

As originally introduced in Section 3.2.2, the Mountain View 2030 *General Plan* (2012), Chapter 5, *Infrastructure and Conservation*, lists the following goal and policies related to groundwater:

Goal INC-18 Prevention and remediation of contamination in groundwater, surface water, soil and from soil vapor and vapor intrusion.

Policy INC 18.1: Contamination Prevention Protect human and environmental health from environmental contamination.

Policy INC 18.2: Contamination Clean-Up Cooperate with local, state, and federal agencies that oversee environmental contamination and clean-up.

City of Cupertino General Plan (Chapter 6, Environmental Resources and Sustainability Element)

As originally introduced in Section 3.2.2, the City of Cupertino 2040 *General Plan* (2014), Chapter 6, *Environmental Resources and Sustainability Element*, lists one goal and one policy relating to management of groundwater resources:

Goal ES-7 Ensure protection and efficient use of all water resources.

Policy ES-7.5: **Groundwater Recharge Sites** Support the Santa Clara Valley Water District efforts to find and develop groundwater recharge sites within Cupertino and provide public recreation where possible.

Town of Los Gatos General Plan (Part 9, Environment and Sustainability Element)

As originally introduced in Section 3.2.2, the Town of Los Gatos 2020 *General Plan* (2010), Part 9, *Environment and Sustainability Element*, identifies the following goal and policies to protect groundwater:

Goal ENV-5 To protect and preserve watersheds and water quality.

Policy ENV-5.1 Applicants shall demonstrate that new development will not contaminate surface water and/or groundwater.

City of Campbell General Plan (Chapter 5, Conservation and Natural Resources)

The City of Campbell *General Plan* (2001), Chapter 5, *Conservation and Natural Resources*, also identifies goals and policies related to groundwater:

Goal CNR-5 Promote high-quality drinking, surface, and groundwater Citywide.

Policy CNR-5.1: Water Quality Enhancement Enhance the quality of surface water and groundwater resources and prevent their contamination.

City of San José General Plan (Part 3, Environmental Leadership, as Amended)

As originally introduced in Section 3.2.2, the City of San José 2040 *General Plan* (2011), Chapter 3, *Environmental Resources, Water Resources*, outlines several policies that address groundwater resources. The following goals and policies are relevant to the Proposed Program:

Goal ER-9 Protect water resources because they are vital to the ecological and economic health of the region and its residents.

Policy ER-9.3 Utilize water resources in a manner that does not deplete the supply of surface or groundwater or cause over drafting of the underground water basin.

Policy ER-9.5 Protect groundwater recharge areas, particularly creeks and riparian corridors.

City of Santa Clara General Plan (Chapter 5.10.4)

As originally introduced in Section 3.2.2, the City of Santa Clara 2010 to 2035 *General Plan* (2010), Chapter 5, *Goals and Policies*, Environmental Quality element, also identifies several goals and policy related to the Proposed Program and groundwater management:

Goal 5.10.4-G1 A reliable, safe supply of potable water adequate to meet present and future needs.

Goal 5.10.4-G2 High water quality maintained throughout the City.

Policy 5.10.4-P10: Work with Santa Clara Valley Water District to minimize undesirable compaction of aquifers and subsidence of soils.

3.3.3 Methodology

This section presents an overview of the methods used in the analysis of the effects of the Proposed Project relative to the current and future baselines, both with reservoir safety constraints (current baseline modeling scenario) and with updated levels of demand and reservoir safety constraints removed (future baseline modeling scenario).

3.3.3.1 Flow Measures Impact Analysis Methodology

Valley Water's reservoirs were constructed to capture winter runoff from the upper watersheds for release through the remainder of the year to provide recharge of the groundwater basins through infiltration in natural channels and in offstream percolation facilities where this water is diverted. Changing the timing and volume of releases to better support fish habitat has the potential to affect the amount of water Valley Water can recharge into the groundwater basins, which is the key strategy to maintain sufficient water supply and prevent subsidence in the county. The model used to assess the potential for groundwater resources impacts is the WEAP model (Section 3.1.4.1). Appendix M, *Water Supply Technical Memorandum*, includes a more detailed description of the modeling and analysis completed to support the groundwater analysis.

Climate Change

The groundwater basins beneath the Coyote Creek, Stevens Creek, and Guadalupe River watershed region hold more water than all of the surface reservoirs within the region combined (Valley Water 2020b). They are essential to the efficient operation of the water supply in the region and require constant replenishment to maintain a sustainable water supply. Climate change, particularly the increase in the severity and longevity of drought brought on by changes in precipitation and air temperatures, is projected to further challenge the management of groundwater in the future. Additionally, sea level rise in the region of the terminus of the Stevens Creek and Guadalupe River watershed system has the potential to cause saltwater intrusion into the groundwater supply (California Natural Resources Agency 2018a). Certain aspects of climate change, including sea level rise, were included in the CalSim II simulations representing imported water supplies. Modeling of local conditions did not include any climate change assumptions.

3.3.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how non-flow measures, as introduced in Section 3.1.4.2, were considered in this analysis as it pertains to groundwater. There would be no impacts to groundwater from the non-flow measures. Implementation of the non-flow measures would not substantially decrease groundwater supplies or impede groundwater recharge such that sustainable groundwater management would be at risk; therefore, no impact would occur.

3.3.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect groundwater.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.3.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to groundwater resources if it would:

- **GW-1**: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin.

  Reductions in average annual groundwater storage greater than 5 percent are considered significant; the 5 percent threshold represents the reasonable accuracy of the WEAP model's representation of the groundwater storage.
- **GW-2**: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality compared to Basin Plan objectives.

3.3.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs to avoid and minimize adverse effects on the environment that could result from Proposed Project measures. Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those Project measures to be implemented by others. Valley Water BMPs applicable to the Proposed Project are included in detail in Appendix D and summarized in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions, as appropriate.

BMPs relevant to the analysis of groundwater resources (along with a brief discussion of their effects on Project activities) include the following:

- **SED-1**: Groundwater Management – Would specify appropriate groundwater management during pumping and water quality testing.

3.3.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur as a result of implementation. This section evaluates the effects of Proposed Project measures on groundwater resources, as compared with both the current and future baseline conditions. As noted, Appendix M, *Water Supply Technical Memorandum*, includes a more detailed description of the modeling and analysis completed to support the groundwater analysis.

3.3.4.1 Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin (less than significant)

Flow Measures Impact Analysis

The flow measures have two primary components that can influence groundwater supplies. First, water is stored in the wet season and released at a generally slower pace to allow for a longer and more consistent base flow in the winter and summer. Second, release of warmer water is avoided in the CWMZs. These measures affect how much water is released to the channel that can be recharged to the groundwater basins instream and diverted into offstream percolation facilities.

As shown in Table 3.3-3, the simulated average monthly Santa Clara Plain groundwater storage would be 317,978 AF under the current baseline scenario and 317,076 AF under the modeled 2015 Proposed Project scenario, representing an average change of 902 AF, or 0.28 percent.

Figure 3.3-4 provides a line graph of modeled groundwater storage. Since the simulation period of record (1990 to 2010) begins in the middle of a notable 6-year drought (1987 to 1992), the total groundwater basin storage decreases until 1992, then increases as the drought ends and operations switch from low recharge to sustainable operations. Similarly, simulated Santa Clara Plain average monthly groundwater storage for 1990 through 2010 under the future modeled future baseline scenario would be 337,084 AF and 338,284 AF under the modeled 2035 Proposed Project, representing a 1,200 AF, or 0.356 percent, increase in average monthly storage. The future baseline scenarios show a similar trend as the current condition scenarios, with an initial 6-year drought dominating the early years of the modeled periods, followed by a return to a higher average monthly storage levels of 348,524 AF during the 2000 to 2010 period for the future baseline condition, and 348,040 AF under the modeled 2035 Proposed Project condition, both of which indicate essentially full recovery from drought operations.

Table 3.3-3. Comparison of Current and Future Baseline and Proposed Project Monthly Average Groundwater Storage (1990 to 2010) for the Santa Clara Plain

Level of Development	Baseline (AF)	Proposed Project (AF)	Difference (AF)
Current baseline conditions	317,978	317,076	–902
Future baseline conditions	337,084	338,284	1,200

Source: WEAP model output

Figure 3.3-4 shows simulated Santa Clara Plain groundwater storage for the modeled 2015 Proposed Project scenario compared with the current baseline conditions, and for the modeled 2035 Proposed Project scenario compared with the future baseline conditions. The minimum simulated storage under the current baseline condition is 199,390 AF, and is 196,104 AF under the modeled 2015 Proposed Project, a 3,286 AF or 2 percent reduction, occurring in December 1991. The lowest minimum groundwater storage under the Future Baseline condition was 252,464 AF, and was 271,065 AF under the modeled 2035 Proposed Project, representing an increase of 18,601 AF, or 7 percent. The minimum groundwater storage occurred in late 1992 under both scenarios.

Since reductions in simulated average monthly Santa Clara Plain groundwater levels under the modeled 2015 Proposed Project scenario would be 0.28 percent, which is less than 5 percent, as compared with the current baseline condition, the impact would be less than significant. For the modeled 2035 Proposed Project scenario, simulated Santa Clara Plain groundwater levels would increase by 0.356 percent relative to the future baseline condition, so the impact would be less than significant.

Non-flow Measures Impact Analysis

There would be no groundwater impacts from the non-flow measures. Implementation of the non-flow measures would not substantially decrease groundwater supplies or impede groundwater recharge such that sustainable groundwater management would be at risk; therefore, no impact would occur.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect groundwater. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

As such, proposed monitoring activities would not result in impacts to groundwater. Since the maintenance and AMP measures are anticipated to be similar in nature to the proposed flow and non-flow measures, impacts to groundwater would be less than significant.

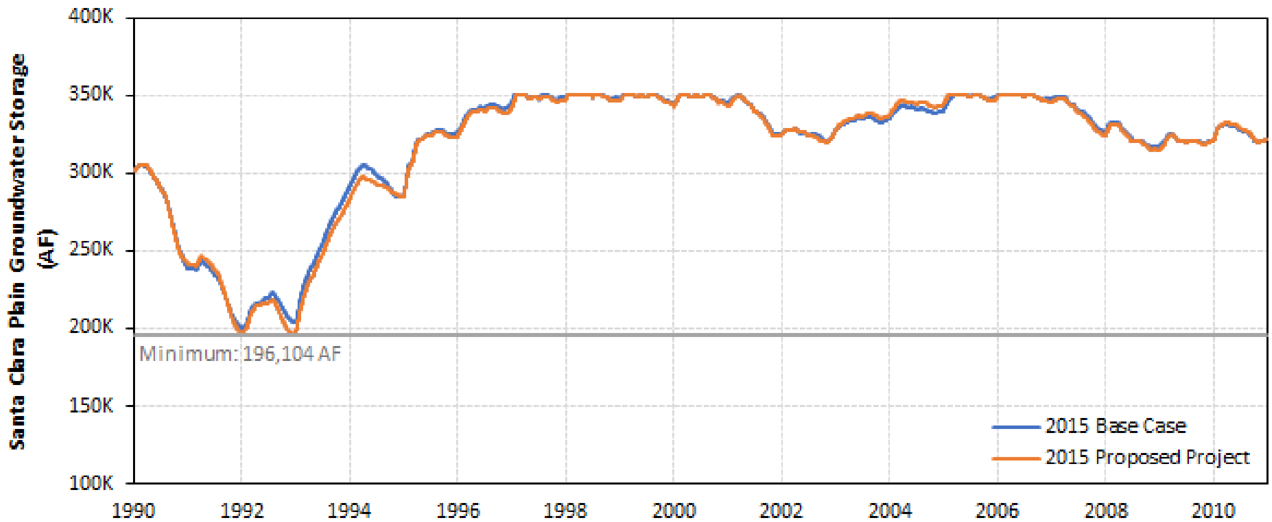
Significance Conclusion Summary

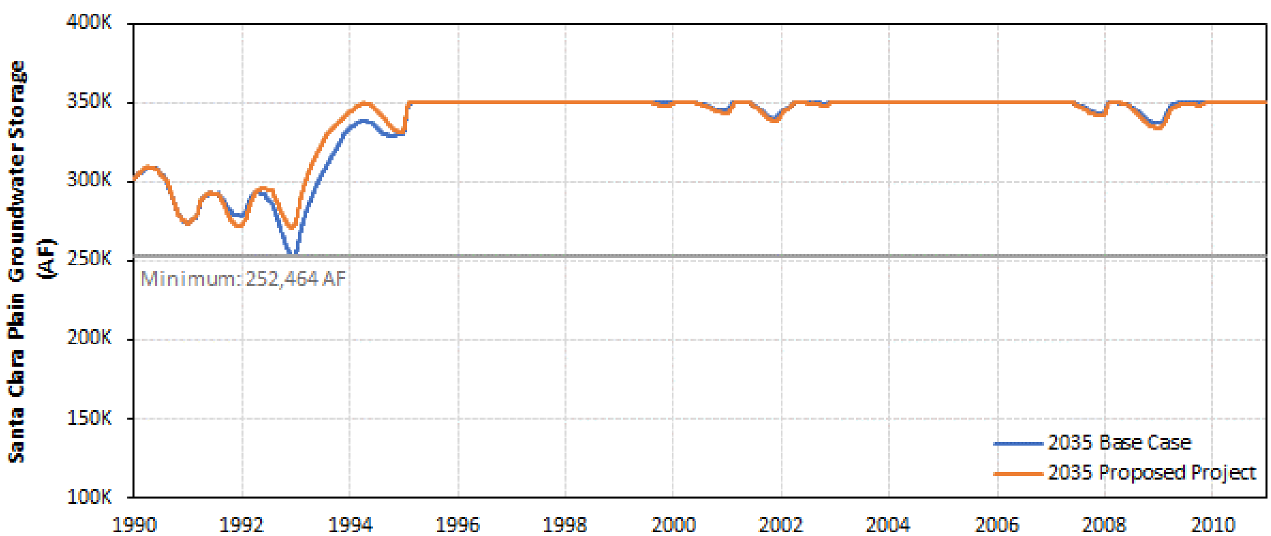
The reduction of monthly average Santa Clara Plain groundwater storage would be less than 1 percent of the average monthly storage in Valley Water’s service under both current and future baseline conditions. Impacts would be **less than significant**.

Mitigation

No mitigation would be required for Impact GW-1.

Figure 3.3-4. Simulated Daily Santa Clara Plain Groundwater Storage under Current Baseline Conditions and Proposed Project for 2015 (top) and 2035 (bottom)





Source: WEAP model output

3.3.4.2 Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality (less than significant)

Flow Measures Impact Analysis

As noted above for Impact GW-1, the modeled 2015 Proposed Project scenario shows reductions in monthly average groundwater levels of less than 1 percent relative to the current baseline condition, and the minimum groundwater storage under the modeled 2015 Proposed Project scenario would be 2 percent lower than the minimum storage under the current baseline condition. Conversely, the 2035 Proposed Project would result in a slight increase (albeit less than 1 percent) in monthly average groundwater levels and the minimum groundwater level would increase by nearly 7 percent, relative to the future baseline condition. Reductions in average annual and minimum groundwater levels under the modeled 2015 Proposed Project scenario are substantially less than 5 percent relative to the current baseline condition and are within the WEAP model's reasonable representation groundwater storage, and therefore would not indicate an increase in any groundwater quality constituent. Accordingly, the impact of the modeled 2015 Proposed Project scenario on groundwater quality, relative to the current baseline condition, would be less than significant. Increases in average monthly and minimum groundwater levels under the modeled 2035 Proposed Project scenario, relative to the future baseline condition, would similarly increase the volume of groundwater and therefore would not result in an increase in water quality constituent concentration, so the impact of the modeled 2035 Proposed Project scenario would be similarly less than significant.

Non-flow Measures Impact Analysis

Since the non-flow measures would not affect groundwater storage levels or introduce pollutants to groundwater, there are no direct groundwater quality impacts.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect groundwater. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. As such, monitoring would have no effect on groundwater. Since the maintenance specific to the non-flow measures and AMP measures applied to both the flow and non-flow measures are anticipated to be similar in nature to the proposed flow and non-flow measures, impacts to groundwater would be less than significant.

Significance Conclusion Summary

The impacts from implementing the Proposed Project on Santa Clara Plain groundwater quality would be **less than significant**.

Mitigation

No mitigation would be required for Impact GW-2.

3.3.4.3 Groundwater Impacts Summary

Table 3.3-4 summarizes the groundwater impacts of the Proposed Project.

Table 3.3-4. Groundwater Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
GW-1	Flow Measures	LTS	N/A	LTS	N/A
GW-1	Non-flow Measures	NI	N/A	NI	N/A
GW-2	Flow Measures	LTS	N/A	LTS	N/A
GW-2	Non-flow Measures	NI	N/A	NI	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A = not applicable, NI = no impact

3.4 Water Supply

This section describes the water supply resources of the study area, including reliability and sustainability for the County. In addition, this section discusses the Proposed Project's impacts to water supply resources in the study area. The study area used to assess the impacts of the Proposed Project is the region being currently supplied with water supply by Valley Water with a complex mix of water supply sources and infrastructure.

Valley Water operates and maintains 10 reservoirs and dams, 25 groundwater recharge facilities, almost 150 miles of pipelines, three treatment plants, an advanced recycled water purification plant, and three pump stations. Water supplies include local surface water and groundwater, imported water, and recycled water. Water conservation is also an important part of the water supply mix because it reduces water demands and helps improve reliability during droughts.

3.4.1 Environmental Setting

The environmental setting represents the existing conditions of water supply resources in the study area. This setting is also referred to as the current baseline conditions. As discussed in Section 3.1.4, the current baseline conditions are represented by the WEAP model scenario of the current baseline conditions and serve as the basis for comparison of 2015 Proposed Project impacts. The effects of the Proposed Project in the future are also evaluated against future baseline conditions, represented by the modeled future baseline.

Valley Water is an independent special district that provides wholesale water supply. Its service area encompasses approximately 1,300 square miles and has a population of about 1.9 million people. Most water use occurs on the valley floor between the Santa Cruz Mountains to the west and the Diablo Range to the east. Northern Santa Clara County is home to Silicon Valley, and the valley floor is highly urbanized. Southern Santa Clara County has some urban development, but much of the land use is still rural and agricultural, resulting in a diverse mix of water users.

3.4.1.1 Water Supplies

The County's population is projected to increase from around 1.9 million people in 2015 by about 23 percent to approximately 2.5 million people by 2040 (Association of Bay Area Governments 2018). More than half of the County's water supply currently comes from imported water sources. Imported water includes Valley Water's SWP and CVP contract supplies and supplies delivered by the San Francisco Public Utilities Commission to cities in northern Santa Clara County. Table 3.4-1 shows an estimate of future water supplies to Valley Water from each source.

Table 3.4-1. Estimated Annual Water Supply Volumes in AF through 2040

Source	2015 (Actual)	2020	2025	2030	2035	2040
Natural groundwater recharge	39,000	60,900	60,900	60,900	60,900	61,000
Local surface water	43,000	78,600	78,600	78,600	78,600	78,600
Recycled water	21,000	23,300	28,500	31,900	33,100	33,500
Potable reuse	0	0	20,200	20,200	20,200	20,200
San Francisco Public Utilities Commission	42,000	56,400	57,600	57,800	58,000	58,500
Delta conveyed (SWP and CVP)	115,000	171,000	175,300	175,300	175,300	175,300
Total supply	**260,000**	**390,200**	**428,100**	**435,800**	**439,900**	**441,900**
Total demand	285,000[a]	371,200	391,400	408,600	425,800	435,100

Source: Valley Water (2016a)

[a] In 2015, total demand exceeded available supply by approximately 25,000 AF. The difference between supply and demand was met through groundwater extractions in excess of the recharge volume.

State Water Project Supplies

The SWP is contracted to deliver up to 100,000 AF of water per year to Valley Water from the Sacramento–San Joaquin River Delta by way of the South Bay Aqueduct. The South Bay Aqueduct begins at the South Bay Pumping Plant, which lifts water from Bethany Reservoir near Tracy into the aqueduct. Water from the pumping plant flows 9 miles through the aqueduct to Patterson Reservoir and continues another 9 miles to Lake Del Valle. The water then flows through a pipeline to its terminus at the Penitencia Water Treatment Plant in San José. The SWP has conveyed water to Santa Clara County since 1965. Valley Water uses storage in the SWP to "carry over" water from one year to the next when supplies and storage allow.

Central Valley Project Supplies

The CVP is contracted to deliver up to 152,400 AF per year to Valley Water from San Luis Reservoir through the 5.3-mile-long Pacheco Tunnel, which flows into the Pacheco Conduit. After running southwest for 8 miles, flow from Pacheco Tunnel bifurcates into the Santa Clara and Hollister Conduits. CVP water flows approximately 22 miles in the Santa Clara Conduit to the Coyote Pumping Plant in Morgan Hill, at which point it enters Valley Water's water supply system. Similar to the SWP, Valley Water can carry over water between WYs.

Other Water Supplies

Local sources of water include natural groundwater recharge and surface water supplies, including surface water rights held by Valley Water, SJWC, and Stanford University. A small but growing portion of the county's water supply is recycled water.

Valley Water supplies are used to recharge the local groundwater subbasins, treated at drinking water treatment plants, released to local creeks to meet environmental needs, or sent directly to water users. In 2015, Valley Water supported a total demand of approximately 285,000 AF, of which 120,000 AF was supplied from groundwater and 115,000 AF was imported. Local supplies and recycling account for the remaining supply (approximately 50,000 AF) (Valley Water 2016a). Given drought conditions in 2015, actual deliveries were less than demand. Valley Water also stores CVP and SWP supplies in an out-of-county groundwater bank (Semitropic).

Demand Reduction

In cases of water supply shortages, Valley Water can request that retailers implement water use reductions. These shortage contingencies are staged across five levels, where Stage 1 represents no water use restrictions, and Stage 5 equates to 40 to 50 percent reductions. The Valley Water Board of Directors approved Valley Water's WSCP, which identifies when Valley Water should call on the community to reduce water use in response to drought or other shortages (Valley Water 2016a). The WSCP is based on the end-of-year groundwater storage because this reflects the general health of the county water supply system.

Implementation of various stages of WSCP water restrictions are described in Valley Water's 2015 UWMP and are summarized in Table 3.4-2. Requested short-term water use reductions are triggered by projected end-of-year groundwater storage (Valley Water 2016a).

Table 3.4-2. Water Shortage Contingencies in Valley Water's WSCP

Stage	Stage Title Use	Projected End-of-year Groundwater Storage	Requested Short-term Water Reduction	Actions
Stage 1	Normal	Above 300,000 AF	None	Valley Water continues ongoing outreach strategies aimed toward achieving long-term water conservation targets. Messages in this stage focus on services and rebate programs Valley Water provides to facilitate water use efficiency for residents, agriculture, and business. While other stages are more urgent, successful outcomes in Stage 1 are vital to long-term water supply reliability.
Stage 2	Alert	250,000–300,000 AF	0%–10%	This stage is meant to warn customers that current water use is tapping groundwater reserves. Coordinate ordinances with Cities and prepare for a Stage 3 situation. Additional communication tools can be employed to augment Stage 1 efforts, promote immediate behavioral changes, and set the tone for the onset of shortages. Specific implementation plans will be developed when a worsening of the water shortage has occurred. Supplemental funding may be identified to augment budgeted efforts.
Stage 3	Severe	200,000–250,000 AF	10%–20%	Shortage conditions are worsening, requiring close coordination with retailers and Cities to enact ordinances and water use restrictions. Requires significant behavioral change by water users. The intensity of communication efforts will increase as the severity of shortage increases. Messages are modified to reflect for dire circumstances.

Stage	Stage Title Use	Projected End-of-year Groundwater Storage	Requested Short-term Water Reduction	Actions
Stage 4	Critical	150,000–200,000 AF	20%–40%	This is the most severe stage in a multiyear drought. Valley Water will expand Stage 3 activities and encourage retailers and Cities to enforce their WSCPs, which could include fines for repeated violations.
Stage 5	Emergency	Below 150,000 AF	40%–50%	Stage 5 of the WSCP is meant to address an immediate crisis such as a major infrastructure failure. Water supply would be available only to meet health and safety needs. Valley Water would activate its Emergency Operations Center and provide daily updates on conditions.

Source: Valley Water (2016a)

3.4.1.2 Water Deliveries

Valley Water delivers treated water to eight water retailers, including SJWC, California Water Service Company, City of Milpitas Community Services, City of Mountain View Public Works, City of Santa Clara Water Department, City of Sunnyvale, and City of Cupertino. Other retailers rely on groundwater or deliveries from the San Francisco Public Utilities Commission. Total annual water demands in 2020 were estimated to be 371,200 AF (Table 3.4-1); actual deliveries can be affected by drought conditions and other limitations. Five years of annual water deliveries to local water retailers are shown in Table 3.4-3. Total water deliveries shown include Valley Water treated water and groundwater, San Francisco Public Utilities Commission supplies (Hetch-Hetchy), and surface water rights of individual retailers. Recycled water is not included because it is provided by others.

Table 3.4-3. Historical Annual Water Deliveries in AF

Retailer	2015	2016	2017	2018	2019	Average
California Water Service	10,132	10,134	11,604	12,414	11,998	11,256
Cupertino	2,236	2,205	2,454	2,649	2,422	2,393
Gilroy Community Services Department	6,968	7,061	7,918	7,918	7,751	7,523
Great Oaks	8,945	8,867	9,997	10,276	10,393	9,696
Milpitas Community Services	8,790	8,702	8,898	9,091	9,328	8,962
Moffett Water	560	510	703	689	618	616
Morgan Hill	5,965	6,326	6,890	6,793	6,874	6,570
Mountain View Public Works	8,870	8,741	9,276	9,550	9,465	9,180
Palo Alto	9,506	9,762	10,923	10,918	10,775	10,377
Purissima Hills Water District	1,540	1,543	1,770	1,865	1,775	1,699
Santa Clara Water Department	17,627	17,179	18,681	18,482	17,789	17,952
San José Municipal Water System	16,071	15,738	16,867	17,071	16,871	16,524
SJWC	103,560	101,538	109,318	112,690	111,751	107,771

Retailer	2015	2016	2017	2018	2019	Average
Stanford Utilities	2,536	2,005	2,238	2,056	1,786	2,124
Sunnyvale Public Works	15,902	16,493	18,625	18,580	18,788	17,678
Total	**219,208**	**216,804**	**236,162**	**241,042**	**238,384**	**230,320**

Source: Personal communication from Michael Martin on September 28, 2020

As shown in Figure 1.2-1, the Valley Water system includes six instream diversions: Alamitos, Coyote, Kirk, Mabury, Masson, and Noble, which divert water to groundwater recharge facilities. For the water supply analysis, the entire Valley Water system is considered as the system is operated together.

Alamitos Diversion

The Alamitos Diversion is an instream facility on the Guadalupe River just downstream of the confluence of Alamitos Creek and Guadalupe Creek. The existing facility is a wooden flashboard dam, a drop structure, a screened diversion structure, and a fish ladder. The structure controls flow for instream recharge and flow to the Alamitos and Guadalupe recharge ponds. The permitted diversion is 3,302 AF per year from November 15 to May 1 for domestic water supply and irrigation beneficial uses under SWRCB License 0006943. Operation of the dam/diversion and fish ladder is conducted under a CDFW LSAA (Notification Number 1600-2009-0409-R3).

Coyote Diversion

The Coyote Percolation Dam, an instream diversion, is located approximately 0.75 mile downstream of Metcalf Road and captures flows within Coyote Creek. This diversion forms the Coyote Percolation Pond. The 10-foot-high flashboard dam includes a fish ladder. The permitted diversion is 5,000 AF per year from April 1 to December 15 for domestic water supply and irrigation beneficial uses under SWRCB License 0002210. Operation of the dam/diversion and fish ladder is conducted under a CDFW LSAA (Notification Number 1600-2009-0411-R3).

Kirk Diversion

The Kirk Diversion is located on Los Gatos Creek downstream of West Mozart Avenue and diverts Los Gatos Creek flows to the Page, Camden, Sunnyoaks, and Budd Percolation Ponds on the west and to the Oka and McGlincy Ponds on the east. The dam is a 90-foot-long by 7-foot-high operable rubber dam situated on a concrete foundation. Two sluice gates on the eastern side of the facility are used to release water to Los Gatos Creek. Diversions to the Kirk Ditch and Page Ditch are made through a screened diversion structure surrounded with a trash rack. The permitted diversion is up to 9,090 AF per year from November 15 to May 1 for domestic water supply and irrigation beneficial uses under SWRCB License 0005729. Operation of the dam/diversion is conducted under a CDFW LSAA (Notification Number 1600-2009-0412-R3).

Mabury Diversion

The Mabury Diversion is located on Upper Penitencia Creek downstream of the Mabury Road. Valley Water does not have a water right for diversion of natural flows at the Mabury Diversion; however, Valley Water diverts up to 2,300 AF per year of imported water to the Mabury and Overfelt groundwater recharge ponds.

Masson Diversion

The Masson Diversion is in Guadalupe Creek and diverts flows to offstream recharge at Los Capitancillos Ponds. The dam includes a fish ladder and a fish screen. Valley Water is permitted to divert up to 0.77 cfs from October 1 to May 1 for industrial, domestic water supply, and irrigation beneficial uses under SWRCB License 0002837. Operation of the dam/diversion and fish ladder is conducted under a CDFW LSAA (Notification Number 1600-2009-0414-R3).

Noble Diversion

The Noble Diversion on Upper Penitencia Creek was originally permitted to divert 3,500 AF per year of water, between November 1 and June 1, into the Penitencia Percolation Pond complex for irrigation and domestic uses (under SWRCB permit 0006565). However, the maximum amount of water ever diverted during the permit period was 2,230 AF per year and the facility is currently not in operation.

Climate Change

As discussed in Section 3.1.4.5, hydrologic changes in the amount, intensity, and timing of precipitation, as well as changes in the Sierra Nevada snowpack, are projected to reduce both local and imported water supplies, and to complicate water supply management for the region. Climate change is projected to affect local supplies in surface water reservoirs and groundwater, especially in the summer and fall because of increased evaporation and evapotranspiration as a result of increases in air temperatures. Imported water and water transfer availability is projected to be affected as well. Observed and projected changes in the Sierra snowpack are expected to have a particularly important impact to the timing and volume of runoff used for imported water supplies. An increase in the variability of precipitation from year to year in concert with warmer air temperatures is projected to reduce snowpack and produce snowmelt earlier in the spring (DWR 2014).

3.4.2 Regulatory Setting

This section summarizes the federal, state, regional, and local laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project’s impacts to water supply resources.

3.4.2.1 Federal

Safe Drinking Water Act [42 U.S. Code 300(f) et seq.]

The federal SDWA [42 USC 300(f) et seq.] applies to water supply. See Section 3.3, *Groundwater Resources*, for a description.

3.4.2.2 State

California Department of Fish and Wildlife Lake and Streambed Alteration Agreement (California Fish and Game Code Section 1600 et seq.)

California law (Fish and Game Code Section 1602) requires an entity to notify CDFW prior to commencing any activity that may:

- Substantially divert or obstruct the natural flow of any river, stream, or lake;
- Substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or
- Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

If CDFW subsequently determines that such an activity might adversely affect an existing fish and wildlife resource, the agency has the authority to issue a streambed alteration agreement, including requirements to protect biological resources and water quality. LSAAs required under FAHCE for reservoir releases and re-diversions downstream would be consistent with the FAHCE rule curves.

State Water Resources Control Board Appropriative Water Rights Permits and Licenses (Water Code 1200 et seq.)

SWRCB issues water rights permits and licenses for diversions from surface waters and subterranean streams. The point of diversion, place of use, and purpose of use for a water right may be changed as long as the change does not injure other water right holders, whether junior or senior, or unreasonably affect fish and wildlife. A user must file a petition with SWRCB before undertaking the change. SWRCB will issue public notice of the request and will evaluate claims of injury to other right holders or public trust values.

California Safe Drinking Water Act (Health and Safety Code 116270 et seq.)

The California SDWA regulates drinking water more rigorously than the federal SDWA. Like the federal SDWA, California requires that primary and secondary maximum contaminant levels (MCLs) be established for pollutants in drinking water; however, some California MCLs are more protective of health. The Act also requires SWRCB to issue domestic water supply permits to public water systems.

Assembly Bill 1668 and Senate Bill 606 of 2018

AB 1668 and SB 606 create a new foundation for long-term improvements in state water conservation and drought planning. They establish guidelines for efficient water use and a framework for the implementation and oversight of the new standards, which must be in place by 2022. The bills' provisions include:

- Establishing water use objectives and long-term standards for efficient water use that apply to urban retail water suppliers; standards cover indoor residential water use; outdoor residential water use; commercial, industrial and institutional irrigation with dedicated meters; water loss; and other unique local uses.
- Providing incentives for water suppliers to recycle water.
- Identifying small water suppliers and rural communities that may be at risk of drought and water shortage vulnerability and providing recommendations for drought planning.
- Requiring both urban and agricultural water suppliers to set annual water budgets and prepare for drought.

3.4.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies the other regional and local regulations relevant to water supply.

Valley Water 2021 Shortage Emergency Resolution

On June 9, 2021, the Valley Water Board of Directors adopted Resolution 21-0661. This resolution declares, pursuant to California Water Code Section 350, that a water shortage emergency condition prevails within the County and will continue until the Board adopts a finding determining otherwise. It also establishes a water reduction program pursuant to Article C(4)(c) of Valley Water's treated water contracts by calling for water retailers to achieve a water use reduction equal to 33 percent of the 2013 water use (15 percent of 2019 water use), which will result in a 23 percent reduction of Valley Water treated water scheduled deliveries to water retailers while the water reduction program is in effect.

Santa Clara Valley Water District Urban Water Management Plan (Water Code Sections 10610 to 10656)

In accordance with Water Code Sections 10610 to 10656, Valley Water developed and regularly updates its UWMP to ensure that water supplies are adequate and available to meet long-term demands during normal, dry, and multiple dry years. DWR requires responsible water agencies to submit new or revised plans every 5 years. Valley Water's most recently adopted plan, the 2015 UWMP (Valley Water 2016a), details programmatic operation, facility maintenance, and asset management activities that address groundwater resources.

Valley Water implements the UWMP, and the Proposed Project includes the following aspects:

- Quantifies current and projected sources of water supply;
- Evaluates reliability for normal, dry, and multiple dry years;
- Outlines a staged plan for responding to shortages including catastrophic supply interruption; and
- Describes efforts to promote water conservation.

The 2020 UWMP, an update to the 2015 UWMP, was adopted by the Valley Water Board of Directors in June 2021.

Integrated Water Resources Master Plan (Water Code Sections 10530 to 10552)

Valley Water has developed an *Integrated Water Resources Master Plan* describing a decision framework and implementation plan for the long-term management of county water resources based on scientific rigor, integrated watershed-scale considerations, and stakeholder engagement (Kennedy/Jenks Consultants 2013).

Santa Clara Valley Water District Act (Chapter 1405 of the Statutes of 1951, As Amended)

A reliable supply of clean water is necessary for the social, economic, and environmental well-being of the county. This is reflected in the District Act (Chapter 1405 of the Statutes of 1951, as amended) that states one of the purposes of Valley Water is "to do any and every lawful act necessary to be done that sufficient water may be available for any present or future beneficial use or uses of the lands or inhabitants within the District." The District Act also authorizes Valley Water to undertake environmental stewardship activities in connection with managing water resources and providing flood protection in the county. To further the implementation of the District Act, the Valley Water Board has developed a mission statement for Valley Water: "The mission of the Santa Clara Valley Water District is to provide Silicon Valley safe, clean water for a healthy life, environment, and economy."

Santa Clara Valley Water District Water Supply Master Plan 2040

In November 2019, Valley Water published its *Water Supply Master Plan 2040* (Valley Water 2019a), presenting Valley Water's strategy for meeting the county's water supply needs over the next 20 years. Valley Water Board's stated policy is to ensure "there is a reliable, clean water supply for current and future generations." Valley Water's level of service goal is to develop water supplies designed to meet at least 100 percent of average annual water demands in non-drought years and not call for water use reductions greater than 20 percent during drought years. Valley Water's water supply strategy has three key elements:

1. Secure existing supplies and infrastructure,
2. Increase water conservation and water reuse, and
3. Optimize the use of existing supplies and infrastructure.

Local Water Retailer and Local Government Water Supply Programs

Local water retailers served by Valley Water each have water conservation programs consistent with state law. In addition, cities within the Stevens Creek and Guadalupe River watersheds have general plan water supply policies, and they implement local water conservation programs; some cities are also local water retailers.

3.4.3 Methodology

3.4.3.1 Flow Measures Impact Analysis Methodology

Computer simulations developed using the FAHCE WEAP Model (Section 3.1.4.1) and post-processing tools were used to quantitatively assess the changes in modeled water supply under the 2015 and 2035 Proposed Project scenarios relative to the current and future baselines. See Section 3.1, *Introduction*, for a full description of the WEAP model. Details regarding the WEAP modeling and water supply analysis may be found in Appendices G, *Valley Water Daily WEAP Model Technical Memorandum*, and M, *Water Supply Technical Memorandum*, respectively.

As described in Section 3.1.4.1, for the current baseline conditions, the WEAP model scenarios consider a current level of development for water supply demands, rather than a projected future level of development as considered for the future baseline conditions. Also, for the current baseline conditions, current safety restrictions on storage are assumed to be in place, while these safety restrictions are assumed to be resolved by 2035.

Standard WEAP output includes metrics representing storage at each of the study area reservoirs, stream flows at key points of all creeks, and water supply diversions.

WEAP model output includes the number and severity of water supply shortages in the modeled period of record for the 2015 and 2035 Proposed Project scenarios. The number and severity of shortages are evaluated relative to the current and future baseline conditions to determine the impacts to water supply from the Proposed Project.

Regarding climate change impacts, the WEAP model projects changes to supplies from imported sources of water (that is, water supplies from non-Valley Water sources) based on a projected 15 cm of sea level rise. While it is acknowledged that temperatures are increasing, specific conditions affecting timing or magnitude of local flows or precipitation within the basin by 2035 are considered speculative, although one general effect of climate change would be to increase local water demands. See Section 3.13, *Greenhouse Gas Emissions and Energy*, for an overview of general climate change assumptions applied to all environmental resource impact analyses.

3.4.3.2 Non-flow Measures Impact Analysis Methodology

Since none of the non-flow measures would affect water availability, there would be no impacts to water supply from the non-flow measures.

3.4.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect water supply.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.4.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to water supply if it would:

- **Impact WS-1:** Substantially alter or reduce Valley Water's ability to have sufficient water supplies available to serve its retailers from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years.

  Any increase in the extent or duration of shortage contingencies greater than 10 percent (that is, an increase in the frequency of Stage 3 shortage contingencies, or in the duration of shortage contingencies) as compared with the baseline would be considered a significant impact.
- **Impact WS-2:** Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects.

3.4.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs and VHP conditions to avoid and minimize adverse effects on the environment that could result from Proposed Project measures. Valley Water BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and applicable VHP conditions are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions.

BMPs relevant to the analysis of water supply resources (along with a brief discussion of their effects on Project activities) include the following:

- **WQ-15**: Prevent Water Pollution – Would protect water supply through long-term protections of water for beneficial use.
- **VHP-3**: Maintain Hydrologic Conditions and Protect Water Quality – Would affect water supply through long-term protections of sources of water for beneficial use and add protection from short-term disruptions for in-channel maintenance or disturbance.
- **VHP-5**: Avoidance and Minimization Measures for Instream Operations and Maintenance – Would add protection from short-term disruptions for in-channel maintenance or disturbance.
- **GEN-1**: In-Channel Work Window – Would add protection from short-term disruptions for in-channel maintenance or disturbance.
- **GEN-16**: In-channel Minor Activities – Would add protection from short-term disruptions for in-channel maintenance or disturbance.
- **SED-3**: Restore Channel Features – Would protect water supply through long-term protections of water for beneficial use.

3.4.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur as a result of implementation. This section evaluates the effects of Proposed Project measures on water supplies, as compared with both the current and future baseline conditions. As noted, Appendix M, *Water Supply Technical Memorandum*, includes a more detailed description of the modeling completed to support the water supply analysis.

3.4.4.1 Impact WS-1: Substantially alter or reduce Valley Water's ability to have sufficient water supplies available to serve its retailers from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years (less than significant)

Flow Measures Impact Analysis

As described in Section 3.4.1.1, the Valley Water Board approved Valley Water's WSCP, which identifies when Valley Water should call on the community to reduce water use in response to drought or other shortages. The WSCP is based on the projected end-of-year groundwater storage because this reflects the general health of the county water system. The plan has five levels listed in Table 3.4-2, ranging from Level 1 (Normal), when short-term water use reductions are not required, to Level 5 (Emergency), which can be triggered by an immediate crisis. Each level has a short-term water use reduction target that the Board can call upon the public to achieve.

The maximum simulated WSCP demand reduction from 1990 to 2010 is 20 percent for both the modeled current baseline conditions scenario and the modeled 2015 Proposed Project scenario). Furthermore, as shown in Table 3.4-4, the total number of years that WSCP is in any stage of demand reduction is the same in the 2015 scenario comparison. Notably, the modeled period includes several consecutive drought years in which Valley Water would be operating under shortage provisions under the existing conditions baseline, but the Proposed Project would not increase the number or severity of shortage contingencies. Therefore, the water supply impact of the modeled 2015 Proposed Project scenario, compared with the existing conditions baseline, would be less than significant because there would be no increase in the frequency or duration of shortage contingencies greater than 10 percent.

When comparing the 2035 Proposed Project modeling results to the future baseline conditions, the Proposed Project would result in 1 additional year of Stage 2 (10 percent) demand reduction, because end-of year groundwater in the Santa Clara Plain subbasin fell below 278,000 AF in the modeled years 1992 and 1993 under the modeled 2035 Proposed Project scenario, but not under the future baseline condition. As noted in Section 3.3, *Groundwater Resources*, in Table 3.3-3, the average monthly groundwater level would increase by 1,200 AF over the period of record, representing an increase in supplies. Overall, both local and non-local storage would increase under the 2035 modeled Proposed Project scenario as compared with the future baseline condition. The water supply impact under the modeled 2035 Proposed Project scenario relative to the future baseline condition would be less than significant because there would be no increase in the frequency or duration of shortage contingencies greater than 10 percent.

Table 3.4-4. Simulated Number of Years Under WSCP Restrictions for Modeled Current and Future Baseline and 2015 and 2035 Proposed Project Scenarios

	Current Baseline	2015 Proposed Project	2015 Difference	Future Baseline	2035 Proposed Project	2035 Difference
Total years with designated water use reductions	3	3	0	2	3	1
Number of years in Stage 2 (10%)	1	1	0	2	3	1
Number of years in Stage 3 (20%)	2	2	0	0	0	0

Source: WEAP model output

Non-flow Measures Impact Analysis

There would be no impact to water supply from the non-flow measures. Although impacts to water quality from short-term construction efforts could temporarily affect water supply through a reduction in the availability of usable water, the losses would be isolated and not large enough to affect water supply. The possible impact to water quality is analyzed in Section 3.5, *Water Quality*.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect water supply. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

As such, proposed monitoring activities would not result in impacts to water supply. And since the maintenance and AMP measures are anticipated to be similar in nature to the proposed flow measures, impacts to water supply would be less than significant.

Significance Conclusion Summary

Overall, shortages would occur at the same frequency and severity under the 2015 modeled Proposed Project scenario relative to the current baseline conditions; therefore, there would not be a reduction in water supply reliability as measured by frequency of demand reductions above 10 percent. Under this threshold criterion, flow measure impacts would be less than significant for Impact WS-1 under current baseline conditions.

There would be 1 year with additional water use reductions of 10 percent under the 2035 modeled Proposed Project relative to the future baseline conditions; however, the additional year of shortage would only be at the 10 percent level, which is within Valley Water's water supply level of service goal. Therefore, flow measure impacts would be **less than significant** for Impact WS-1. There would be **no impact** to water supply from implementation of the Proposed Project non-flow measures.

Mitigation

No mitigation would be required for Impact WS-1.

3.4.4.2 Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects (no impact)

Flow Measures Impact Analysis

As stated in the findings for Impact WS-1, the 2015 and 2035 modeled Proposed Project conditions would not have a significant effect on overall water supply reliability as compared with the corresponding current and future baseline conditions; therefore, the flow measures would not require additional water supply facilities or expansions to existing facilities, and the single additional year of a 10 percent water use reduction under the modeled 2035 Proposed Project scenario, as compared with the future baseline condition, would not warrant construction of new water facilities. Therefore, implementation of the Proposed Project flow measures would result in no impact because there is no corresponding need for construction of water supply facilities.

Non-flow Measures Impact Analysis

As stated in the findings for Impact WS-1, there would be no water supply impacts from the non-flow measures. Since there would be no impact to water supply from the non-flow measures, no new or expanded water supply facilities would be necessary.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect water supply. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. As such, proposed monitoring activities would not result in impacts to water supply. And since the maintenance and AMP measures are anticipated to be similar in nature to the proposed flow and non-flow measures, impacts to water supply would be less than significant.

Significance Conclusion Summary

Implementation of flow and non-flow measures would result in **no impact** related to new or expanded water supply facilities under Impact WS-2.

Mitigation

No mitigation would be required for Impact WS-2.

3.4.4.3 Water Supply Impacts Summary

Table 3.4-5 summarizes the water supply impacts of the Proposed Project.

Table 3.4-5. Water Supply Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
WS-1	Flow Measures	LTS	N/A	LTS	N/A
WS-1	Non-flow Measures	NI	N/A	NI	N/A
WS-2	Flow Measures	NI	N/A	NI	N/A
WS-2	Non-flow Measures	NI	N/A	NI	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A = not applicable, NI = no impact

3.5 Water Quality

This section describes the water quality of the study area and discusses the Proposed Project's impacts to water quality in the study area. Both the flow measures and non-flow measures have the potential to affect water quality conditions in the reservoirs and streams of the study area.

The study area in the Stevens Creek watershed used to assess the impacts of the Proposed Project on water quality is defined as Stevens Creek, generally downstream of the Stevens Creek Dam and upstream of the tidally influenced section of the creek (approximately midway between Highway 101 and the Crittenden Lane pedestrian bridge). For the analysis of water temperature, the Stevens Creek study area is made up of the CWMZ below Stevens Creek Dam. For the analysis of the warm water habitat beneficial use, the study area is the Stevens Creek Reservoir.

The study area in the Guadalupe River watershed used to assess the impacts of the Proposed Project on water quality is defined as the four specific waterways in the Guadalupe River watershed: Alamitos Creek, Guadalupe Creek, Los Gatos Creek, and the Guadalupe River. The study areas generally begin below each waterway's associated dam and upstream of the tidally influenced section of the Guadalupe River (approximately located at the pedestrian bridge downstream of the Montague Expressway). For the analysis of water temperature, the Guadalupe River study area consists of the CWMZ below Guadalupe Dam on Guadalupe Creek (Figures 2.2-1 and 2.2-2). For the analysis of warm water habitat beneficial use, the study area is the reservoirs in the watershed.

3.5.1 Environmental Setting

The environmental setting represents the existing conditions of water quality in the study area, as described above. Characterization of existing water quality conditions in this section is used to inform the assessment of potential impacts to water quality associated with the proposed flow measure operational changes and the non-flow measures. Evaluation of changes in water quality conditions resulting from the proposed flow measures is also based on comparative hydrologic and water temperature modeling analyses (Section 3.5.3).

Ambient water quality in the Santa Clara Basin is influenced by numerous natural and artificial factors including soil erosion, stormwater runoff, agriculture runoff, recreation activities, municipal point sources, mining, and agriculture. Land uses in the Santa Clara Basin range from residential, commercial, and industrial uses in the northern portion of the basin to a primarily rural southern portion with scattered agricultural and grazing lands, water-supply catchments, low-density residential development uses, abandoned mines, and undeveloped and preserved open space (Santa Clara Basin Watershed Management Initiative 2003). For the purpose of this analysis, the following water quality parameters and pollutants are considered:

- temperature
- dissolved oxygen (DO)
- pH
- turbidity
- mercury
- pesticides (for example, diazinon)
- polychlorinated biphenyls (PCBs)

These parameters and pollutants were selected as they were identified in the *Coastal Multispecies Recovery Plan* as potential limiting factors in the Stevens Creek and Guadalupe River watersheds (NMFS 2016). These water quality parameters and pollutants are described in detail in

Section 3.5.2.1. Additionally, the prevalence of trash and conditions that result in aquatic toxicity are also generally assessed.

3.5.1.1 Stevens Creek Watershed

As described in Section 3.2, *Hydrology*, the Stevens Creek watershed covers 29 square miles in western Santa Clara County. Flows originate in the Santa Cruz Mountains and enter Stevens Creek Reservoir, then continue north for approximately 13 miles before discharging into San Francisco Bay. Flows entering the reservoir come from several sources, including Stevens, Swiss, and Montebello Creeks (see Figure 1.2-1). In addition to reservoir releases, downstream inflows to Stevens Creek include flow from the Permanente Diversion, Heney Creek, and imported flow from the Stevens Creek Pipeline.

Temperature

Water temperature is important to water quality because temperature may change the concentrations of molecules as well as the rate at which molecular reactions occur between chemical constituents. Water temperature also plays a role in how quickly certain physical, chemical, and biological reactions occur. Water temperatures also often limit the extent and production of cold-water fisheries (for example, steelhead) during the summer in many watersheds in California.

Temperature in the current baseline described by the 2015 model set, which modeled the hydrological period of record extending from 1990 through 2010, reached daily means of 58.2°F to 62°F with high temperatures ranging from 62.8°F to 66.8°F in the CWMZ. The highest temperatures were typically reached in August and September before decreasing. These temperatures increased only slightly downstream of the CWMZ, reaching a daily mean ranging from 58.8°F to 64.4°F, with highs reaching 63°F to 69.5°F.

The daily mean water temperatures in Stevens Creek below the dam have remained similar to those modeled. For example, from 2013 to 2020, water temperature reached daily means of 64.4°F to 68°F in the CWMZ, usually by July, before decreasing (Smith 2020). This reach includes POIs STEV4–STEV6. (see Appendix H, *Methods for Establishing Reaches of Interest and Points of Interest Technical Memorandum*). Farther downstream in the lower part of the creek, near POIs STEV1 and STEV2, Smith (2020) reported temperatures ranging from 66.2°F to 69.8°F over the same time period.

Dissolved Oxygen

DO is the amount of oxygen present in water. DO levels are inversely related to water temperature in that DO increases as water temperature decreases. Higher DO levels result in more productive waters.

In 2020, Smith reported that DO levels in the CWMZ of Stevens Creek ranged between 8.1 and 9.8 ml/L in October 2020; these levels met the greater than 7 mg/L threshold described for cold water habitat in the *Water Quality Control Plan for the San Francisco Bay Basin* (Basin Plan; Smith 2020). See Section 3.5.2.2.

pH

pH is a measure of how acidic or basic water is. High pH is also described as alkaline. The pH range is from 0 to 14, with 7 being neutral. The pH level is important to aquatic species because it affects their ability to regulate life-sustaining processes. When water becomes alkaline (high pH), effects on aquatic species can include reduced fitness and increased mortality. Low pH or acidic water can result in respiration interference in fish, as gills are affected as well as susceptibility to acid stress and even increased mortality (Central Valley RWQCB 2004).

For WYs 2015 and 2016, the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) reported pH levels in Stevens Creek ranging from 7.5 to 8.2. and 8.2 to 8.4, respectively (SCVURPPP 2016, 2017). These levels meet the water quality standard requiring that pH not fall below 6.5 or exceed 8.5. See Section 3.5.2.2.

Turbidity

Stevens Creek Reservoir overlays Santa Clara Formation fluvial deposits, which are soft and highly erosive. The headwater tributaries of Stevens Creek that drain into the reservoir are highly silted, especially during and after storm events. In addition, Stevens Creek Reservoir includes an oxygenation system to reduce methylmercury in the water. This system can stir up sediment from the bottom of the reservoir (described below). Therefore, Stevens Creek Reservoir flow releases are more turbid than those from the other reservoirs (Valley Water 2017b).

Mercury

Mercury in the study area is sourced from mercury mining waste, urban stormwater runoff, naturally occurring mercury in the soil, atmospheric deposition, and other potential sources (SWRCB 2020). During the summer months, reservoirs typically stratify into distinctive density layer—the warmer, less dense epilimnion floats atop the colder, denser hypolimnion. Decomposition of organic material depletes oxygen concentrations in the hypolimnion, creating low-oxygen conditions that can persist through the period of stratification. Anaerobic bacteria in substrates convert mercury to methylmercury, which is a highly toxic organic molecule that can cause neurological damage and cardiovascular disease in humans and bioaccumulates in algae, prey, and predatory fishes (Davis et al. 2003). Reservoir warm-water fish species in Stevens Creek Reservoir have been measured to contain mercury concentrations that exceed USEPA's national criterion for protection of human health, resulting in fish consumption advisories being issued (Valley Water 2017b).

To reduce the establishment of seasonal hypoxic conditions in the hypolimnia of study area waterbodies, Valley Water has installed circulation and oxygenation systems to reduce anaerobic conversion of mercury to methylmercury. A hypolimnetic oxygenation system was installed in Stevens Creek Reservoir (Valley Water 2017b). However, these types of systems can disturb sediment, increasing turbidity (Smith 2020).

Valley Water (2017b) summarizes the results of extensive monitoring activities that have been conducted regarding mercury concentrations in Stevens Creek Reservoir. Based on methylmercury monitoring studies, total mercury loading Stevens Creek Reservoirs occurred primarily during the wet season, when concentrations were higher, and more water was discharged from reservoir outlets (Valley Water 2017b). Drought conditions from 2012 to 2016 resulted in substantially reduced mercury loading from the reservoir. In 2017, Stevens Creek Reservoir accounted for more mercury loading downstream than other nearby reservoirs. This may be attributable, in part, to the fact that Stevens Creek Reservoir flow releases are more turbid than those from the other reservoirs, and mercury is commonly transported bound to sediments (Valley Water 2017b). During average flow years, the majority of methylmercury loading occurred during the dry season when methylmercury production was highest. However, the oxygenation system in Stevens Creek Reservoir has substantially reduced reservoir outlet methylmercury concentrations (Valley Water 2017b).

Reservoir water surface fluctuation has been suggested to enhance methylation in seasonally inundated reservoir margins by oxidatively increasing sulfate concentrations while sediments are exposed to the atmosphere (Valley Water 2017b). Average annual capacity fluctuation is defined as the arithmetic mean of water-yearly capacity variations, measured as the difference between maximum and minimum annual capacity as a percentage of total reservoir capacity (Valley Water 2017b). SWRCB (2017) reported that the ratio of aqueous methylmercury to chlorophyll-a, aqueous total mercury, and annual reservoir water level fluctuations explain greater than 85 percent of the variability in reservoir fish methylmercury concentrations.

Pesticides (Diazinon) and Polychlorinated Biphenyls

Diazinon is a broad-spectrum organophosphorus pesticide used to control a variety of pests, such as ants and grubs. During the 1990s, numerous San Francisco Bay urban creeks were found to exceed water quality standards for aquatic toxicity associated with stormwater runoff of diazinon. Until 1999, substantial quantities of diazinon were applied in the Bay Area, but diazinon use began to decline substantially in 2000. Toxic concentrations of diazinon have been observed less frequently than in prior years (SWRCB 2020). USEPA phased out most urban diazinon applications at the end of 2004. The Diazinon and Pesticide-Related Toxicity in San Francisco Bay Urban Creeks total maximum daily load (TMDL) was incorporated into a Basin Plan amendment in 2007 (SWRCB 2020) and covers the diazinon impairment listed for Stevens Creek. Given the phasing out of most diazinon use, concern arose that pesticides used to replace diazinon (for example, pyrethroids) also may be toxic to aquatic life. Therefore, the diazinon TMDL addresses all pesticide-related toxicity. The National Pollutant Discharge Elimination System (NPDES) Municipal Regional Permit, adopted in 2015, requires municipalities of Santa Clara and other counties to take TMDL implementation actions, such as to improve coordination between pesticide and water quality agencies, education and outreach, and research and monitoring activities (San Francisco Bay RWQCB 2017).

PCBs are oils to which chlorine has been added to keep them from breaking down in industrial applications. After their harmful effects became evident, they were banned from being manufactured in 1979, although some PCBs are still in use today, primarily by electric utility companies in transformers. PCBs are toxic and accumulate in the tissues of fish, wildlife, and humans. Most PCB pollution occurred decades ago, but some contamination may still occur because of municipal and industrial wastewater effluent, and from storm drains and stormwater runoffs. The NPDES Municipal Regional Permit, adopted in 2015, requires municipalities of Santa Clara and other counties to take TMDL implementation actions, including implementation of source control measures, stormwater treatment, and pollution prevention actions. PCBs are currently identified as impairments to Stevens Creek Reservoir, but no information is available regarding the source of the contamination.

In 2016, water and sediment toxicity and sediment chemistry information was collected at two monitoring sites in the Stevens Creek Watershed (SCVURPPP 2017). The water sampled was found to be significantly toxic to macroinvertebrates (for example, *Chironomus dilutus*) and minnows (for example, *Pinephales promelas*) survival. However, these levels were not high enough to trigger follow-up sampling, and the causes of the toxicity were unknown (SCVURPPP 2017). In 2017, SCVURPPP recorded significant toxicity levels at a toxicity monitoring station in the Stevens Creek watershed (SCVURPPP 2018). This level exceeded the Municipal Regional Permit threshold for resampling; however, similar levels were not documented in the subsequent sampling (SCVURPPP 2018).

3.5.1.2 Guadalupe River Watershed

The Guadalupe River watershed covers 170 square miles (Figure 3.2-2), beginning in the Santa Cruz Mountains on the west side of Santa Clara County, with the full Guadalupe River. The Guadalupe River has four tributaries in the study area (Calero, Alamitos, Guadalupe, and Los Gatos Creeks), and each creek is regulated by a storage reservoir.

Other water quality parameters recorded in WY 2016 included a DO level of 9.41 mg/L, pH levels of 8.3, and specific conductance of 547 microSiemens per centimeter (μS/cm) (SCVURPPP 2017).

The Guadalupe River watershed was contaminated by the former New Almaden Mining District, which was North America's oldest and most productive mercury mine, and the fifth largest in the world (Valley Water 2017b). Although active mining was stopped by 1970, waste rock and contaminated sediments persist as sources of mercury to the watershed. Almaden and Guadalupe Reservoirs are directly affected by mercury contamination through mercury-laden sediments and waste material. Guadalupe Reservoir is believed to have been built on a former mercury processing area containing waste material (SWRCB 2020). Calero Reservoir is contaminated with mercury because of water transfers from Almaden Reservoir through the Almaden-Calero Canal, and from imported water transfers through the Santa Clara Conduit from San Luis Reservoir (Valley Water 2017b), which also is listed as impaired for mercury (Central Valley RWQCB 2016). Mercury and PCBs in stormwater runoff are being reduced through implementation of the respective TMDL water quality restoration plans. In compliance with Municipal Regional Permit Provisions C.11 (mercury) and C.12 (PCBs), the Program will continue to identify sources of these pollutants and will implement control actions designed to achieve new minimum load reduction goals (SCVURPPP 2018).

The trash in several study area creeks is reportedly attributable to illegal dumping, homeless encampments, and urban runoff and storm sewer effluent. Valley Water has been monitoring locations of accumulated trash in the Guadalupe River since 2015. Although a notable reduction in the presence of observed trash occurred in 2017 relative to 2016 in the Guadalupe River, this has been attributed to the high stream flows that occurred during 2017, flushing the trash downstream. Trash in local creeks has been reduced by new control measures to reduce the impacts of illegal dumping directly into waterways. These actions include the installation and maintenance of trash capture systems, the adoption of ordinances to reduce the impacts of litter-prone items, enhanced institutional controls such as street sweeping, and the ongoing removal and control of direct dumping (SCVURPPP 2018).

Temperature

Temperature in the current baseline, described by the 2015 model set, reached daily means of 62.8°F to 66.8°F in the CWMZ below Guadalupe Dam, typically by August and September before decreasing. High temperatures in the CWMZ ranged from 61.4°F to 69.4°F, with the highest temperatures reached in October before decreasing. These temperatures increased downstream of the CWMZ in the Guadalupe River closer to the boundary of the study area, reaching daily means ranging from 63.9°F to 69.9°F, with highs reaching 68.1°F to 75.3°F. High temperatures in the Guadalupe River typically occurred in June.

More recent data collected reflect the range of temperatures that illustrate the current baseline. In 2014, temperature monitors in the watershed below Guadalupe Dam indicated water temperatures exceeded the weekly average temperature of 63.5°F between 17 and 49 percent of the time (SCVURPPP 2015). Similarly, in 2015, watershed temperatures exceeded 63.5°F, with the maximum 7-day average ranging from 63.5°F to 68°F (SCVURPPP 2016). Water temperatures measured in three tributaries to the Guadalupe River generally increased with decreasing site elevation because of their distance from upstream reservoirs, which are the sources of cooler water (SCVURPPP 2018).

Dissolved Oxygen

In terms of DO, the SCVURPPP reported levels of 9.41 mg/L (2017), whereas, more recently, Valley Water has reported levels ranging as high as 12.1 mg/L in Alamitos Creek and as low as 6.9 mg/L in the Guadalupe River (Valley Water 2021a).

pH

In 2016, the SCVURPPP reported pH levels of 8.3 in the Guadalupe River watershed study area (SCVURPPP 2017). These levels meet water quality standards requiring that pH not fall below 6.5 or exceed 8.5. See Section 3.5.2.2.

Turbidity

Turbidity in the Guadalupe River watershed and associated suspended sediment concentrations are closely related to flow events. It is reported that about 90 percent of sediment discharge that occurs in the system occurs over just a few days a year. The majority of sediment discharge occurs during short, but intense, winter storms (Lent and McKee 2011).

Mercury

Although most study area reservoirs are designated as impaired for mercury, Guadalupe, Almaden and Calero Reservoirs have been the focus of many mercury-related studies and monitoring efforts and are being addressed through a mercury TMDL, which covers the portion of the Guadalupe River watershed directly affected by historical mining operations.

The Guadalupe River watershed was contaminated by the former New Almaden Mining District, which was North America's oldest and most productive mercury mine, and the fifth largest in the world (Valley Water 2017b). Although active mining was stopped by 1970, waste rock and contaminated sediments persist as sources of mercury to the watershed. Almaden and Guadalupe Reservoirs are directly affected by mercury contamination through mercury-laden sediments and waste material. Guadalupe Reservoir is believed to have been built on a former mercury processing area containing waste material (SWRCB 2020). Calero Reservoir is contaminated with mercury because of water transfers from Almaden Reservoir through the Almaden-Calero Canal, and from imported water transfers through the Santa Clara Conduit from San Luis Reservoir (Valley Water 2017b), which also is listed as impaired for mercury (Central Valley RWQCB 2016).

Reservoir warm-water fish species in the Guadalupe River watershed (Almaden, Calero, Guadalupe, and Lexington Reservoirs) have been measured to contain mercury concentrations that exceed USEPA's national criterion for protection of human health, resulting in fish consumption advisories being issued (Valley Water 2017b). Mercury concentrations in largemouth bass have been found to be notably higher in Guadalupe and Almaden Reservoirs and Lake Almaden relative to other study area reservoirs (Lexington Reservoir) and other reservoirs in the San Francisco Bay area (SWRCB 2020). In fact, SWRCB (2020) reported that fish from Guadalupe Reservoir contained the highest recorded fish tissue mercury concentrations in California.

To reduce the establishment of seasonal hypoxic conditions in the hypolimnia of study area waterbodies, Valley Water has installed circulation and oxygenation systems to reduce anaerobic conversion of mercury to methylmercury. Hypolimnetic circulators were installed in Almaden Lake, and hypolimnetic oxygenation systems were installed in Almaden, Calero, and Guadalupe Reservoirs (Valley Water 2017b).

Valley Water (2017b) summarizes the results of extensive monitoring activities that have been conducted regarding mercury concentrations in the Guadalupe River watershed. Based on methylmercury monitoring studies, total mercury loading to the creeks downstream of Almaden, Calero, Guadalupe and Stevens Creek Reservoirs occurred primarily during the wet season, when concentrations were higher, and more water was discharged from reservoir outlets (Valley Water 2017b). Drought conditions from 2012 to 2016 resulted in substantially reduced mercury loading from all reservoirs. Guadalupe Reservoir showed the highest mercury loading during the wet year of 2017.

Reservoir water surface fluctuation has been suggested to enhance methylation in seasonally inundated reservoir margins by oxidatively increasing sulfate concentrations while sediments are exposed to the atmosphere (Valley Water 2017b). Among Guadalupe, Almaden, and Calero Reservoirs, and prior to the imposition of the DSOD dam safety storage restrictions, Calero Reservoir experienced the lowest variation in water surface level, and Almaden Reservoir exhibited the highest variation in water surface level. Subsequent to the storage restrictions, reservoir water surface fluctuations have decreased in Calero and Guadalupe Reservoirs, but not in Almaden Reservoir (Valley Water 2017b). Lake Almaden's relatively modest volume and lack of a permanent barrier for impounding water results in much smaller water level fluctuations than those that occur in the reservoirs.

Pesticides (Diazinon) and Polychlorinated Biphenyls

The Diazinon and Pesticide-Related Toxicity in San Francisco Bay Urban Creeks TMDL was incorporated into a Basin Plan amendment in 2007 (SWRCB 2020) and covers the diazinon impairment listed for the Guadalupe River and Los Gatos Creek. Given the phasing out of most diazinon use, concern arose that pesticides used to replace diazinon (for example, pyrethroids) also may be toxic to aquatic life. Therefore, the diazinon TMDL addresses all pesticide-related toxicity.

PCBs in stormwater runoff are being reduced through implementation of the respective TMDL water quality restoration plans. In compliance with Municipal Regional Permit Provision C.12 (PCBs), the Program will continue to identify sources of this pollutant and will implement control actions designed to achieve new minimum load reduction goals (SCVURPPP 2018). Historically, the Guadalupe River was noted as supplying "a disproportionately large load" of PCBs (Lent and McKee 2011).

Trash

The trash in several study area creeks is reportedly attributable to illegal dumping, homeless encampments, and urban runoff and storm sewer effluent. Valley Water has been monitoring locations of accumulated trash in the Guadalupe River since 2015. Although a notable reduction in the presence of observed trash occurred in 2017 relative to 2016 in the Guadalupe River, this has been attributed to the high stream flows that occurred during 2017, flushing the trash downstream. Trash in local creeks has been reduced by new control measures to reduce the impacts of illegal dumping directly into waterways. These actions include the installation and maintenance of trash capture systems, the adoption of ordinances to reduce the impacts of litter-prone items, enhanced institutional controls such as street sweeping, and the ongoing removal and control of direct dumping (SCVURPPP 2018).

3.5.2 Regulatory Setting

This section summarizes the federal, state, regional, and local laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to water quality.

In the study area, regulations for water quality are implemented primarily by the San Francisco Bay RWQCB, which derives its regulatory authority and mandates from the State's Porter-Cologne Act and the federal CWA (see discussions in Section 3.5.2.2). The Basin Plan (SWRCB 2020) for the San Francisco Bay Basin, as amended, described in Section 3.5.2.2, is the San Francisco Bay RWQCB's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the state and includes programs of implementation to achieve water quality objectives. Additional details regarding the regulatory setting as it applies to water quality standards, programs, and plans are provided below.

3.5.2.1 Federal

Clean Water Act Section 303 (33 U.S. Code 1313)

Section 303 of the CWA has been delegated for implementation by USEPA to the SWRCB and its nine RWQCBs.

Section 303(c)(2)(b), the National Toxics Rule, requires States to adopt numeric criteria for the priority toxic pollutants listed in Section 307(a) if those pollutants could interfere with the designated uses of a state's waters. California's water quality standards, established in 2000, apply to inland surface waters, enclosed bays, and estuaries.

Section 303(d) requires that States identify waterbodies that do not meet water quality standards and the pollutants or factors that impair them. The term "303(d) list" is short for a State's list of impaired waters (for example, stream and river segments and lakes). States are required to submit their lists for USEPA approval every 2 years. For each water on the list, the State identifies the pollutant causing the impairment, when known. The law requires that the Water Board develop TMDLs for these impaired waters. TMDLs are the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards. The State assigns a priority for developing TMDLs based on the severity of the pollution and the sensitivity of the uses to be made of the waters, among other factors [40 CFR 130.7(b)(4)].

The study area reservoirs and creeks have been identified as impaired for several water quality constituents. The most common impairment designated in the study area is for mercury. Stevens Creek; Lexington, Almaden, Calero, and Guadalupe Reservoirs; Lake Almaden; Guadalupe and Alamitos Creeks; and the Guadalupe River have all been designated as impaired for mercury (San Francisco Bay RWQCB 2017). Stevens and Los Gatos Creeks and the Guadalupe River have been identified as impaired for urban pesticide toxicity (diazinon; San Francisco Bay RWQCB 2017). Additional impairments include legacy pesticides and PCBs in Stevens Creek Reservoir, water temperature and toxicity in Stevens Creek, and trash in several of the creeks. In addition, the San Francisco Bay RWQCB (2018) has proposed listing Los Gatos Creek downstream of Lexington Reservoir as impaired for water temperature. The currently identified water quality impairments for each of the watersheds are as follows:

- Stevens Creek watershed:
  - Stevens Creek: Urban pesticide toxicity (diazinon), water temperature, toxicity, trash
  - Stevens Creek Reservoir: Legacy pesticides (chlordane and dieldrin), mercury, PCBs
- Guadalupe River watershed:
  - Guadalupe River: Urban pesticide toxicity (diazinon), mercury, trash
  - Guadalupe Creek: Mercury
  - Alamitos Creek: Mercury
  - Los Gatos Creek: Urban pesticide toxicity (diazinon)
  - Lake Almaden: Mercury
  - Almaden, Calero, and Guadalupe Reservoirs: Mercury

Clean Water Act, Section 401 (33 U.S. Code 1341)

Under Section 401 of the CWA, a federal agency cannot issue a license or permit to conduct any activity that may result in a discharge into waters of the U.S. until the state where the discharge would originate has granted or waived a Section 401 Water Quality Certification that any such discharge will not violate state water quality standards. Section 401 water quality certifications for discharges in the study area are issued by the San Francisco Bay RWQCB. See Section 3.5.2.2 for a discussion of the state water quality standards.

Clean Water Act, Section 402 (33 U.S. Code 1342)

CWA Section 402 regulates discharges to surface waters (other than dredge or fill material) through the NPDES, which is administered by USEPA. The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits for discharges to waters of the U.S. The NPDES program is implemented at the state level and is further described below.

Other federal regulations such as Section 404 of the CWA (33 USC 1344) and the SDWA [42 USC 300(f) et seq.] are also applicable but are discussed in Section 3.8, *Terrestrial Biological Resources*, and Section 3.4, *Water Supply*, respectively, of this EIR.

3.5.2.2 State

Porter-Cologne Water Quality Control Act (Water Code Division 7)

The 1969 Porter-Cologne Water Quality Control Act (known as the Porter-Cologne Act) dovetails with the CWA (see discussion above). It established the SWRCB and divided the state into nine regions, each overseen by its own RWQCB. The SWRCB is the primary state agency responsible for protecting the quality of the state's surface water and groundwater supplies; however, much of the SWRCB's daily implementation authority is delegated to the nine RWQCBs, which are responsible for implementing CWA Sections 303(d), 401, and 402. In general, the SWRCB manages water rights and regulates statewide water quality, whereas the RWQCBs focus on water quality within their respective regions.

The Porter-Cologne Act requires that the RWQCBs develop Basin Plans that designate beneficial uses of California's major surface waterbodies and groundwater basins and establish specific narrative and numerical water quality objectives for those waters. Beneficial uses represent the services and qualities of a waterbody (that is, the reasons that the waterbody is considered valuable). Water quality objectives reflect the standards necessary to protect and support those beneficial uses. Basin Plan standards are primarily implemented by regulating waste discharges through Waste Discharge Requirements permits so that water quality objectives are met.

Water Quality Control Plan for the San Francisco Bay Basin

SWRCB has developed, adopted, and implemented a Basin Plan for the San Francisco Bay Basin (Region 2). The Basin Plan is the master policy document that contains descriptions of the legal, technical, and programmatic bases of water quality regulation in the region, and includes:

- identification of beneficial water uses that the SWRCB will protect
- water quality objectives needed to protect the designated beneficial water uses
- strategies and time schedules for achieving the water quality objectives

The Basin Plan is the master policy document that describes the legal, technical, and programmatic bases of water quality regulation in the San Francisco Bay region. The plan includes a statement of beneficial water uses that the San Francisco Bay RWQCB will protect, water quality objectives to protect designated beneficial water uses, and implementation plans for achieving water quality objectives through its regulatory programs (SWRCB 2020). As defined in the Basin Plan, the definitions of these beneficial uses are:

Cold Freshwater Habitat (COLD)

"*Uses of water that support cold-water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates*… Cold freshwater habitats generally support trout and may support anadromous salmon and steelhead fisheries as well" (SWRCB 2020). Many of the study area stream reaches are designated as having beneficial use of COLD. This beneficial use may be affected by changes in water temperature. Changes in modeled habitat suitability, including thermal suitability, for fish species in the study area are evaluated in Section 3.7, *Aquatic Biological Resources*, and are not evaluated in detail this section.

Warm Freshwater Habitat (WARM)

"*Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates*…. The warm freshwater habitats supporting bass, bluegill, perch, and other fish are generally lakes and reservoirs, although some minor streams will serve this purpose where stream flow is sufficient to sustain the fishery" (SWRCB 2020).

This beneficial use may be affected by changes in water temperature and/or associated warm water spawning and embryo development habitat.

Fish Migration (MIGR)

"*Uses of water that support habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region*…. A water quality barrier, whether thermal, physical, or chemical, can destroy the integrity of the migration route and lead to the rapid decline of dependent fisheries" (SWRCB 2020).

Many of the study area stream reaches are designated as having the beneficial use of MIGR. This beneficial use may be affected by changes in water temperature.

Preservation of Rare and Endangered Species (RARE)

"*Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered"* (SWRCB 2020).

Fish Spawning (SPWN)

"*Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish"* (SWRCB 2020).

Many of the study area stream reaches are designated as having the beneficial use of SPWN. This beneficial use may be affected by changes in water temperature.

Wildlife Habitat (WILD)

"*Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl*…. Two important types of wildlife habitat potentially affected are riparian and wetland habitats" (SWRCB 2020).

Municipal Supply (MUN)

"*Uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply*" (SWRCB 2020).

Groundwater Recharge (GWR)

"*Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting saltwater intrusion into freshwater aquifers"* (SWRCB 2020).

Freshwater Replenishment (FRSH)

"*Uses of water for natural or artificial maintenance of surface water quantity or quality*" (SWRCB 2020).

Water Contact Recreation (REC1)

"*Uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and uses of natural hot springs"* (SWRCB 2020).

Noncontact Water Recreation (REC2)

"*Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities*" (SWRCB 2020).

The designated beneficial uses for each creek are listed in Table 3.5-1. Water quality objectives (standards) relevant to the Proposed Project are described below.

Table 3.5-1. Designated Beneficial Uses

Beneficial Use	Stevens Creek	Guadalupe River	Guadalupe Creek	Los Gatos Creek	Alamitos Creek	Calero Creek
COLD	X	X	X	X	X	X
WARM	X	X	X	X	X	X
MIGR	X	X	X	X	X	X
RARE	X	X	X	X	X	X
SPWN	X	X	X	X	X	X
WILD	X	X	X	X	X	X
MUN	Not applicable	Not applicable	Not applicable	X	Not applicable	Not applicable
GWR	X	X	X	X	X	Not applicable
FRSH	X	Not applicable	X	X	X	X
REC1	X	X	X	X	X	X
REC2	X	X	X	X	X	X

As described above, the Basin Plan identifies water quality objectives to protect designated beneficial uses. The plan differentiates between objectives for ocean waters, surface waters, and groundwaters (SWRCB 2020). The following defines the water quality objectives considered in this EIR:

Temperature

"The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses…. The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature" (SWRCB 2020).

Dissolved Oxygen

"For non-tidal waters, the DO objectives are 7.0 mg/L DO minimum for cold-water habitat and 5.0 mg/L DO minimum for warm-water habitat" (SWRCB 2020).

pH

"The pH shall not be depressed below 6.5 nor raised above 8.5. This encompasses the pH range usually found in waters within the basin. Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels" (SWRCB 2020).

Toxicity

"All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms. Detrimental responses include, but are not limited to, decreased growth rate and decreased reproductive success of resident or indicator species. There shall be no acute or chronic toxicity in ambient waters. Acute toxicity is defined as a median of less than 90 percent survival, or less than 70 percent survival, 10 percent of the time, of test organisms in a 96-hour static or continuous flow test" (SWRCB 2020).

Existing toxic impairments in the Project area include:

- Stevens Creek and Reservoir: Toxicity – chlordane, dieldrin, diazinon, mercury, and PCBs
- Guadalupe River watershed: Toxicity – diazinon and mercury

Population and Community Ecology

"All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce significant alterations in population or community ecology or receiving water biota. In addition, the health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ substantially from those for the same waters in areas unaffected by controllable water quality factors" (SWRCB 2020).

State Authority under Clean Water Act Section 402 (33 U.S. Code 1342)

The State of California adopted the Construction General Permit, Order No. 2012-0006-DWQ, amending Order No. 2009-0009-DWQ, effective July 17, 2012. SWRCB Water Quality Order 2012-0006-DWQ (Construction General Permit) regulates construction site stormwater management. Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the general permit for discharges of stormwater associated with construction activity. This requirement includes linear projects that disturb 1 or more acres. Construction activity subject to this permit includes clearing, grading, and other ground disturbance, such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

Permit applicants are required to submit an Notice of Intent to SWRCB and to prepare a SWPPP. The SWPPP identifies BMPs that must be implemented to reduce construction effects on receiving water quality based on pollutants. The BMPs identified are directed at implementing both sediment- and erosion-control measures and other measures to control chemical contaminants. The SWPPP must also include descriptions of the BMPs to reduce pollutants in stormwater discharges after all construction phases have been completed at the site (post-construction BMPs). The SWPPP must contain a visual monitoring program, a chemical monitoring program for “nonvisible” pollutants to be implemented if there is a failure of BMPs, and a sediment monitoring plan if the site discharges directly to a waterbody listed on the CWA 303(d) list for sediment.

Other applicable state laws, including water right permits (Water Code Section 1200 et seq.), the California SDWA, the Water Conservation Act of 2009 (SB X7-7, Water Code Section 10608 et seq.), and State Water Conservation Programs, are discussed in Section 3.2, *Hydrology*, of this EIR.

3.5.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies the other regional and local regulations relevant to water quality.

As described above in Section 3.5.1, the Santa Clara County 15 co-permittees of the Municipal Regional Stormwater NPDES permit have developed an *Urban Runoff Management Plan* (URMP). The URMP is a San Francisco Bay area-wide permit that lists 77 co-permittees and regulates or requires water quality protective actions in the following activity categories:

- developing land in a way that affects stormwater quality and flow
- emitting construction-related pollutants
- implementing Pollutant of Concern control programs to reduce the impacts of copper, dioxins, mercury, PCBs, pesticides, sediment, and trash from urban runoff into waterbodies
- implementing an illicit-discharge control program that includes an active surveillance component, a centralized complaint-collection component, and a follow-up component to target illicit discharges and non-stormwater sources
- controlling and reducing polluted runoff from commercial and industrial sites
- maximizing the removal of pollutants during municipal operations (that is, sweeping streets, cleaning storm drain inlets and basins, and conducting other routine municipal maintenance)

Valley Water participates in the SCVURPPP (SCVURPPP 2018). Program member agencies (co-permittees) include the Cities of Campbell, Cupertino, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San José, Santa Clara, Saratoga, and Sunnyvale; Santa Clara County; and Valley Water. The Program components follow the Program’s NPDES permit and involve permit and permit support components such as construction site control, water quality monitoring, green infrastructure, and municipal operations, among others.

The Program cooperates with the Santa Clara Basin Watershed Management Initiative (2003), which was established by USEPA, the SWRCB, and the San Francisco Bay RWQCB to manage water resources in Santa Clara Basin watersheds.

Water Resources Protection Ordinance of The Santa Clara Valley Water District (as amended by Ordinance 081)

The Water Resources Protection Ordinance (as amended by Ordinance 081) was adopted by the Valley Water Board to help implement the Guidelines and Standards for Land Use near Streams (Santa Clara Valley Water Resources Protection Collaborative 2006). The ordinance is intended to protect the water resources managed by Valley Water; it provides a set of model guidelines and standards for land use along stream corridors and regulates access to and use of the District's facilities and easements. The ordinance specifies the project review and permitting process for projects located within 50 feet of a creek or waterway or within 50 feet of a Valley Water-owned property or easement. The *Water Resources Protection Manual* provides guidance for complying with the ordinance.

3.5.3 Methodology

This section presents an overview of the methods used to analyze the effects of the Proposed Project on water quality. The analysis considers the effects of Proposed Project flow measures under current and future baseline conditions. It also presents the effects of non-flow measures.

3.5.3.1 Flow Measures Impact Analysis Methodology

Overview of Analytical Approach

The water quality impact assessment methodology includes both quantitative and qualitative components. Where feasible, the analysis relies on projected changes in reservoir storage, instream flows, and instream water temperatures to determine potential water quality effects that could occur as a result of the Proposed Project. However, based on the available data and modeling for the study area, most water quality impairment constituents are assessed qualitatively.

As discussed in other flow-related sections (see Section 3.2.3.1), Valley Water uses the WEAP hydrologic model to evaluate water operations in Valley Water's service area. The WEAP model is used in this analysis to simulate operations for the current and future baseline conditions and for Proposed Project operations in 2015 and 2035. Water temperature estimation models also are used to simulate instream water temperatures for the same timeframes. Refer to the *Temperature Modeling Technical Memorandum* (Appendix I) for a detailed description of the water temperature estimation methodology.

Reservoir Hydrology

Reservoir storage volumes are an important analytical component for water quality because they inform dilution factors for constituents of concern, potential for erosion and sedimentation, and reservoir water temperature, including cold-water pool volume.

When the source of a pollutant is fairly constant in its frequency and magnitude, low reservoir storage (that is, the period of minimum dilution) is typically the critical condition for the receiving water. Dilution is the primary mechanism by which the concentrations of contaminants (for example, mercury) from point and some non-point sources are reduced. However, when reservoir storage is relatively low, there is less water available to dilute contaminant loadings, resulting in higher concentrations.

In addition to changes in dilution potential of contaminants, changes in reservoir storage also can influence erosion and sedimentation in the reservoir. Specifically, an increase in the area of exposed reservoir shoreline can result in greater erosion because of surface runoff during precipitation, leading to increases in sediment delivery and potentially mercury into the reservoir and downstream. As previously described, increased water surface elevation fluctuations in particular have been identified as potentially exacerbating mercury loading in reservoirs. Additionally, severely low reservoir storage levels have the potential to result in increased mixing of fine sediment in the reservoir, increasing turbidity and potentially mercury concentrations in the reservoir and downstream.

The volume of the cold-water pool in a reservoir also provides an indication of water quality available to cold-water fisheries and may indirectly provide an indication that there is a sufficient quantity of DO available to support aquatic life and natural benthic processes. In addition, the cold-water pool is often relied upon to ensure the health and protection of downstream riverine fish species, particularly for anadromous salmonid spawning and rearing activities.

To assess the effects of reservoir water surface elevation change-related impacts to the warm-water fisheries, the following two-phased approach is used. First, the magnitude of change in reservoir water surface elevation occurring each month of the primary spawning period for nest-building fish (March through June) under the Proposed Project are determined and compared with that which is modeled for the bases of comparison. Review of the available literature suggests that, on average, self-sustaining black bass populations in North America experience a nest success (that is, the nest produces swim-up fry) rate of 60 percent (Friesen 1998; Goff 1986; Hunt and Annett 2002; Hurley 1975; Knotek and Orth 1998; Kramer and Smith 1962; Latta 1956; Lukas and Orth 1995; Neves 1975; Philipp et al. 1997; Raffetto et al. 1990; Ridgway and Shuter 1994; Turner and MacCrimmon 1970).

The California Department of Fish and Game (Lee 1999) examined the relationship between reservoir water surface elevation fluctuation rates and nesting success for black bass in several California reservoirs, which indicates that a reduction rate of approximately 0.16 to 0.20 feet per day or less would result in 60 percent nest success for largemouth bass and smallmouth bass. Lee (1999) considered the spawning and embryo incubation period to extend for 15 days for largemouth bass, 17 days for spotted bass, and 20 days for smallmouth bass. For evaluation purposes, a 17-day period was selected to evaluate Centrarchid spawning and incubation success because it represents the centroid of the referenced durations. A daily water surface elevation reduction of 0.18 feet was selected as the threshold beyond which spawning success may be affected because it represents the centroid of the daily water surface elevation reduction rate corresponding to 60 percent nest success. Therefore, a daily spawning cohort (that is, adults spawning on one day of the March through June spawning and incubation period) is considered to have successfully spawned if modeled water surface elevation was not reduced by more than 3 feet (that is, 0.18 feet x 17 days) over a 17-day period. The number of successful daily spawning cohorts is calculated by month for each year of the simulation period and totaled for each year of the simulation period. The average monthly and average annual total number of successful spawning cohorts are compared under the Proposed Project, relative to the baselines. A change in the number of average annual total successful spawning cohorts of 10 percent or more is used as a potential substantial change in reservoir warm-water fish populations.

Criteria for reservoir water surface elevation increases (nest flooding events) have not been developed by CDFW. Because of overall reservoir fishery benefits (for example, an increase in the availability of littoral habitat for warm-water fish rearing), greater reservoir elevations that would be associated with rising water levels would likely offset negative impacts resulting from nest flooding (Lee 1999). Therefore, the likelihood of spawning-related impacts from nest flooding is not addressed for reservoir fisheries. Reservoirs also provide spawning and embryo development habitat for warm-water fish species, such as bass. Fluctuations in reservoir levels during the spawning period (March through mid-June) can reduce reproductive success of warm-water species, potentially reducing their overall numbers and availability for the recreational fishery.

To assess potential reservoir-related effects associated with the Proposed Project, the analysis relies on changes in modeled reservoir storage and water surface elevation under the Proposed Project relative to the bases of comparison (that is, 2015 Proposed Project relative to Current Baseline and 2035 Proposed Project relative to Future Baseline). Modeled monthly averages and monthly probability of exceedance distributions of storage volumes are calculated and compared under the Proposed Project, relative to the bases of comparison, to evaluate general changes in storage. When a reservoir exhibits increased storage (or water surface elevation), there would be an improvement in water quality (for example, greater dilution of constituents of concern, increased cold-water pool volume). Conversely, when storages are projected to be lower than under the baseline, there would be a potential for impaired water quality (for example, less stratification, reduced cold water, higher concentrations of pollutants, reduced warm-water spawning areas, and greater sediment exposure around the shoreline). An increase in the extent to which water surface elevations fluctuate within a WY is considered an indicator of potential mercury loading in the reservoir.

Instream Flow

Water quality constituent concentrations are usually highly correlated with stream flow, and flow is strongly weather-dependent. Thus, constituent loads, calculated as pollutant concentration multiplied by stream flow, have a large weather-dependent variance component (Stow and Borsuk 2003). Water quality constituents on the 303(d) list are candidates for TMDL development, which generally focuses on either reducing the load of pollutants into a waterbody or increasing the dilution of pollutants (USEPA 2018b).

Hydrology is often critical to modeling nonpoint source pollution because water flow and routing are the basic transport mechanisms for most pollutants (Oregon Department of Environmental Quality 2010). According to the USEPA (2008), while temporal variations in water quality can be affected by source activity, they are more often related to environmental conditions such as weather and resulting flow patterns. When the source of a pollutant is fairly constant in its frequency and magnitude, low flow (that is, the period of minimum dilution) is typically the critical condition for the receiving water (USEPA 2010). During a low-flow event, less water is available to dilute contaminant loadings, resulting in higher instream concentrations (USEPA 2010).

In addition to dilution potential, changes in flows also could affect erosion rates and sedimentation in the stream channels. For example, substantial reductions in river stage could lead to increases in erosion because of greater exposure of stream banks to surface runoff during precipitation. Substantial reductions in stage also could steepen the water surface slope from tributary streams, increasing erosive power at tributary junctions. Substantial increases in river stage could influence erosion rates because of the increased scour. In addition to increased turbidity, increases in erosion have the potential to increase concentrations of some contaminants.

Similar to reservoir conditions, the analysis relies on changes in simulated stream flows to evaluate potential water quality effects of the Proposed Project. Modeled monthly average flows and monthly flow probability of exceedance distributions are calculated and compared to qualitatively assess water quality impacts attributable to differences in flows over the simulation period under the Proposed Project relative to the bases of comparison. Flows are evaluated for representative POIs in the study area, including POIs immediately downstream of most dams (or the upstream limit of anadromy), POIs nearest the downstream extent of CWMZs, the most downstream-located POIs for which flow was simulated, and POIs downstream of imported water discharge. To evaluate the potential for water quality impacts associated with substantial increases in flows and associated stages, results of the peak flow analyses conducted in Section 3.2, *Hydrology*, also are considered in this assessment. Increases in stream flow during months when flows are relatively low would potentially improve water quality because of greater dilution of contaminants, while substantial increases in flow during relatively higher flow conditions may potentially increase turbidity and contaminant concentrations as a result of increased erosion. Conversely, substantially reduced flows during relatively low flow periods may increase contaminant concentrations, while substantially reduced flows during relatively high flow conditions may decrease the potential for erosion and increase contaminant concentrations.

Water Temperature

The Basin Plan establishes a temperature water quality standard requiring that the temperature of any cold or warm water freshwater habitat not increase by more than 5°F (2.8°C) above the natural receiving water temperature (RWQCB 2019). However, the definition of “natural receiving water” temperature has not been established and there is debate as to what time period and watershed conditions the “natural receiving water” should reflect. In the absence of an appropriate natural temperature metric for this area, Valley Water assesses water temperature standards in this EIR based on salmonid-specific reported limiting temperatures.

There is also scientific uncertainty as to what the most appropriate temperatures would be for salmonids in the central California region during different times of their lifecycle. Valley Water is also currently engaged in a multiyear study to determine appropriate temperatures for various life stages of the Central California Coast (CCC) steelhead Distinct Population Segment (DPS). The current approach used by SWRCB is to apply temperature guidance developed for salmonid species in Oregon, Washington, and Idaho (that is, 64.4°F; USEPA 2003). However, studies in California and other regions with warmer temperatures have shown that salmonids (including *O. mykiss*) are capable of tolerating and even benefiting from warmer water temperatures (Wurtsbaugh and Davis 1977; Myrick and Cech 2001; Hayes et al. 2008; Chen et al. 2015; Verhille et al. 2016). For example, research based in southern California streams has shown steelhead persisting even at peak temperatures from 82.4°F (28°C) in the Ventura River (Carpanzo 1996, as cited in Exponent 2020) to 86°F (30°C) in Santa Paula Creek (Sloat and Osterback 2013). Scrutiny of the breadth and applicability of the science used in establishing the EPA guidance has called into question its appropriateness in setting thermal guidelines (Exponent 2020) for all steelhead populations equally. In fact, a June 27, 2018, letter from the Deputy Assistant Administrator of the USEPA indicated that:

> the EPA considers there to be an open and legitimate scientific question about the adaptability of salmonid populations to warmer conditions in California. The EPA is aware of research with salmonid species from California Rivers that suggests populations at the southern limit of their distribution may be locally adjusted to warmer temperatures relative to more northern populations, and that these findings challenge the use of a single thermal criterion along the entirety of its distribution range.

Given this statement and the likely higher temperature tolerance of CCC steelhead, the EIR water quality analysis for temperature focuses on Proposed Project changes from current and future baseline water temperatures, recognizing the Settlement Agreement requirements for Valley Water related to managing temperatures in each CWMZ. The analysis focuses on Project temperature impacts in the CWMZs because they are the areas where Valley Water operations have the most direct influence on water temperatures through reservoir releases. This approach is consistent with the Basin Plan’s emphasis on “controllable water quality factors” when considering achievement of water quality standards. As defined in the Basin Plan, “controllable water quality factors are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the state and that may be reasonably controlled” (RWQCB 2019, Section 3.1, p. 3-2). As water flows farther downstream from the CWMZ, other factors beyond Valley Water’s control (for example, solar radiation, impermeable surface runoff, and development) influence water temperatures, limiting Valley Water’s ability to reasonably control the temperature or other water quality parameters. To better understand the distinction between where Valley Water exercises control over water temperatures compared with where that control is diminished by non-Valley Water sources, the analysis compares temperatures in the CWMZs with downstream Valley Water POI monitoring sites.

Cold Water Management Zones and Downstream Locations

Settlement Agreement Section 6.5.2.1 requires that "SCVWD will make flow releases from Stevens Creek Reservoir as provided below. … (C) May 1 to October 31. SCVWD will maintain a water temperature not to exceed 19 degrees Centigrade throughout as much of the CWMZ (that is, the reach from the outlets of Stevens Creek Dam to approximately Highway 280) as available cold water supply will allow." Appendix E clarifies that water temperature is not to exceed a daily average temperature of 66.2°F (19°C) in order to maintain a water temperature not to exceed a daily maximum of 71.6°F (22°C) throughout the CWMZ.

In addition, Section 6.6.2.1.2.1 requires that Valley Water make flow releases from Guadalupe Reservoir from May 1 to October 31 to maintain a water temperature not to exceed 64.4°F (18°C) throughout as much of the CWMZ (that is, the reach from the outlets of Guadalupe Dam to approximately Camden Avenue) as available cold water supply will allow.

To assess temperatures in the CWMZs, this EIR focuses on the most downstream POIs within the CWMZs in Stevens and Guadalupe Creeks. Specifically, it evaluates changes in temperature at the following two POIs: STEV4 (Figure 3.2-1) and GCRK3 (Figure 3.2-2). Given the distance from the reservoir release to these downstream CWMZ POIs, temperatures likely reflect the highest readings within the downstream boundary of CWMZs. POI monitoring data from locations farther downstream of the CWMZs (STEV3 and GUAD3) provide context of how water temperatures change through the system, as the influence of cold water reservoir releases (that is, the factor within Valley Water's control) on surface water temperature decreases.

Temperature Metrics and Analysis

As stated above, there is scientific uncertainty as to the most appropriate temperatures for CCC steelhead during different times of their lifecycle. The temperature analysis evaluates the Proposed Project temperature water quality impacts by comparing the current and future baselines, which reflect historical water quality data. This analysis considers the daily average temperatures modeled within the two creeks each day over the period from 1990 to 2010, with data integrated into the modeled temperatures for current and future baselines, with and without the Proposed Project. Average daily temperatures were then averaged by month over the period to develop a range of monthly averages (high, average, low). These monthly averages were examined individually as well as grouped by two seasons: May 1 through October 31 and November 1 through April 30. These two seasons represent the Summer Rearing Flow Period and Winter Baseflow Period, as defined in the Settlement Agreement. The differences in monthly and seasonally average temperatures indicated impacts of the Proposed Project compared with the current and future baselines.

To determine the potential for significant temperature impacts, average daily temperatures exceeding 71.6°F (22°C) in the CWMZ were selected as the significance criterion. USEPA has indicated that temperatures between 71.6°F and 75.2°F (22°C and 24°C) could begin to change salmonid behavior in response to increased temperature and limit salmonid distribution (USEPA 1999a and 2003, as cited in Carter 2008), with numerous reports citing juveniles present at temperatures of approximately 72°F (22°C) (NCRCD 2014; SCWA 2003; Smith, J. 2018). Temperatures exceeding 71.6°F (22°C) would have a higher likelihood of altering salmonid behavior, reducing fitness, and approaching increased potential for mortality (depending on duration of exposure). Therefore, average daily temperatures exceeding 71.6°F (22°C) in the CWMZ are considered a significant impact in this EIR. It should be noted that this temperature is likely conservative for salmonids found in California, as research mentioned earlier indicates that they may be locally acclimated to even warmer conditions. Juvenile CCC steelhead have been observed in streams with temperatures as high as 75.2°F to 78.8°F (24°C to 26°C) (Hayes 2008; Kubicek and Price 1976). These temperatures align with those reported from controlled studies that showed central California steelhead could maintain 95 percent of their aerobic scope[4] at temperatures as high as 76.3°F (24.6°C) (Verhille et al. 2016). Taken together, these studies provide evidence that steelhead in central California can tolerate temperatures greater than 75.2°F (24°C), although thermal variances occur with some populations having higher or lower thermal tolerance (Myrick & Cech 2000, 2001; Beakes et al. 2010; Chen et al. 2015).

It should be noted that the Settlement Agreement identifies 66.2°F (19°C) in the Stevens Creek CWMZ and 64.4°F (18°C) in the Guadalupe Creek CWMZ as objectives for certain species' life cycles. However, based on the above discussion, exceeding these temperatures in the CWMZs would not necessarily lead to substantial adverse effects on salmonids in Stevens Creek and the Guadalupe River, so they were not used as EIR significance criteria.

Other Water Quality Components

Water quality components not explicitly addressed through evaluation of changes in dilution, erosion, or water temperature (for example, DO) are evaluated qualitatively using the model output described above in combination with available monitoring data, to the extent that sufficient monitoring data are available. Days with reduced temperatures can indicate increases in DO. These changes in temperature were assessed considering selected POIs in Stevens, Guadalupe, Alamitos, Calero, and Los Gatos Creeks (ALAM1, CALE1, LOSG1) and the Guadalupe River (GUAD4).

Imported Water Use

To the extent that potential changes in the frequency or magnitude of imported water use in the study area are not reflected in the hydrologic or water temperature model output, additional evaluation is conducted on differences in the extent of imported water use and release in the study area reservoirs and creeks under the Proposed Project relative to the bases of comparison.

Climate Change

As climate change warms the atmosphere, altering the hydrologic cycle, changes to the amount, timing, form, and intensity of precipitation will continue. Other projected changes include the flow of water in watersheds, as well as the quality of aquatic and marine environments. These impacts are likely to affect the programs designed to protect water quality, public health, and safety (USEPA 2021). Adverse changes in water quality are projected as a result of climate change and have already manifested themselves in many locations within the U.S. While toxic algae are common in waters across the planet, there is mounting evidence that the frequency and severity of these events is rising and that global climate change may exacerbate the problem (USEPA 2021).

The changes in drought and flood cycles attributable to climate change are also projected to affect water quality through increases in turbidity and sediment and nutrient loading. Freshwater resources are especially vulnerable to the consequences of a changing climate. A Water Research Foundation team of scientists assessed the most likely climate-related risks to water quality are algal growth, increased turbidity, and increased dissolved organic carbon loads (Water Research Foundation 2018). To address these consequences of a changing climate and analyze their impacts, Valley Water used qualitative and quantitative assumptions based on the findings from *California's Fourth Climate Change Assessment* (Governor's Office of Planning and Research 2019) regarding future projections for climate change into its WEAP model development and the County's *Raw Water Plan*, as described in Section 3.1.4.5.

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[4] Aerobic scope is the difference between a species' standard metabolic rate required to maintain a stable equilibrium and its maximum metabolic rate necessary for growth, reproduction, and predator avoidance.

3.5.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure, as introduced in Section 3.1.4.2, was considered in this analysis as it pertains to water quality. This analysis is programmatic in nature, using potential sites to analyze impacts. Once specific projects are proposed at these or other sites, a future CEQA site-specific analysis may be conducted.

Fish Passage Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation that could affect water quality include removal of riparian vegetation to access the work area, use and staging of heavy equipment within the Project area and on unpaved roads, channel dewatering within the limits of the active work area, dredge and removal of barrier materials, disturbance of channel bed and bank, concrete and asphalt demolition and removal, and installation of new energy dissipation improvements or erosion control materials, including riprap or potentially concrete. The impacts analysis considered whether these construction and corresponding future maintenance activities could result in significant impacts to water quality. In addition, consideration is given to the potential impacts from implementing the monitoring program under the Proposed Project.

Spawning and Rearing Habitat Improvements

Instream habitat enhancement projects that could affect water quality include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Six representative gravel or LWD augmentation project sites have been identified, as noted in Table 2.4-5, on which to base this programmatic analysis. One site is within the Stevens Creek study area while five are in the Guadalupe River study area. Impacts were assessed based on the whether these activities, and their construction and maintenance, could result in significant impacts to water quality. In addition, consideration is given to the potential impacts from implementing the monitoring program under the Proposed Project.

Other Watershed-specific Non-flow Measures Specific to Each of the Watersheds

Stevens Creek Watershed-specific Measures: Portable Multiport Outlet

Construction of a portable multiport outlet would allow for cooler water flow releases during the summer from Stevens Creek Reservoir while meeting instream water temperature objectives and improving cold-water pool management in the reservoir. Adverse and beneficial impacts would be related to construction and outlet operation.

Guadalupe River Watershed-specific Measures: Geomorphic Function Enhancement Pilot Projects

The Guadalupe River watershed-specific measures include the proposed enhancement and restoration of geomorphic function. These pilot projects would involve ground disturbance, such as the removal of culverts and structures, and installation activities. The impact analysis assesses whether these activities, and their construction and maintenance, would result in significant impacts to water quality. In addition, consideration is given to the potential impacts from implementing the monitoring program under the Proposed Project AMP.

3.5.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators that could then trigger adaptive management actions would relate to the effects of seasonal flow regimes or pulse flows on fish habitat.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed Phase 1 non-flow measures for the purpose of complying with the measure and validating that non-flow measures are effective. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations, recognizing that Valley Water is not responsible for other environmental conditions that may limit the population or distribution of steelhead and Chinook salmon in the Stevens Creek or Guadalupe River watersheds. Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.5.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to water quality if it would:

- **WQ-1**: Impair beneficial uses of surface waters.
- **WQ-2**: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality (groundwater quality is assessed in Section 3.3, *Groundwater Resources*).

CEQA Guidelines Appendix G also suggests that a project may have a significant water quality impact if it conflicts with or obstructs implementation of a Basin Plan. The analysis of beneficial uses in Impact WQ-1 and water quality standards in Impact WQ-2 inherently identifies conflicts with the Basin Plan to the extent that impairments of beneficial uses or violations of applicable water quality standards would also conflict with the Basin Plan.

3.5.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs and VHP conditions to avoid and minimize adverse effects on the environment that could result from Proposed Project measures. Valley Water BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and applicable VHP conditions are included in the Proposed Project description, as appropriate, and the impact analyses were conducted assuming application of these practices and conditions.

Valley Water BMPs apply to District-owned barrier remediation measures in Stevens Creek and in all Project creeks for other Valley Water-implemented instream non-flow measures. While the Valley Water BMPs apply to all Project measures to be implemented by Valley Water, Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those barrier removal Project measures to be implemented by others.

BMPs relevant to water quality (along with a brief discussion of their effects on Project activities) include the following:

- **WQ-15**: Prevent Water Pollution – Would reduce impacts on water quality from pollution.

- **WQ-16**: Prevent Stormwater Pollution – Would reduce impacts on water quality from stormwater pollution.
- **GEN-3**: Avoid Exposing Soils with High Mercury Levels – Would reduce impacts on water quality from mercury.
- **GEN-21**: Staging and Stockpiling of Materials – Would reduce impacts on water quality by preventing sediment-laden water from being released back into waterways.
- **GEN-22**: Sediment Transport – Would reduce impacts to water quality by preventing increased sediment levels in the waterways.
- **GEN-27**: Existing Hazardous Sites – Would minimize impacts on water quality from hazardous materials at a site.
- **VEG-1**: Minimize Local Erosion Increase from In-channel Vegetation Removal – Would minimize the potential for localized erosion by protecting the toe of bank.

In addition to Valley Water's BMPs above, avoidance and minimization measures from the Santa Clara VHP conditions would also be applied to the Proposed Project, as applicable. These conditions would be limited to those areas that are within the VHP-covered area. Full descriptions of each measure are provided in Appendix E, *General Conditions of the Valley Habitat Plan Applicable to FAHCE FHRP*. The avoidance and minimization measures are summarized as follows:

- **VHP-3**: Maintain Hydrologic Conditions and Protect Water Quality – Would maintain hydrologic condition in an effort to protect water quality.
- **VHP-4**: Avoidance and Minimization for Instream Projects – Would reduce impacts on water quality from construction-related pollution.
- **VHP-5**: Avoidance and Minimization Measures for Instream Operations and Maintenance – Would reduce impacts on water quality from construction-related pollution.

3.5.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur during implementation. For flow measures, this section evaluates the effects of implementation of 2015 and 2035 Proposed Project measures on water quality as compared with current and future baseline conditions. For non-flow measures, conditions following implementation of the Proposed Project results are compared with current existing conditions.

3.5.4.1 Impact WQ-1: Impair beneficial uses of surface waters (less than significant)

Flow Measures Impact Analysis

Implementation of the flow measures would affect water temperature to support fish habitat in the two watersheds consistent with beneficial uses identified in the Basin Plan (see Section 3.5.2.2). The effects of the flow measures on beneficial uses associated with the two watersheds are described below.

Cold Freshwater Habitat (COLD)

The COLD beneficial use is one that supports a cold-water ecosystem, with habitats that generally support trout and may support anadromous salmon and steelhead fisheries, among other species. A detailed analysis of the Proposed Project's impacts to steelhead and Chinook salmon is presented in Section 3.7, *Aquatic Biological Resources*. Impacts or benefits to these cold-water fish species would represent changes to the COLD beneficial use. Based on the analysis presented in Section 3.7, the Proposed Project would benefit steelhead spawning, fry rearing, and juvenile rearing habitat and would increase upstream passage opportunities for adult steelhead to the lower reaches of the watershed. Similarly, cold-water habitat would be maintained for Chinook salmon and other cold waters species, though some seasonal modifications may occur based on flows and species-specific life history timing. Overall, there would be beneficial impacts to and no adverse impact to cold-water habitat as a result of the Proposed Project, as the COLD beneficial use would be maintained and not impaired.

Warm Freshwater Habitat (WARM)

As described above, WARM is defined as uses of water that support warm-water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates. The warm freshwater habitats supporting bass, bluegill, perch, and other fish are generally lakes and reservoirs. To determine whether the Proposed Project would impair the WARM beneficial use, the impact analysis focuses on the availability of warm freshwater spawning and embryo habitat, as it relates to reservoir levels, from March to mid-June.

Table 3.5-2 describes the number of days over the 20-year modeled period for the current baseline where reservoir levels provided suitable warm-water habitat for spawning and embryo development during the critical period between March and mid-July. It also describes the projected number of days based on the 2015 Proposed Project and indicates any differences in terms of days or percent change.

Based on this analysis, only Stevens Creek Reservoir would see a decrease in days with suitable habitat over the modeled period (6 days), which is discountable because the percentage change is 0.0 percent (as rounded). There would be no change in the availability of warm-water habitat for Almaden and Calero Reservoirs from the 2015 Proposed Project compared with the current baseline. Guadalupe and Lexington Reservoirs would see slight increases in the number of days, 33 and 49, respectively. However, only Lexington Reservoir would show a barely discernable change of 0.1 percent (based on rounding). As described above, change in the number of average annual total successful spawning cohorts of 10 percent or more is used as a potential substantial change in reservoir warm-water fish populations. Based on this analysis, there would be no meaningful change in the number of total successful spawning cohorts in warm water habitat from the implementation of the 2015 Proposed Project that would impair the WARM beneficial use.

Table 3.5-3 describes the number of days over the 20-year modeled period for the future baseline when reservoir levels provide suitable warm-water habitat for spawning and embryo development during the critical period between March and mid-July. It also describes the projected number of days based on the 2035 Proposed Project and indicates any differences in terms of days or percent change.

Based on this analysis, Stevens Creek and Calero Reservoirs would see slight decreases in days with suitable habitat over the modeled period: 6 and 4 days, respectively. This decrease would be discountable as the percent change would still be 0.0 percent (as rounded). There would be no change in the availability of warm-water habitat for Almaden Reservoir from the 2035 Proposed Project compared with the future baseline. Guadalupe and Lexington Reservoirs would see increases in the number of days: 173 and 46, respectively. However, these would result in barely discernible changes of 0.2 percent for Guadalupe and 0.1 percent for Lexington. As described above, change in the number of average annual total successful spawning cohorts of 10 percent or more is used as a potential substantial change in reservoir warm-water fish populations.

Table 3.5-2. 2015 Number of Successful Daily Warm-water Fish Spawning Cohorts

Reservoir	Current Baseline[a] March	Current Baseline[a] April	Current Baseline[a] May	Current Baseline[a] June[b]	2015 Proposed Project March	2015 Proposed Project April	2015 Proposed Project May	2015 Proposed Project June[b]	Difference Days	Difference %[c]
Stevens Creek	649	630	651	273	645	628	651	273	–6	0.0
Almaden	651	627	649	273	651	627	649	273	0	0.0
Calero	646	630	651	273	646	630	651	273	0	0.0
Guadalupe	649	629	623	238	638	610	651	273	+33	0.0
Lexington	651	626	433	91	651	626	465	108	+49	0.1

[a] modeled over a 20-year period (1990 to 2010)
[b] March 1 through June 13 was used as the warm-water fish spawning period.
[c] rounded to the nearest tenth

Table 3.5-3. 2035 Number of Successful Daily Warm-water Fish Spawning Cohorts

Reservoir	Future Baseline[a] March	Future Baseline[a] April	Future Baseline[a] May	Future Baseline[a] June[b]	2035 Proposed Project March	2035 Proposed Project April	2035 Proposed Project May	2035 Proposed Project June[b]	Difference Days	Difference %[c]
Stevens Creek	649	630	651	273	645	628	651	273	–6	0.0
Almaden	651	627	650	273	651	627	650	273	0	0.0
Calero	651	624	647	273	642	628	648	273	–4	0.0
Guadalupe	651	627	497	133	573	584	651	273	+73	0.2
Lexington	651	626	438	89	651	626	465	108	+46	0.1

[a] modeled over a 20-year period (1990 to 2010)
[b] March 1 through June 13 was used as the warm-water fish spawning period.
[c] rounded to the nearest tenth

Based on this analysis, there would be no meaningful change in the number of total successful spawning cohorts in warm-water habitat from the implementation of the 2035 Proposed Project that would impair the WARM beneficial use.

Fish Migration (MIGR)

Many of the study area stream reaches are designated as having the beneficial use of MIGR. This beneficial use may be affected by changes in water temperature. Changes in modeled habitat suitability, including thermal suitability and migration corridors, for fish species in the study area are evaluated in Section 3.7, *Aquatic Biological Resources*, and are not evaluated in detail this section. However, the Proposed Project flow measures are intended to improve the MIGR beneficial use in the long term, especially for steelhead. As described Section 3.7, the Proposed Project would improve migration conditions for steelhead; however, given the timing of flow releases, there could be impacts to Chinook salmon. Based on this analysis, the overall impact to the MIGR beneficial use would be less than significant.

Preservation of Rare and Endangered Species (RARE)

Overall adverse impacts to rare and endangered species were found to be less than significant in Section 3.7, *Aquatic Biological Resources*, while a number of benefits are realized. Section 3.8, *Terrestrial Biological Resources,* also considered impacts to rare and endangered species that could be affected by changes in flow. It is unlikely that the changes in flows would have substantial adverse effects on special-status plant and wildlife species, given the timing and ramping rates implemented. Aquatic special-status wildlife could be affected, but impacts would be less than significant. Overall, short-term impacts to RARE would be less than significant, though flow measures are intended to provide long term benefits to the RARE beneficial use.

Fish Spawning (SPWN)

Many of the study area stream reaches are designated as having the beneficial use of SPWN. This beneficial use may be affected by changes in water temperature. Changes in modeled habitat suitability, including thermal suitability, for fish species in the study area are evaluated in Section 3.7, *Aquatic Biological Resources*, and are not evaluated in detail this section. However, the intent of the proposed project is to increase availability to spawning areas and will provide long-term benefits to this beneficial use. Based on the analysis presented in Section 3.7, when compared with the current baseline, the Proposed Project would benefit steelhead, Pacific lamprey, Chinook salmon spawning, fry rearing, and juvenile rearing habitat. As such, the Proposed Project would have no adverse impact to the SPWN beneficial use.

Wildlife Habitat (WILD)

Impacts on wildlife habitat from proposed flow measures were found to be less than significant based on the analysis described in Section 3.8, *Terrestrial Biological Resources*. The slow ramping up of flows would limit impacts to wildlife habitat as flows outside the current banks of the streams would be rare and similar to the current baseline. For those wildlife species that are reliant on water availability, the proposed flow measures would provide benefits by providing additional water during the drier seasons. Overall, impacts to the WILD beneficial use would be less than significant.

Municipal Supply (MUN)

As discussed in Section 3.4, *Water Supply*, the Proposed Project's flow measures would not impair this beneficial use. Proposed Project conditions would not have a significant effect on overall average water supply. Potential shortages would occur with or without the Proposed Project. Impacts on the MUN beneficial use would be less than significant.

Groundwater Recharge (GWR)

As discussed in Section 3.3, *Groundwater Resources*, modeling indicates that substantial reductions in groundwater supplies are not projected, including reductions that could cause undesirable results. Any reduction would be less than 5 percent and would not impair this beneficial use. As such, impacts to the GWR beneficial use would be less than significant or would not occur with the implementation of the Proposed Project.

Freshwater Replenishment (FRSH)

As discussed in Section 3.2, *Hydrology*, modeling indicates that impacts to surface water resources would be less than significant or not occur with the implementation of the Proposed Project. Similarly, as discussed in Section 3.4, *Water Supply*, the Proposed Project's flow measures would not impair the municipal supply beneficial use. The Proposed Project would continue to use water for the natural or artificial maintenance of surface water quantity and quality. The Proposed Project would provide changes in flows that would maintain or improve surface water quantity or quality while still meeting Valley Water's water supply obligations. There would be changes in the timing and quality of flows under the Proposed Action; however, the impacts to FRSH would be less than significant. There would be no impairment of the FRSH beneficial use.

Water Contact Recreation (REC1)

The proposed flow measures would not impair this beneficial use because the flow measures would not result in a significant impact to either reservoir- or stream-based water contact recreation. See Section 3.6, *Recreation*, for additional discussion of impacts to recreation. No impacts are likely for water contact recreation at reservoirs because the changes in reservoir levels would be small. There would be no impairment of the REC1 beneficial use.

Noncontact Water Recreation (REC2)

The proposed flow measures would not impair this beneficial use because impacts to noncontact water recreation and associated infrastructure would be less than significant as a result of flow measures. See Section 3.6, *Recreation*, for additional discussion of recreation impacts. There would be no impairment of the REC2 beneficial use.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the Proposed Project that could result in water quality impacts are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the watersheds. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation that could affect water quality include removal of riparian vegetation to access the work area, use and staging of heavy equipment within the channel, channel dewatering within the limits of the active work area, modification of channel bed and bank dimensions, and installation of new structures. Other short-term impacts from construction-related activities such as staging equipment and channel dewatering would not affect the course of Project channels.

These fish barrier remediation projects would result in short-term construction-related impacts that could temporarily impact beneficial uses. Specifically, channel dewatering or other instream construction and water diversion could affect COLD, MIGR, RARE, SPAWN, and WILD. However, project planning to avoid certain periods like SPAWN and MIGR would limit impacts. The long-term benefits of these projects would improve these same beneficial uses in the long term by improving MIGR and increasing habitat availability for COLD, RARE, and WILD. Therefore, impacts to these beneficial uses would be less than significant. Other beneficials uses (that is, WARM, MUN, GWR, FRSH, REC1, and REC2) would likely remain unaffected.

Implementation of Valley Water BMPs WQ-15 (Prevent Water Pollution), WQ-16 (Prevent Stormwater Pollution), GEN-3 (Avoid Exposing Soils with High Mercury Levels), GEN-21 (Staging and Stockpiling of Materials), GEN-22 (Sediment Transport), GEN-27 (Existing Hazardous Sites), and VEG-1 (Minimize Local Erosion from In-Channel Vegetation Removal) would minimize the effects of non-flow measures on beneficial uses by limiting activities and actions that could impair beneficial uses.

The Proposed Project would also adhere to VHP conditions 3 (Maintain Hydrologic Conditions and Protect Water Quality), 4 (Avoidance and Minimization for In-stream Projects), and 5 (Avoidance and Minimization Measures for In-stream Operations and Maintenance) where applicable, which would reduce Project impacts to water quality within the covered areas by maintaining hydrologic condition to protect water quality and to avoid water quality pollution related to construction and maintenance.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects on certain beneficial uses, they would not impair designated beneficial uses of the waters in the study area, and impacts would be less than significant.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects that could affect designated beneficial uses include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Other short-term impacts from construction-related activities such as bank modification would not affect the course of Project channels. Impacts to beneficial uses would be the same as described for fish barrier remediation projects above. However, the long-term benefits would improve COLD, SPWN, RARE, MIGR, and WILD by providing improved habitat conditions. Therefore, impacts to these beneficial uses would be less than significant. Other beneficials uses (that is, WARM, MUN, GWR, FRSH, REC1, and REC2) would likely remain unaffected.

Implementation of Valley Water BMPs WQ-15 (Prevent Water Pollution), WQ-16 (Prevent Stormwater Pollution), GEN-3 (Avoid Exposing Soils with High Mercury Levels), GEN-21 (Staging and Stockpiling of Materials), GEN-22 (Sediment Transport),GEN-27 (Existing Hazardous Sites), and VEG-1 (Minimize Local Erosion from In-Channel Vegetation Removal) would minimize the effects of non-flow measures on water quality by limiting activities and actions that could impair beneficial uses.

The Proposed Project would also adhere to VHP conditions 3 (Maintain Hydrologic Conditions and Protect Water Quality), 4 (Avoidance and Minimization for In-stream Projects), and 5 (Avoidance and Minimization Measures for In-stream Operations and Maintenance) where applicable, which would reduce Project impacts to designated beneficial uses.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects on certain designated beneficial uses, they would not impair designated beneficial uses of the waters in the study area, and impacts would be less than significant.

Other Non-flow Measures

The Stevens Creek Multiport Project would allow for cooler water flows during summer months from Stevens Creek Reservoir; however, flows during the summer months would be consistent with the flow measures analyzed above. Construction-related impacts would be similar to those described above for other non-flow measures. Overall, the impacts to designated beneficial uses would be less than significant.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, the geomorphic function enhancement measures would impact the same beneficial uses in the short term; however, they would not result in impairments. Similarly, impacts would be less than significant.

Implementation of Valley Water BMPs WQ-15 (Prevent Water Pollution), WQ-16 (Prevent Stormwater Pollution), GEN-3 (Avoid Exposing Soils with High Mercury Levels), GEN-21 (Staging and Stockpiling of Materials), GEN-22 (Sediment Transport), GEN-27 (Existing Hazardous Sites), and VEG-1 (Minimize Local Erosion from In-Channel Vegetation Removal) would minimize the effects of non-flow measures on beneficial uses.

The Proposed Project would also adhere to VHP conditions 3 (Maintain Hydrologic Conditions and Protect Water Quality), 4 (Avoidance and Minimization for In-stream Projects), and 5 (Avoidance and Minimization Measures for In-stream Operations and Maintenance) where applicable, which would reduce Project impacts to designated beneficial uses within the covered areas.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects on designated beneficial uses (that is, COLD, MIGR, RARE, SPWN, and WILD), they would not impair designated beneficial uses of the waters in the study area, and impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect water quality. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys and would have no impact to designated beneficial uses. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or PIT tag readers using noninvasive technology and would also have no impact to designated beneficial uses.

Long-term monitoring would also include electrofishing, capturing, DNA sampling, and PIT tagging, which could cause some adverse impacts to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin. During electrofishing, steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin could be stunned, captured, crowded, and handled, which could cause acute physiological stress and may cause occasional but rare incidental injury and/or mortality. Additionally, juvenile steelhead would be sampled for DNA and PIT tagged, which would cause acute physiological stress and may cause occasional but rare incidental injury and/or mortality.

Electrofishing would follow standard NMFS survey protocols, which would minimize injury and mortality during sampling and tagging. Therefore, although there would be impacts to RARE, they would be less than significant and would not impair designated beneficial uses. The monitoring program would provide valuable long-term information on steelhead habitat that could be used to adjust components of the Proposed Project through the AMP to be more beneficial to steelhead over the long term.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

Maintenance of non-flow measures would involve activities similar to those laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility, and causing water quality impacts similar to those of the non-flow measure being maintained. Adaptive measures implemented through the AMP would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 flow and non-flow measures.

Significance Conclusion Summary

Implementation of flow measures, including monitoring and adaptive management, would at most result in **less-than-significant impacts** to beneficial uses. None of the beneficial uses would be impaired. Beneficial impacts to beneficial uses would occur with the COLD, MIGR, RARE, SPWN, and WILD beneficial uses.

Implementation of the proposed non-flow measures, including maintenance, monitoring, and adaptive management, would not result in an impairment of designated beneficial uses; impacts would be **less than significant**. Long-term benefits to beneficial uses would occur with the COLD, MIGR, RARE, SPWN, and WILD beneficial uses.

Mitigation

No mitigation would be required for Impact WQ-1.

3.5.4.2 Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade water quality (less than significant)

Flow Measures Impact Analysis

The following is an analysis of applicable water quality standards (or applicable parts thereof) that potentially could be affected by the proposed flow measures.

Surface Water Temperature

As described in the methodology above, this surface water temperature analysis focuses on the ability for Valley Water to provide certain water temperatures in the two CWMZs. It also provides an analysis of water temperatures farther downstream from the CWMZs, as other temperature inputs (warm and cold) limit the control of Valley Water on downstream temperatures.

Current Baseline Analysis

As shown on Figure 3.5-1, the selected representative POI for evaluation of the CWMZs on Stevens Creek was STEV4. With STEV3 representing the downstream POI outside of the CWMZ. For the Guadalupe Creek CWMZ, as shown on Figure 3.5-2, POI GCRK3 was analyzed. POI GUAD3 represented the downstream area of the Guadalupe River Watershed. The analysis examines the wet and dry season separately and provide both monthly average daily temperatures and well as seasonal (6 month) average daily temperatures. In addition, the analysis identifies the highest and lowest average daily temperature by month and season. Table 3.5-4 provides the 2015 Proposed Project projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the flow measures in the Stevens Creek CWMZ as compared to the current baseline.

Table 3.5-4. 2015 Proposed Project Average Temperature Projections (°F) May 1–October 31 in the Stevens Creek CWMZ (STEV4) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
May	63.9	62.8	59.0	58.2	53.0	53.1
June	63.6	63.3	61.0	60.5	56.9	56.9
July	67.0	64.5	62.7	62.0	59.0	58.9
August	67.4	66.8	62.3	61.7	60.4	60.3
September	67.4	66.8	61.5	61.4	59.3	59.5
October	61.5	62.9	59.8	60.2	56.3	58.2
6-month Season	65.1	64.5	61.1	60.7	57.5	57.8

Figure 3.5-1. Stevens Creek Watershed Points of Interest

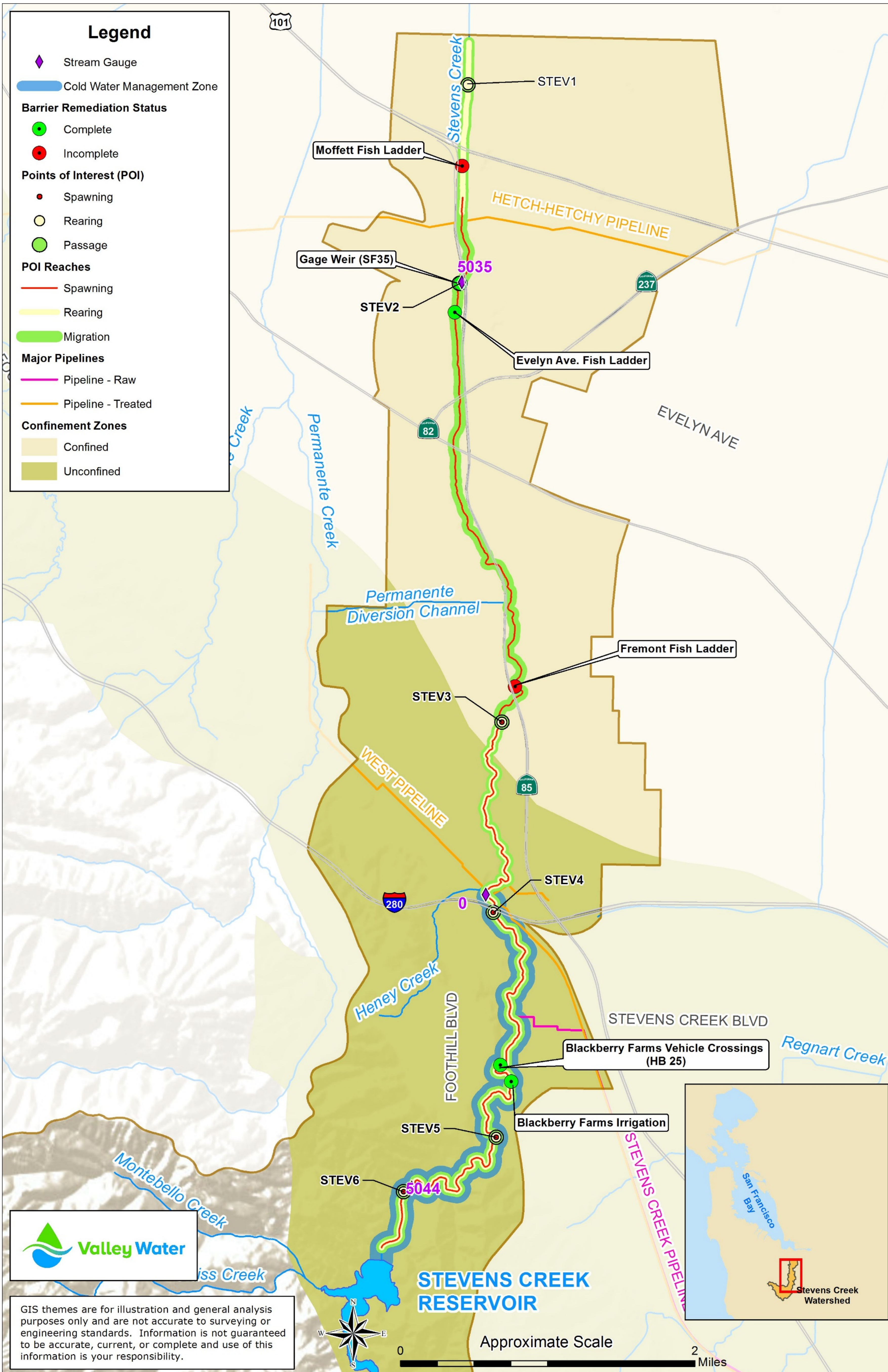
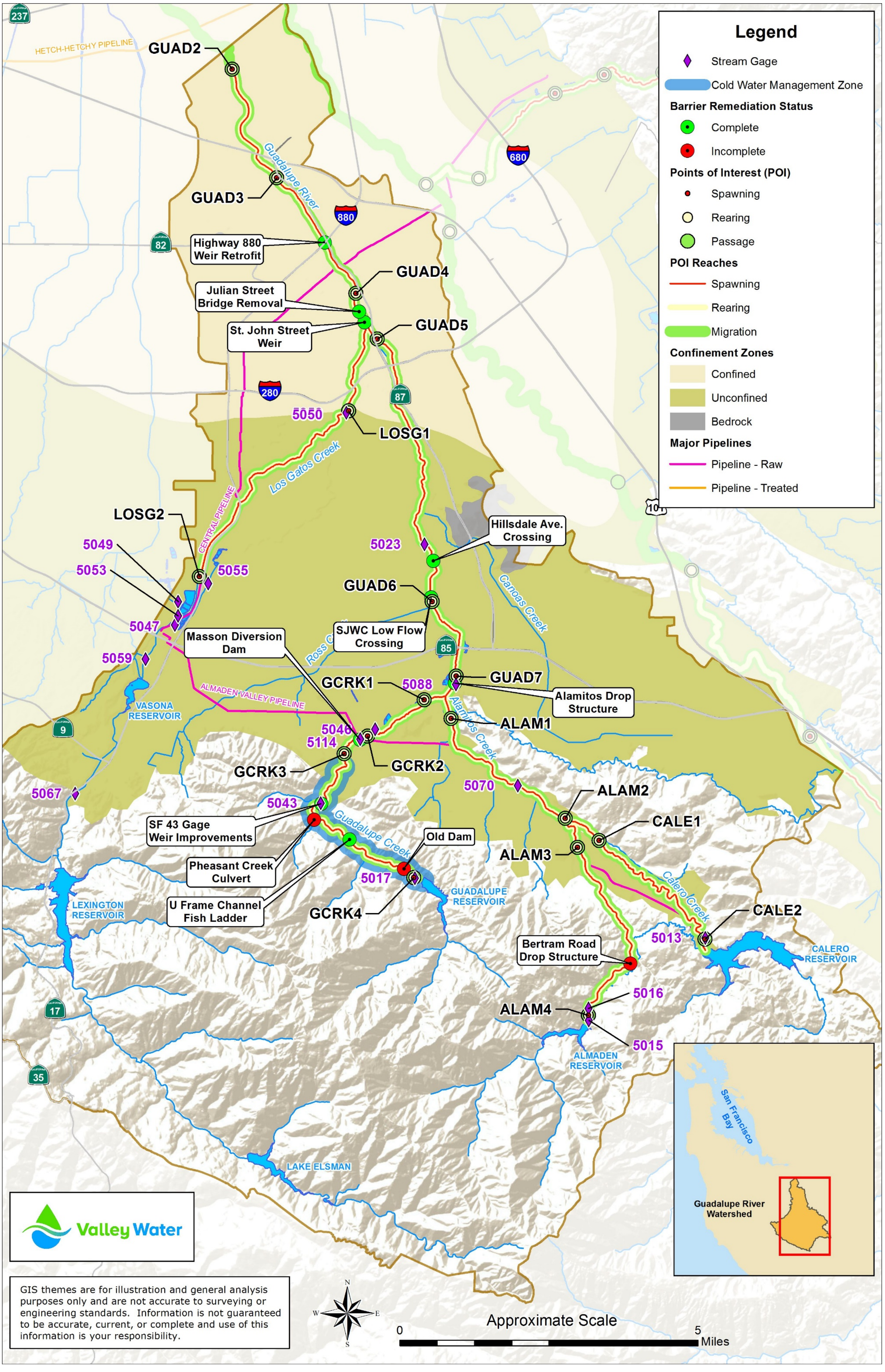


Figure 3.5-2. Guadalupe River Watershed Points of Interest



As indicated in Table 3.5-4, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F. However, with the exception of October, all projected monthly average daily temperatures are negligibly higher than the current baseline. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season in the CWMZ, though some periods may exceed that by 1.2°F based on the maximum (high) average monthly temperature.

Table 3.5-5 provides the 2015 Proposed Project projections of the monthly and seasonal (November 1 to April 30) daily average temperatures based on implementation of the flow measures in the Stevens Creek CWMZ as compared to the current baseline.

Table 3.5-5. 2015 Proposed Project Average Temperature Projections (°F) November 1–April 30 in the Stevens Creek CWMZ (STEV4) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
November	58.5	68.7	54.6	60.0	50.7	52.3
December	55.7	61.3	50.0	53.6	46.4	50.6
January	54.4	55.8	48.8	52.6	47.9	50.6
February	53.4	60.5	49.8	54.0	48.1	51.2
March	53.3	65.0	51.7	59.2	49.4	52.7
April	56.1	67.4	53.1	62.0	51.3	53.8
6-month Season	55.2	63.1	51.3	56.9	49.0	51.9

As indicated in Table 3.5-5, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°F. In fact, all monthly daily averages would be below the current baseline as well as the Settlement Agreement objective of 66.2°F during this season.

Based on the results of the analysis of projected water temperatures in the Stevens Creek CWMZ, the 2015 Proposed Project would have a less-than-significant impact to surface water temperature, with only rare occasions of exceeding Settlement Agreement temperatures.

Table 3.5-6 provides the 2015 Proposed Project projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the flow measures downstream of the Stevens Creek CWMZ as compared to the current baseline.

Table 3.5-6. 2015 Proposed Project Average Temperature Projections (°F) May 1–October 31 Downstream of the Stevens Creek CWMZ (STEV3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
May	65.5	64.0	59.7	58.8	53.3	53.3
June	66.1	64.9	62.6	62.0	56.9	56.9
July	71.4	67.9	65.3	64.4	60.9	60.8
August	72.1	69.5	64.3	63.1	61.1	61.1
September	71.5	69.1	62.4	62.1	59.4	60.0
October	61.6	63.0	58.7	59.6	55.4	57.0
6-month Season	68.0	66.4	62.2	61.7	57.8	58.2

As illustrated in Table 3.5-6, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F. However, with the exception of October, all projected monthly average daily temperatures are negligibly higher than the current baseline. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season immediately downstream of the CWMZ, though some periods may exceed that objective by 5.9°F based on the maximum (high) average monthly temperature. This analysis begins to illustrate the effects of additional temperature inputs farther downstream from the CWMZ.

Table 3.5-7 provides the 2015 Proposed Project projections of the monthly and seasonal (November 1 to April 30) daily average temperatures based on implementation of the flow measures downstream of the Stevens Creek CWMZ as compared to the current baseline.

Table 3.5-7. 2015 Proposed Project Average Temperature Projections (°F) November 1–April 30 Downstream of the Stevens Creek CWMZ (STEV3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
November	57.3	57.6	53.2	53.4	50.2	47.8
December	60.3	60.7	49.4	49.0	45.2	44.0
January	54.0	54.1	48.6	48.6	47.6	46.7
February	53.7	58.1	49.8	50.2	48.3	48.5
March	53.6	58.4	52.0	52.2	49.6	49.7
April	57.0	56.8	53.5	53.4	51.8	51.4
6-month Season	56.0	57.6	51.1	51.1	48.8	48.0

As indicated in Table 3.5-7, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°F, and there are only negligible differences with the current baseline. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season downstream of the CWMZ.

Table 3.5-8 provides the 2015 Proposed Project projections of the monthly and seasonal (May 1 to October 31) average daily temperatures based on implementation of the flow measures in the Guadalupe Creek CWMZ as compared to the current baseline.

Table 3.5-8. 2015 Proposed Project Temperature Projections (°F) May 1–October 31 in the Guadalupe Creek CWMZ (GCRK3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
May	63.7	61.4	59.3	57.6	52.6	51.7
June	68.8	65.8	64.2	60.4	56.6	55.3
July	69.1	65.8	64.6	60.5	58.0	51.8
August	67.4	65.8	63.0	60.3	57.5	51.8
September	67.1	65.1	62.0	60.4	55.0	54.4
October	63.0	69.4	52.2	54.6	49.2	49.4
6-month Season	66.5	65.6	60.9	59.0	54.8	52.4

As indicated in Table 3.5-8, all projected monthly average daily temperature between May 1 and October 31 are below 71.6°F. However, water temperatures would be higher than the current baseline. All monthly daily averages would be below the Settlement Agreement objective of 64.4°F during this season in the CWMZ, though some periods may exceed that by 2.6°F based on the maximum (high) average monthly temperature.

Table 3.5-9 provides the 2015 Proposed Project projections of the monthly and seasonal (November 1 to April 30) average daily temperatures based on implementation of the flow measures in the Guadalupe Creek CWMZ as compared to the current baseline.

Table 3.5-9. 2015 Proposed Project Temperature Projections (°F) November 1–April 30 in the Guadalupe Creek CWMZ (GCRK3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
November	58.5	58.7	53.8	54.1	50.5	50.8
December	51.7	51.8	48.6	48.6	46.9	46.6
January	52.0	54.5	47.7	48.3	44.9	44.8
February	55.4	55.4	50.8	50.2	45.1	45.1
March	54.1	54.6	52.7	52.9	50.6	50.6
April	58.7	59.3	53.7	54.0	50.5	50.5
6-month Season	55.1	55.7	51.2	51.3	48.1	48.1

As indicated in Table 3.5-9, all projected monthly average daily temperature between November 1 and April 30 are below 71.6°F in the Guadalupe Creek CWMZ, and there are only negligible differences with the current baseline. All monthly daily averages would be below the Settlement Agreement objective of 64.4°F during this season.

Based on the results of the analysis of project water temperatures in the Guadalupe Creek CWMZ, the 2015 Proposed Project would have a less-than-significant impact to surface water temperature, with only rare occasions of exceeding current baseline or Settlement Agreement temperatures.

Table 3.5-10 provides the 2015 Proposed Project projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the flow measures downstream of the Guadalupe Creek CWMZ in the Guadalupe River as compared to the current baseline.

Table 3.5-10. 2015 Proposed Project Average Temperature Projections (°F) May 1–October 31 Downstream of the Guadalupe Creek CWMZ in the Guadalupe River (GUAD3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
May	73.1	73.0	66.7	66.5	60.1	60.2
June	76.0	75.3	70.5	69.9	64.6	65.0
July	74.4	74.4	70.1	69.8	66.8	66.1
August	73.9	73.9	67.9	67.7	59.9	58.7
September	70.2	70.2	65.9	65.9	60.4	59.5
October	68.0	68.1	64.0	63.9	60.2	58.2
6-month Season	72.6	72.5	67.5	67.3	62.0	61.3

As illustrated in Table 3.5-10, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F, and there are only negligible differences with the current baseline. However, monthly daily averages would exceed, during certain months, the Settlement Agreement objective of 64.4°F established for the upstream CWMZ. Based on the maximum (high) average monthly temperature, water temperature could exceed 71.6°F. This illustrates additional temperature inputs farther downstream from the CWMZ.

Table 3.5-11 provides the 2015 Proposed Project projections of the monthly and seasonal (November 1 to April 30) daily average downstream temperatures based on implementation of the flow measures downstream of the Guadalupe Creek CWMZ in the Guadalupe River as compared to the current baseline.

Table 3.5-11. 2015 Proposed Project Average Temperature Projections (°F) November 1–April 30 Downstream of the Guadalupe Creek CWMZ in the Guadalupe River (GUAD3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
November	68.6	68.7	60.7	60.0	52.5	52.3
December	61.3	61.3	53.6	53.6	50.7	50.6
January	55.5	55.8	52.2	52.6	50.4	50.6
February	60.0	60.5	54.2	54.0	51.1	51.2
March	64.4	65.0	59.3	59.2	52.6	52.7
April	68.4	67.4	62.7	62.0	53.7	53.8
6-month Season	63.1	63.1	57.1	56.9	51.8	51.9

As indicated in Table 3.5-11, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°F downstream of the Guadalupe Creek CWMZ, and there are only negligible differences with the current baseline. In fact, all monthly daily averages would be below the Settlement Agreement objective of 64.4°F during this season.

Future Baseline Analysis

This analysis also considers potential impacts to surface water temperature based on the 2035 Proposed Project compared to the future baseline using the same methods and POIs described above for the 2015 Proposed Project.

Table 3.5-12 provides the 2035 Proposed Project projections of the monthly and seasonal (May 1 to October 31) average daily average temperatures based on implementation of the flow measures in the Stevens Creek CWMZ as compared to the future baseline.

Table 3.5-12. 2035 Proposed Project Average Temperature Projections (°F) May 1–October 31 in the Stevens Creek CWMZ (STEV4) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
May	64.0	62.8	59.0	58.2	53.0	53.1
June	63.6	63.3	61.0	60.5	56.9	56.9
July	67.0	65.1	62.7	62.0	59.0	58.9
August	67.4	66.8	62.3	61.7	60.4	60.3
September	67.4	66.8	61.5	61.4	59.3	59.5
October	61.5	62.9	59.3	60.2	55.9	58.2
6-month Season	65.2	64.6	61.0	60.7	57.4	57.8

As indicated in Table 3.5-12, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F, and there are only negligible differences with the future baseline. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season in the CWMZ.

Table 3.5-13 provides the 2035 Proposed Project projections of the monthly and seasonal (November 1 to April 30) average daily average temperatures based on implementation of the flow measures in the Stevens Creek CWMZ as compared to the future baseline.

Table 3.5-13. 2035 Proposed Project Average Temperature Projections (°F) November 1–April 30 in the Stevens Creek CWMZ (STEV4) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
November	58.5	68.7	54.6	59.8	50.7	52.1
December	55.7	61.3	50.0	53.5	46.4	50.6
January	54.4	55.5	48.8	52.1	47.9	50.3
February	53.4	60.4	49.8	53.8	48.1	51.1
March	53.3	65.0	51.7	59.4	49.4	53.7
April	56.0	67.4	53.2	62.6	51.4	55.7
6-month Season	55.2	63.0	51.3	56.9	49.0	52.2

As indicated in Table 3.5-13, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°F, as well as the future baseline temperatures. In fact, all monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season.

Based on the results of the analysis of project water temperatures in the Stevens Creek CWMZ, the 2035 Proposed Project would have no impact to surface water temperature.

Table 3.5-14 provides the 2035 Proposed Project projections of the monthly and seasonal (May 1 to October 31) average daily temperatures based on implementation of the flow measures downstream of the Stevens Creek CWMZ, as compared to the future baseline.

Table 3.5-14. 2035 Proposed Project Average Temperature Projections (°F) May 1–October 31 Downstream of Stevens Creek CWMZ (STEV 3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
May	65.6	64.0	59.7	58.8	53.3	53.3
June	66.1	64.9	62.6	62.0	56.9	56.9
July	71.4	67.9	65.3	64.4	60.9	60.8
August	72.1	69.5	64.3	63.1	61.1	61.1
September	71.5	69.1	62.4	62.1	59.4	60.0
October	61.6	63.0	58.7	59.6	55.4	57.0
6-month Season	68.0	66.4	62.2	61.7	57.8	58.2

As illustrated in Table 3.5-14, all projected monthly average daily temperature between May 1 and October 31 are below 71.6°F, although the Proposed Project would exceed future baseline temperatures. Monthly daily averages would meet the Settlement Agreement objective of 66.2°F established for the upstream CWMZ. However, based on the maximum (high) average monthly temperature, water temperature could exceed 71.6°F at certain times by up to 0.5°F. This illustrates additional temperature inputs farther downstream from the CWMZ.

Table 3.5-15 provides the 2035 Proposed Project projections of the monthly and seasonal (November 1 to April 30) average daily temperatures based on implementation of the flow measures downstream of the Stevens Creek CWMZ, as compared to the future baseline.

Table 3.5-15. 2035 Proposed Project Average Temperature Projections (°F) November 1–April 30 Downstream of the Stevens Creek CWMZ (STEV3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
November	57.3	57.6	53.2	53.4	50.2	47.8
December	60.3	60.7	49.4	49.0	45.2	44.0
January	54.0	54.1	48.6	48.6	47.6	46.7
February	53.7	58.1	49.8	50.2	48.3	48.5
March	53.6	58.4	52.1	52.2	49.7	49.7
April	57.0	56.8	53.5	53.4	51.8	51.4
6-month Season	56.0	57.6	51.1	51.1	48.8	48.0

As indicated in Table 3.5-15, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°F, although there would be only negligible differences from future baseline temperatures. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season downstream of the CWMZ.

Table 3.5-16 provides the 2035 Proposed Project projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the flow measures in the Guadalupe Creek CWMZ, as compared to the future baseline.

Table 3.5-16. 2035 Proposed Project Temperature Projections (°F) May 1–October 31 in the Guadalupe Creek CWMZ (GCRK3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
May	61.1	61.1	56.8	56.8	52.6	51.7
June	68.8	65.8	63.5	58.4	56.7	53.5
July	69.1	65.9	63.2	58.3	57.1	51.9
August	67.4	64.9	62.7	59.1	57.5	51.8
September	67.1	64.6	61.8	59.8	55.0	54.4
October	63.2	69.6	53.0	56.6	49.2	49.4
6-month Season	66.1	65.3	60.1	58.2	54.7	52.1

As illustrated in Table 3.5-16, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F, although the Proposed Project would exceed future baseline temperatures. Monthly daily averages would also meet the Settlement Agreement objective of 64.4°F established for the CWMZ. However, the Settlement Agreement could be exceeded for certain short periods as illustrated by the high average monthly temperatures.

Table 3.5-17 provides the 2035 Proposed Project projections of the monthly and seasonal (November 1 to April 30) daily average temperatures based on implementation of the flow measures in the Guadalupe Creek CWMZ, as compared to the future baseline.

Table 3.5-17. 2035 Proposed Project Temperature Projections (°F) November 1–April 30 in the Guadalupe Creek CWMZ (GCRK3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
November	58.9	58.9	54.1	54.7	50.5	50.8
December	51.7	51.9	48.6	48.6	46.6	46.7
January	52.0	55.0	47.8	48.5	45.1	45.2
February	55.5	55.3	50.9	50.1	45.1	45.1
March	54.1	54.6	52.7	52.9	51.0	50.6
Aril	58.7	58.9	53.7	53.7	50.5	50.5
6-month Season	55.1	55.8	51.3	51.4	48.1	48.2

As indicated in Table 3.5-17, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°F in the Guadalupe Creek CWMZ, and there are only negligible differences with the future baseline. In fact, all monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season.

Based on the results of the analysis of projected water temperatures in the Guadalupe Creek CWMZ, the 2035 Proposed Project would have a less-than-significant impact to surface water temperature, with only rare occasions of exceeding Settlement Agreement temperatures.

Table 3.5-18 provides the 2035 Proposed Project projections of the monthly and seasonal (May 1 to October 31) average daily temperatures based on implementation of the flow measures downstream of the Guadalupe Creek CWMZ in the Guadalupe River, as compared to the future baseline.

Table 3.5-18. 2035 Proposed Project Average Temperature Projections (°F) May 1–October 31 Downstream of the Guadalupe Creek CWMZ in the Guadalupe River (GUAD3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
May	72.6	72.7	66.2	66.6	60.0	61.7
June	76.0	75.3	70.3	69.6	64.2	63.5
July	74.5	74.6	70.1	69.9	66.8	65.8
August	73.9	74.0	68.0	67.6	59.9	58.7
September	70.3	70.3	66.1	66.2	60.4	59.5
October	68.0	68.1	63.8	63.8	60.2	58.3
6-month Season	72.6	72.5	67.4	67.3	61.9	61.3

As illustrated in Table 3.5-18, all projected monthly average daily temperature between May 1 and October 31 are below 71.6°F, and there are only negligible differences with the future baseline. During certain months, average daily temperatures would exceed the Settlement Agreement objective of 64.4°F established for the upstream CWMZ. Based on the maximum (high) average monthly temperature, water temperature would exceed 71.6°F. This illustrates additional temperature inputs farther downstream from the CWMZ.

Table 3.5-19 provides the 2035 Proposed Project projections of the monthly and seasonal (November 1 to April 30) average daily temperatures based on implementation of the flow measures downstream of the Guadalupe Creek CWMZ in the Guadalupe River, as compared to the future baseline.

Table 3.5-19. 2035 Proposed Project Average Temperature Projections (°F) November 1–April 30 Downstream of the Guadalupe Creek CWMZ in the Guadalupe River (GUAD3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
November	68.6	68.7	60.7	59.8	52.5	52.1
December	61.3	61.3	53.6	53.5	50.7	50.6
January	55.7	55.5	52.7	52.1	50.5	50.3
February	60.0	60.4	54.3	53.8	51.1	51.1
March	64.0	65.0	59.2	59.4	52.8	53.7
April	67.8	67.4	61.7	62.6	54.5	55.7
6-month Season	62.9	63.0	57.0	56.9	52.0	52.2

As indicated in Table 3.5-19, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6° downstream of the Guadalupe Creek CWMZ, and there are only negligible decreases in temperature compared to the future baseline.

Dissolved Oxygen Water Quality Standard

The proposed flow measures are intended to enhance cold-water habitat. Because DO saturation increases as temperature decreases, it is unlikely that the proposed flow measures would violate this water quality standard or otherwise substantially degrade water quality. Table 3.5-20 identifies the percentage of days, modeled over a 20-year period, when temperature decreases are projected. These percentages compare the current baseline with the 2015 Proposed Project scenario and the future scenario with the 2035 Proposed Project scenario.

Table 3.5-20. Percentage of Days with Temperature Decreases

POI	2015 With-Project Scenario: Percentage of Days with Temperature Decrease	2035 With-Project Scenario: Percentage of Days with Temperature Decrease
STEV4	3.48	3.48
GCRK3	3.17	3.38
ALAM1	2.12	4.33
CALE1	1.92	5.24
LOSG1	3.42	3.61
GUAD4	3.32	4.17

As noted in Table 3.5-20, the percentage of days with decreases in temperature are projected at all POIs considered. Given the relationship with temperature, increases in DO levels are projected. Based on this analysis, the proposed flow measures would not result in substantial decreases in DO levels and, overall, not violate this water quality standard. In fact, DO levels are likely to improve.

pH Water Quality Standard

The proposed flow measures do not include any action or activity that would alter the current hydrological inputs of surface water pollutants into the system that would substantially affect pH in such a way that would violate this water quality standard or otherwise substantially degrade water quality. Therefore, no impact to pH is expected.

Toxicity Water Quality Standard

The proposed flow measures would not result in additional inputs, re-suspend and/or redistribute substantial amounts of existing toxic substances (for example, mercury, pesticides, PCBs), introduce other toxic substances that would violate this water quality standard, or otherwise substantially degrade water quality.

Population and Community Ecology Water Quality Standard

The proposed flow measures under the Proposed Project do not include any action or activity that would alter the current hydrological inputs of surface water pollutants into the system that would substantially affect population or community ecology in such a way that would violate this water quality standard or otherwise substantially degrade water quality. The changes in flows are designed to improve habitat conditions for steelhead and Chinook salmon and would lead to long-term improvement related to the population and community ecology water quality standard.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow. The non-flow measures included in the Proposed Project that could result in water quality impacts are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the watersheds. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation that could affect water quality standards include removal of riparian vegetation to access the work area, use and staging of heavy equipment within the channel, channel dewatering within the limits of the active work area, modification of channel bed and bank dimensions, and installation of new structures.

These fish barrier remediation projects would result in short-term construction-related impacts that could temporarily increase surface water temperature from removal of riparian vegetation and manipulation of the stream channel. Specifically, channel dewatering or other instream construction and water diversion could increase temperatures. Increased temperatures would result in decreased DO levels. This non-flow measure would not likely affect local pH levels.

Construction along and within the streambed could result in inadvertent releases of oils and other pollutants resulting from leaks from construction equipment. However, Valley Water would implement BMPs, including pre-work inspections of equipment, to reduce this risk. Therefore, impacts to water quality standards would be less than significant.

Implementation of Valley Water BMPs WQ-15 (Prevent Water Pollution), WQ-16 (Prevent Stormwater Pollution), GEN-3 (Avoid Exposing Soils with High Mercury Levels), GEN-21 (Staging and Stockpiling of Materials), GEN-22 (Sediment Transport), GEN-27 (Existing Hazardous Sites), and VEG-1 (Minimize Local Erosion from In-Channel Vegetation Removal) would minimize the effects of non-flow measures on water quality standards by limiting activities and actions that could adversely impact water quality standards.

The Proposed Project would also adhere to VHP conditions 3 (Maintain Hydrologic Conditions and Protect Water Quality), 4 (Avoidance and Minimization for In-stream Projects), and 5 (Avoidance and Minimization Measures for In-stream Operations and Maintenance) where applicable, which would reduce Project impacts to water quality within the covered areas by maintaining hydrologic condition to protect water quality and to avoid water quality pollution related to construction and maintenance.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects to certain water quality standards, it is unlikely that they would violate any applicable water quality standards in the study area, and impacts would be less than significant.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects that could affect water quality standards include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Impacts to water quality standards would be the same as described for fish barrier remediation projects described above. However, the long-term benefits would improve several of the water quality standards, such as decreased temperature as a result of refugia created by LWD and improvements in the population and community ecology standard. Therefore, impacts to water quality standards would be less than significant.

Implementation of Valley Water BMPs WQ-15 (Prevent Water Pollution), WQ-16 (Prevent Stormwater Pollution), GEN-3 (Avoid Exposing Soils with High Mercury Levels), GEN-21 (Staging and Stockpiling of Materials), GEN-22 (Sediment Transport), GEN-27 (Existing Hazardous Sites), and VEG-1 (Minimize Local Erosion from In-Channel Vegetation Removal) would minimize the effects of non-flow measures on water quality standards by limiting activities and actions that could impact water quality.

The Proposed Project would also adhere to VHP conditions 3 (Maintain Hydrologic Conditions and Protect Water Quality), 4 (Avoidance and Minimization for In-stream Projects), and 5 (Avoidance and Minimization Measures for In-stream Operations and Maintenance) where applicable, which would reduce Project impacts to water quality standards.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects on certain water quality standards, they would not violate any water quality standards in the study area, and impacts would be less than significant.

Other Non-flow Measures

The Stevens Creek Multiport Project would allow for cooler water flows during summer months from Stevens Creek Reservoir; however, flows during the summer months would be consistent with the flow measures analyzed above. Construction-related impacts would be similar to those described above for other non-flow measures. Overall, the impacts to water quality standards would be less than significant.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, the geomorphic function enhancement measures would impact the same water quality standards in the short term; however, they would not result in violations of applicable water quality standards. Similarly, impacts would be less than significant.

Implementation of Valley Water BMPs WQ-15 (Prevent Water Pollution), WQ-16 (Prevent Stormwater Pollution), GEN-3 (Avoid Exposing Soils with High Mercury Levels), GEN-21 (Staging and Stockpiling of Materials), GEN-22 (Sediment Transport), GEN-27 (Existing Hazardous Sites), and VEG-1 (Minimize Local Erosion from In-Channel Vegetation Removal) would minimize the effects of non-flow measures on water quality standards.

The Proposed Project would also adhere to VHP conditions 3 (Maintain Hydrologic Conditions and Protect Water Quality), 4 (Avoidance and Minimization for In-stream Projects), and 5 (Avoidance and Minimization Measures for In-stream Operations and Maintenance) where applicable, which would reduce Project impacts to water quality standards within the covered areas.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects on water quality standards (that is, temperature and DO), they would not violate any applicable water quality standards of the waters in the study area, and impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect water quality. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. As such, proposed monitoring activities would not result in impacts to water supply. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys and would have no impact to water quality standards. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or PIT tag readers using noninvasive technology and would also have no impact to water quality standards. Water quality impacts of maintenance of non-flow measures, and AMP adaptive management of both flow and non-flow measures, would be similar to those analyzed for these measures and would likewise be less than significant.

Significance Conclusion Summary

Implementation of the proposed flow measures would modify temperatures in portions of the Stevens Creek and Guadalupe River watersheds. The results indicate that there would be no impact to the Stevens Creek CWMZ. The Guadalupe Creek impacts to water temperature would be less than significant, although the CWMZ could experience limited times when the Settlement Agreement temperatures are unable to be met. Flow measures would provide slight improvements in DO levels in the study area. Flow measures would not change pH levels or introduce additional pollutants; therefore, there would be no impact to these water quality standards. The population and community ecology standard is expected to benefit from flow measures. Overall, flow measure impacts to water quality standards would be **less than significant**.

The impact to applicable water quality standards from non-flow measures and related maintenance would occur only in the short-term as a result of construction activities but would not violate applicable water quality standards, and impacts would be **less than significant**. In the long term, the non-flow measures would improve water quality.

There would be **no impact** from monitoring activities, and adaptive management impacts would be similar to impacts experienced when measures are first implemented.

Mitigation

No mitigation would be required for Impact WQ-2.

3.5.4.3 Water Quality Impacts Summary

Table 3.5-21 summarizes the water quality impacts of the Proposed Project.

Table 3.5-21. Water Quality Impacts Summary

Impact	Flow/ Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?	Types of Benefits
WQ-1	Flow Measures	LTS	N/A	LTS	Yes	Improved conditions for designated beneficial uses
WQ-1	Non-flow Measures	LTS	N/A	LTS	Yes	Improved conditions for designated beneficial uses
WQ-2	Flow Measures	LTS	N/A	LTS	Yes	Improvements to DO
WQ-2	Non-flow Measures	LTS	N/A	LTS	Yes	Long-term water quality improvements

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A= not applicable

3.6 Recreation

This section describes the recreational resources of the study area, including land- and water-based recreational activities such as hiking, camping, picnicking, fishing, wildlife viewing, bicycling, and powered and non-powered boating. In addition, this section discusses the Proposed Project's impacts to recreational resources in the study area.

The *Initial Study* (Appendix F) eliminated one recreation impact threshold from further analysis because the Proposed Project would not result in the construction or expansion of recreational facilities. Specifically, the *Initial Study* found that some Project activities would occur on lands owned by the County and operated by SCCPRD, and construction activities could result in short-term and temporary impacts to recreational access. Project implementation would include early and ongoing coordination with the County to maintain access to county park and recreational facilities throughout the construction process. Because the Project would not include recreational facilities or require the construction or expansion of recreational facilities, impacts with respect to that impact threshold would be less than significant with Project implementation.

The impact analysis evaluates how the Proposed Project could affect existing parks or other recreational facilities in and around the Stevens Creek and Guadalupe River and Valley Water-owned and -maintained facilities. It also considers potential impacts to warm-water fishing in reservoirs; however, this is based on the availability of warm-water habitat analyzed in Section 3.5, *Water Quality*.

3.6.1 Environmental Setting

The environmental setting represents the existing conditions of recreation resources in the study area. This setting is based on current baseline conditions; however, more recent data are presented where available. In addition, the future baseline conditions are considered based on assumptions for increases in water supply, levels of demand, and maximum reservoir capacities within the Stevens Creek and Guadalupe River watersheds by remediation of reservoir safety restrictions (Section 2.2, *Proposed Project Area*). The current and future baselines form the basis for comparison of Proposed Project impacts.

The larger Project area described in Chapter 2, *Project Description*, includes the two watersheds in northern Santa Clara County where Valley Water holds water rights licenses: Stevens Creek and the Guadalupe River. The study area as it pertains to the recreational analysis is limited to the reservoirs and streams—downstream of the dams and upstream of the tidal influence zone—that occur within these watersheds and those associated recreation areas that could be affected by implementation of the Proposed Project. The following reservoirs are considered in the analysis:

- Stevens Creek Reservoir
- Almaden Reservoir
- Calero Reservoir
- Guadalupe Reservoir
- Lexington Reservoir
- Vasona Reservoir

The total length of all creeks and rivers included in the study area is approximately 135.6[5] miles. The length encompasses the following rivers and creeks that could be directly or indirectly affected by Project-related measures:

- Stevens Creek (23.1 miles)
- Alamitos Creek (9.0 miles)
- Calero Creek (24.6 miles)
- Guadalupe Creek (8.5 miles)
- Los Gatos Creek (50.0 miles)
- Guadalupe River (20.4 miles)

The majority of recreational resources in the County are provided by the Santa Clara County Parks system and operated by the SCCPRD, which is made up of 28 regional parks encompassing more than 52,000 acres (SCCPRD 2018a). The County has the authority to make available for public recreation 10 reservoirs and 5 ponds owned and operated by Valley Water under an existing agreement with Valley Water (that is, Master Partnership Agreement for Recreational Use of Certain District Lands, Reservoirs and Recharge Ponds; Valley Water 2018c). Under this agreement, the County operates all Valley Water reservoirs for recreational uses. The recreational uses of these reservoirs and ponds account for approximately 209,000 visitors annually, or 7 percent of the total Santa Clara County recreational visitation (Valley Water 2018c).

Activities available at many Santa Clara County Parks include, but are not limited to, biking, hiking, equestrian, interpretive (that is, educational) programs, picnicking, fishing, power and non-power boating, camping, and wildlife viewing. According to the *Countywide Trails Prioritization and Gaps Analysis*, as of 2015, approximately 316 miles of Santa Clara County trails are complete, and another 479 miles of future trails have been identified (SCCPRD 2015). Parks, trails, and recreational activities and facilities within the study area are discussed in further detail below.

Santa Clara County offers a wide variety of trail opportunities including hiking and biking, with more than 160 miles of bike trails offering off-road bicycling opportunities from paved trails to single-track mountain bike trails (SCCPRD 2019).

Trail restrictions or closures occur most commonly during winter because of conditions that lead to trail erosion, creation of unwanted trails, and wildlife habitat impacts; other closures are based on impacts to threatened or endangered species or new trail construction (SCCPRD 2018c). SCCPRD implements the following types of trail closures (SCCPRD 2018c):

- Temporary closures: because of wet conditions, certain trails will be closed temporarily to equestrian and mountain bike use; trails are evaluated daily for reopening as soon as possible.
- Seasonal closures: trail closure to all user types and usually of a longer duration, for a set period of time, and reoccurring, because of geographic location, topographical features, and soil types; based on safe trail access balanced with resource protection.
- Construction closures: newly constructed trails will be closed for the first winter after construction until June 1 to allow the trail to settle, compact, and accumulate vegetation to provide a better and more stable trail system in the long term and to meet County obligations to protect water quality and wildlife habitat.

Trails located on Valley Water property outside of Valley Water's reservoir properties are allowed under joint use agreements with the applicable public agency, typically the city or municipality in which

[5] All river and creek lengths are rounded to the nearest tenth of a mile.

they are located. In general, the joint use agreements allow for recreation use as a secondary use (Valley Water use is primary), with the responsibility for all recreational uses including trail safety and closures to the applicable public agency. Coordination for closures needs to be conducted with the partner agency. Beyond the county trails, regional and municipal trails exist throughout Santa Clara County. Regional trails provide longer-distance trail uses that often extend beyond the boundaries of Santa Clara County. Local or municipal trails that are owned and operated by the applicable municipalities generally provide connectivity between local parks and connect to other area trails, often in urban areas, and typically consist of paved trail systems.

Boating is available at some of the water bodies within the study area, including Calero, Lexington, and Stevens Creek Reservoirs. Boating hours are 8 a.m. to ½ hour before sunset. Reservoirs in Santa Clara County in the study area that are closed indefinitely to all vessels and floats include Almaden and Guadalupe Reservoirs (SCCPRD 2018b).

Closures at Calero Reservoir are managed for and actively closed to boating by SCCPRD when the reservoir elevation reaches the end of the developed boat ramp. The closure elevation is 452.0 feet at Calero Reservoir (Hearin 2018). Calero Reservoir is the primary reservoir in the study area that offers powered boating opportunities (that is, jet-skiing, waterskiing, and fishing) along with non-powered opportunities (that is, sailing, canoeing, and kayaking). In comparison, the other reservoirs in the study area generally provide non-powered boating opportunities with the exception of a few reservoirs that provide restricted or limited powered boating opportunities (that is, low speeds or size of motors). SCCPRD does not close these non-powered boating reservoirs based on lowering water levels.

Reservoir fishing for warm-water species is an important recreational resource. Fish species documented in the study area reservoirs include primarily warm-water fish species guilds (for example, black bass, crappie, bluegill, carp, and catfish). Although stocking of rainbow trout historically occurred in some study area reservoirs, stocking no longer occurs, and persistent or self-sustaining cold-water fisheries are not known to occur in any of the study area reservoirs. Therefore, no explicit evaluation of cold-water reservoir fisheries is conducted in this section. Largemouth bass are evaluated in the study area reservoirs as a representative of the warm-water fish species guild because of the recreational importance of warm-water recreational fisheries. See Section 3.5, *Water Quality*, for the analysis of the WARM beneficial use and its relationship to reservoir fishing.

The following sections provide additional details on the recreational opportunities provided within the study area, by watershed.

3.6.1.1 Stevens Creek Watershed

Recreation resources in the Stevens Creek Watershed are located at Stevens Creek Reservoir and along Stevens Creek, as shown in Figure 3.6-1. The recreation resources include a county park and municipal trails, as described in Table 3.6-1. Stevens Creek Reservoir is located on Stevens Creek about 2 miles southwest of the city of Cupertino. The reservoir provides opportunities for non-powered boating and fishing.

Table 3.6-1. Parks and Recreational Facilities in the Vicinity of the Proposed Project in the Stevens Creek Watershed

Recreation Facility	Jurisdiction	Features	Activities
Alamitos Creek	See below	See below	See below
Stevens Creek County Park	Santa Clara County	1,063-acre park is located in the foothills between the cities of Saratoga and Cupertino and includes Stevens Creek Reservoir, including 9 miles of multiuse trails, picnic areas, archery course, and volleyball courts	Archery, fishing, picnicking, horseback riding, hiking, mountain biking, wildlife viewing, non-power boating, and volleyball
Stevens Creek Trail	City of Mountain View	5-mile paved, multiuse trail that runs through tidal marshlands and natural riparian habitats, providing recreation and educational opportunities	Biking, bird watching, commuting, dog walking, education, hiking, jogging, nature walks, running, scootering, skating, skateboarding, striding, and walking

Sources: SCCPRD (2018j), City of Mountain View (2018), and Friends of Stevens Creek Trail (2018)

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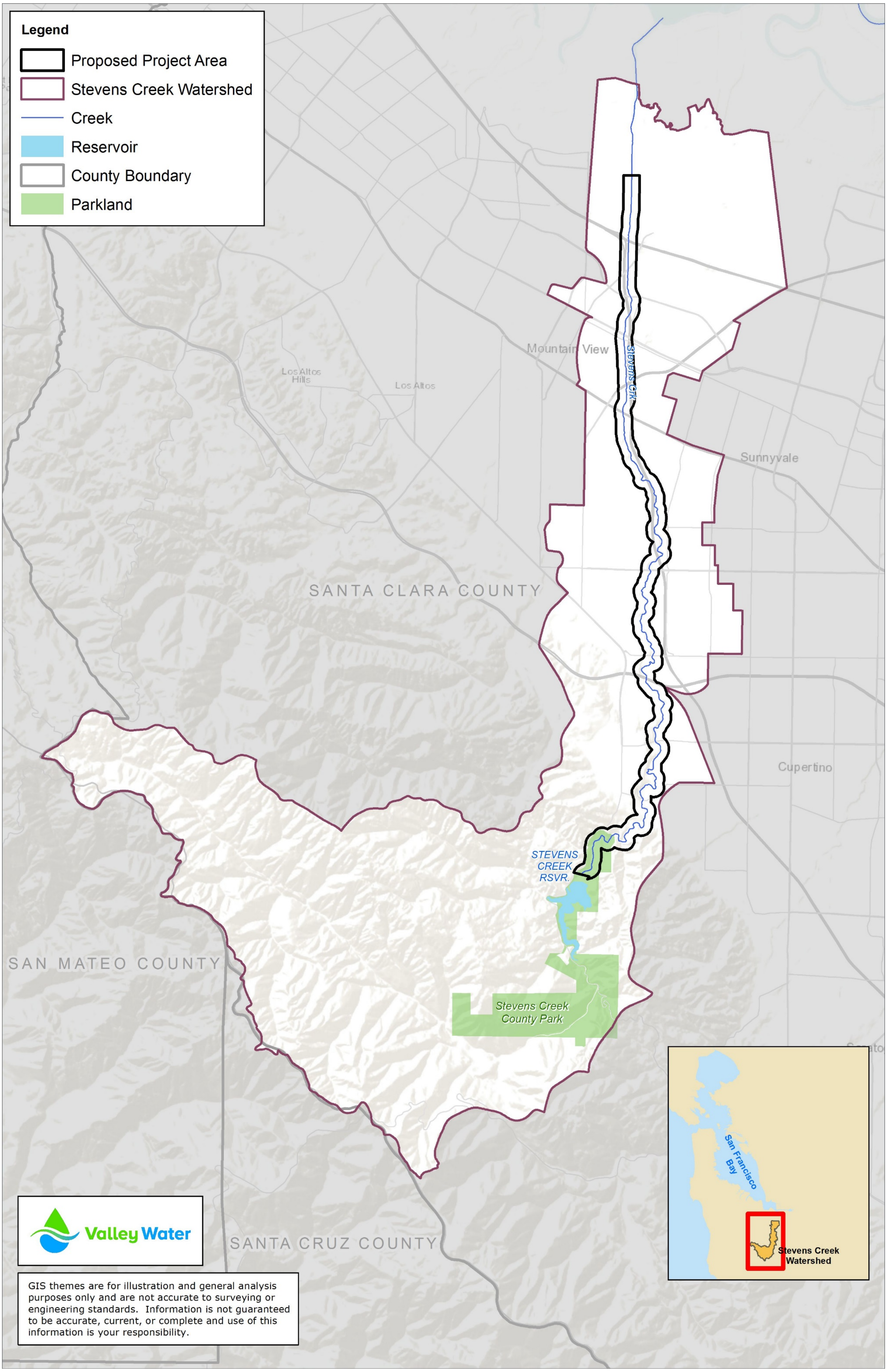
Figure 3.6-1. Parks and Recreational Facilities in the Stevens Creek Watershed



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3.6.1.2 Guadalupe River Watershed

Recreation resources in the Guadalupe River Watershed are located at Almaden Reservoir and along Alamitos Creek, at Calero Reservoir and along Calero Creek, at Guadalupe Reservoir and along Guadalupe Creek, at Lexington Reservoir and Vasona Reservoir, at Los Gatos Creek, and along Guadalupe River, as shown in Figure 3.6-2. The reservoirs are described below. County and municipal parks, facilities, and trails are described in Table 3.6-2.

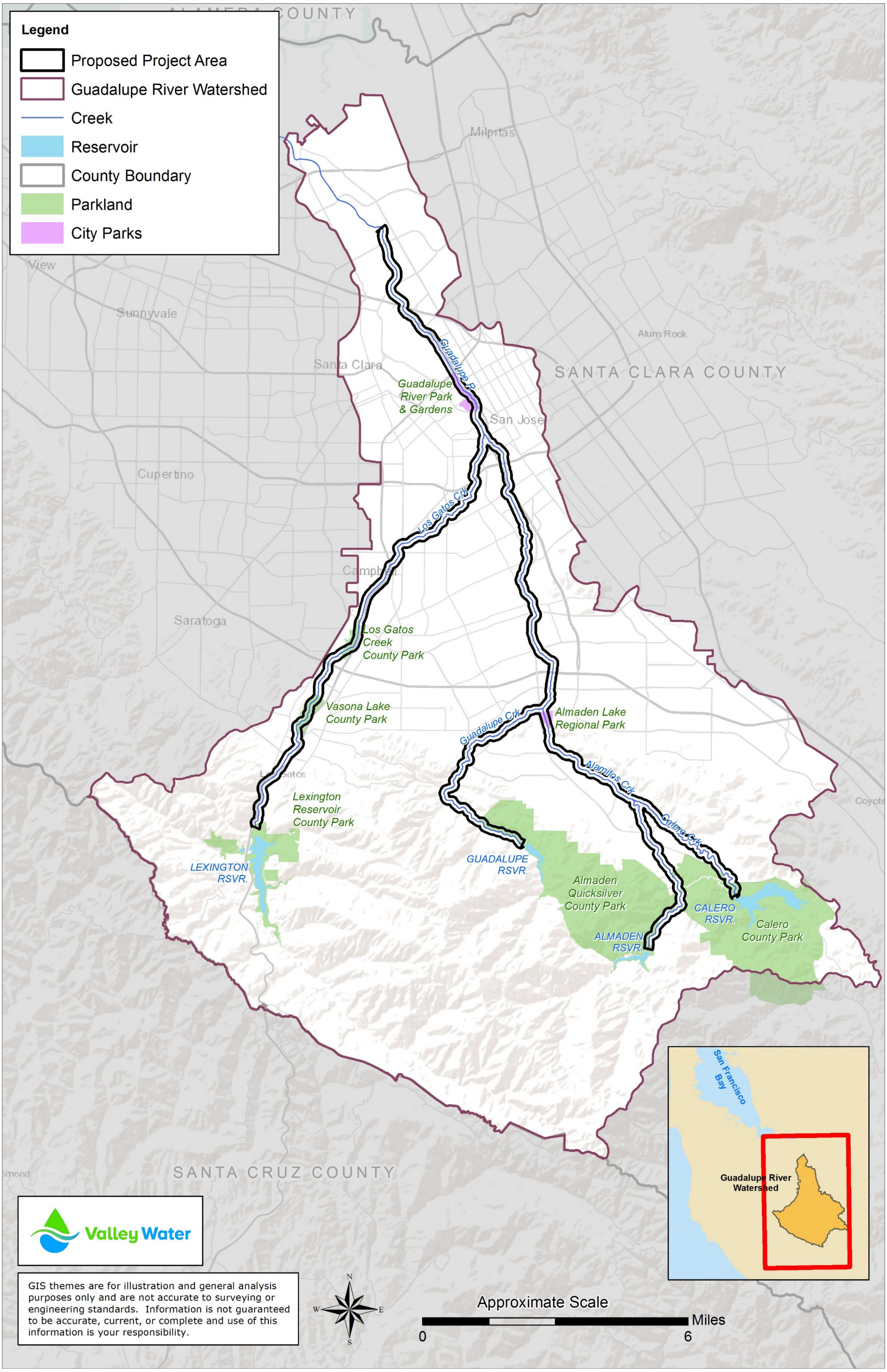
Table 3.6-2. Parks and Recreational Facilities in the Vicinity of the Proposed Project in the Guadalupe River Watershed

Recreation Facility	Jurisdiction	Features	Activities
Alamitos Creek	See below	See below	See below
Los Alamitos Creek Trail	City of San José	4.7-mile trail in the southern portion of the city of San José along Almaden Lake south to McKean Road	Hiking, biking, walking
Almaden Quicksilver County Park	Santa Clara County	4,163-acre park atop Capitancillos Ridge includes Guadalupe and Almaden Reservoirs, and 37 miles of multiuse trails including 30 miles of equestrian trails and 16.6 miles of bike trails	Hiking, biking, and horseback riding
Almaden Lake Regional Park	City of San José	65-acre park including the 32-acre Almaden Lake providing pedal boat rentals (personal watercraft are not allowed), trails, picnic facilities, and volleyball and bocce ball courts	Pedal boating, fishing, swimming, picnicking, volleyball, bocce ball, and hiking
Calero Creek	See below	See below	See below
Calero County Park	Santa Clara County	4,471-acre park located south of Calero Reservoir with a boat launch area, picnic areas, and 18.9 miles of trails including 0.5 miles of which are suitable for biking	Fishing; power and non-power boating (that is, jet-skiing, sailing, water skiing, kayaking), horseback riding, hiking, biking, wildlife viewing, and picnicking
Calero Creek Trail	City of San José	1.9-mile trail located in south San José between Camden Avenue and Harry Road with a link to the Los Alamitos Creek Trail	Hiking, biking, walking
Guadalupe Creek	See below	See below	See below
Guadalupe Creek Trail	City of San José	1.7-mile trail extending from the Almaden Expressway to Singletree Way in south San José	Biking, walking
Los Gatos Creek	See below	See below	See below
Lexington Reservoir County Park	Santa Clara County	950-acre park near the town of Los Gatos including Lexington Reservoir; facilities include a boat launch area near the dam, and the Miller Point Day Use Area	Hiking, fishing, picnicking, non-power boating, mountain biking and kayaking

Recreation Facility	Jurisdiction	Features	Activities
Los Gatos Creek County Park	Santa Clara County	Located in the city of Campbell and providing trails, picnic area, a flycasters' pond, and a dog park	Biking, fishing, picnicking, remote control boating, fishing, and dog play
Vasona Lake County Park	Santa Clara County	152-acre park in the town of Los Gatos providing trails, picnic areas, boat rentals, playgrounds, and volleyball courts	Biking, fishing, picnicking, non-powered boating, kids/playground activities, nature trails, and volleyball
Los Gatos Creek Trail	Santa Clara County, City of Campbell, City of San José, Town of Los Gatos	9.5-mile multiple use trail that passes through the Los Gatos Creek County Park as well as the town of Los Gatos, Vasona Lake County Park, and the cities of Campbell and San José	Hiking, biking, walking, and skating
Guadalupe River (mainstem)	See below	See below	See below
Guadalupe River Trail	City of San José	11.4-mile-long, disconnected trail system in the city of San José including a 9-mile segment from Gold Street to Virginia Street and a 2.4-mile segment from Chynoweth Avenue to Coleman Road, which connects to Almaden Lake and Los Alamitos Creek Trail	Hiking, walking, biking, skating, and dog walking
Guadalupe River Park and Gardens	City of San José	254-acre park along 3 miles of the Guadalupe River in the heart of downtown San José, including Heritage Rose Garden, the Historic Orchard, Rotary PlayGarden, a community garden, and approximately 2.6 miles of trails (that is, River Walk), which are widely used for recreation and commuting	Hiking, walking, biking, wildlife and nature viewing, festival and concert activities

Sources: San José Parks, Recreation, and Neighborhood Services (SJPRNS) (2018a), SCCPRD (2018d), SJPRNS (2018b), SCCPRD (2018f), SCCPRD (2018e), SJPRNS (2018c), SJPRNS (2018d), SCCPRD (2018g), SCCPRD (2018h), SCCPRD (2018i), SJPRNS (2018e), and Guadalupe River Park Conservancy (2021)

Figure 3.6-2. Parks and Recreational Facilities in the Guadalupe River Watershed



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Almaden Reservoir

Almaden Reservoir is a 1.1-mile-long reservoir with a surface area of 59 acres located 12 miles south of the city of San José. No swimming or boating of any kind is permitted at Almaden Reservoir (SCCPRD 2018b). Reservoir-based recreation is limited to fishing, and the majority of recreation activities at or near Almaden Reservoir are land-based, particularly hiking and picnicking at the adjacent Almaden Quicksilver County Park (SCCPRD 2018h).

Calero Reservoir

Calero Reservoir is a 2.2-mile-long reservoir with a surface area of 349 acres. Calero Reservoir has a limited capacity because of seismic restrictions, which means the water levels cannot exceed 467 feet in elevation. SCCPRD also closes Calero Reservoir to boating when the reservoir elevation is 452 feet and lower (Hearin 2018). Calero Reservoir was not closed at any time over the period of record (that is, 1990 to 2010) for the current baseline and future baseline. SCCPRD actively manages the boating levels on the reservoir with a minimum of 23 boats at the closure elevation (that is, 452 feet), 37 boats at the DSOD seismic capacity limit (that is, 467 feet elevation), and up to maximum of 58 boats at full capacity (that is, 484 feet elevation) (Hearin 2018).

Guadalupe Reservoir

Guadalupe Reservoir is a 1.1-mile-long reservoir with a surface area of 74 acres located approximately 5 miles east of the city of San José. No swimming or boating of any kind is permitted at Guadalupe Reservoir (SCCPRD 2018b). Reservoir-based recreation is limited to fishing, and the majority of recreational activities at or near Guadalupe Reservoir are land-based, particularly hiking and picnicking at the adjacent Almaden Quicksilver County Park (SCCPRD 2018h).

Lexington Reservoir

Lexington Reservoir is a 2.5-mile-long reservoir with a surface area of 412 acres. Non-powered boating, hiking, and picnicking are allowed, and fishing is popular, including for black bass, trout, bluegill, and crappie (SCCPRD 2018j).

3.6.2 Regulatory Setting

This section summarizes the regional and local regulations, policies, and plans pertinent to the evaluation of the Proposed Project's impacts to recreation resources.

3.6.2.1 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies the other regional and local regulations relevant to recreation.

Almaden Quicksilver County Park Trail Master Plan, 1998

This plan includes recommendations for all user groups, including pedestrians, equestrians, pet owners, bikers, and cart owners. The plan also addresses design, use, and management guidelines for official existing trails, unofficial existing trails, and new trails recommended by the Plan's Task Force and park staff (SCCPRD 1998).

Calero County Park Trails Master Plan, 2013

This plan provides a framework for the expansion of an existing trail system to include limited-use trails for equestrians, hikers, and dogs on-leash; and multiuse trails that will allow all users to use the recently acquired Rancho San Vicente property; and provides regional trail connections as identified in the *Santa Clara County Countywide Trails Master Plan* (SCCPRD 2013).

Master Partnership Agreement for Recreational Use of Certain Valley Water Lands, Reservoirs and Recharge Ponds, 2018

The partnership agreement is between Valley Water and the County and provides a renewed commitment to partnership in the operation of Valley Water properties for public recreational use (Valley Water 2018c). Sections of the agreement relevant to the Proposed Project include:

- Valley Water responsibility for repairing and/or replacing Santa Clara County improvements damaged or removed by Valley Water as part of Valley Water projects
- requirement that Valley Water provide the County with annual notice of the scheduled operational levels for each reservoir on Valley Water Property for the remainder of the calendar year
- requirement that Valley Water engage the County early in conceptual and subsequent planning and design for projects

Santa Clara County General Plan, 1994

The Parks and Recreation element of the County's *General Plan,* as originally introduced in Section 3.2.2*,* addresses three types of areas and facilities that can contribute both to meeting future recreation demand and to maintaining the county's natural resources and beauty: regional parks and public open space lands, trails, and scenic highways. The Parks and Recreation element further identifies general strategies for each of these areas with detailed and extensive policies and implementation recommendations for each of these strategies (Santa Clara County 1994).

Santa Clara County Countywide Trails Master Plan Update, 1995

The purposes of the *Trails Master Plan* are to build a trail system that meets the needs of residents, respects private property rights in planning and designing trails, provides responsible trail management and teaches trail users to respect adjacent land uses, accepts responsibility for any liability arising from the public's use of county trails, and implements trails involving private property only when the landowner is a willing participant in the process (Santa Clara County 1995a).

3.6.3 Methodology

Impacts were evaluated qualitatively, based on the potential for the proposed flow and non-flow measures to increase use of recreation areas and resources such that substantial physical deterioration of the resource would occur or would be accelerated; or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment. Impacts were evaluated quantitatively to the extent possible based on the methodology described below.

3.6.3.1 Flow Measures Impact Analysis Methodology

The flow measures impact analysis evaluated impacts associated with operational changes to non-emergency flow releases. As described in Section 2.4, *Project Components – Fish Habitat Restoration Plan Phase 1 Measures*, these non-emergency flow releases, or reservoir re-operation rule curves, are planned changes to the release of impounded water from Valley Water reservoirs to support lifecycle needs of steelhead and Chinook salmon.

In the study area, impacts to recreational facilities and trails and activities would be associated with changes in recreational use both in and adjacent to the waterways resulting from implementation of proposed flow measures. For impacts related to reservoir reoperation rule curves, where sufficient modeling data are available, the analysis quantifies the type, location, and magnitude of potential impacts of the Proposed Project's flow measures attributable to the resulting changes in reservoir elevations. Specifically, this analysis evaluates whether the Proposed Project results in increased use at other available recreational facilities because of an increase in boating closure days at Calero Reservoir, where SCCPRD manages the boating and closes the reservoir when specific reservoir levels or storage levels are reached.

For impacts to stream-based recreation, the analysis compares the locations of existing and planned recreational facilities and trails along the stream reaches in comparison to the instream flow changes attributable to the reservoir re-operation rule curves. Specifically, this analysis evaluates whether the Proposed Project results in increased average daily peak flows that may inundate existing available recreational facilities for a sustained period that would result in increased use at other available recreational facilities. This analysis relies on instream flow model analysis and geographic information system analysis of the stream reaches in the study area to locate the existing and planned recreational facilities and trails and to qualitatively assess whether the Project operation would result in increased use at other available recreational facilities.

3.6.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure, as introduced in Section 3.1.4.2, was considered in this analysis for recreation impacts. Construction measures may result in a short-term disruption to or closure of existing recreational facilities (that is, primarily trails and some parks) or opportunities that may cause an increase in use of other available recreational facilities and subsequently result in substantial physical deterioration of these facilities. A long-term effect could occur if the Proposed Project resulted in longer-term closures of recreational facilities that may result in increased use of other available recreational facilities and subsequently result in substantial physical deterioration of these facilities. Additionally, the analysis includes discussion of the potential for impacts resulting from maintenance of non-flow measure physical structures, as well as Project-related monitoring. The analysis methodology for non-flow measures relies primarily on geographic information system analysis of the stream reaches in the study area to locate the existing and planned recreational facilities and trails and the non-flow measure Project sites. The impact analysis qualitatively assesses whether and to what extent these measures could cause increased use at other available recreational facilities that may cause significant or accelerated physical deterioration of these other available public recreational facilities.

Fish Passage Barrier Remediation

Construction measures associated with fish passage barrier remediation that could affect recreation resources include use and staging of heavy equipment within the study area and on unpaved roads, channel dewatering within the limits of the active work area, disturbance of channel bed and bank, concrete and asphalt demolition and removal, and installation of new concrete.

Spawning and Rearing Habitat Improvements

Construction measures associated with instream habitat enhancement and restoration projects that could affect recreation resources include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bankfull channel at the CWMZs identified downstream of Stevens Creek and Guadalupe Reservoirs (Section 2.4.1.5). Six representative gravel or LWD augmentation project sites have been identified, as noted in Table 2.4-5, on which to base this programmatic analysis. One site is within the Stevens Creek study area, while five are in the Guadalupe River study area.

Other Watershed-specific Non-flow Measures

Stevens Creek Watershed-specific Measures: Portable Multiport Outlet

Construction of a portable multiport outlet would allow for cooler water flow releases during the summer from Stevens Creek Reservoir while meeting instream water temperature objectives and improving cold-water pool management in the reservoir. Temporary impacts would be related to construction.

Guadalupe River Watershed-specific Measures: Geomorphic Function Enhancement Pilot Projects

The Guadalupe River watershed-specific measures include proposed enhancements and restoration of geomorphic functions. Construction measures associated with geomorphic function restoration and enhancement projects would involve ground disturbance, such as the removal of culverts and structures, and installation measures.

3.6.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that would relate to the effects of seasonal flow regimes or pulse flows on use at recreational facilities and trails. Impacts related to reservoir reoperation rule curves and stream-based recreation would be similar to the flow measures impact analysis methodology in Section 3.6.3.1.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.6.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to recreational resources if it would:

- **REC-1**: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

CEQA Guidelines Appendix G also suggests that projects may have a significant effect on recreation if they include recreational facilities or require construction or expansion of recreational facilities that could have adverse environmental effects. Because the Project would not include recreational facilities, or require the construction or expansion of recreational facilities, impacts would be less than significant and are not evaluated further in the EIR (see Appendix F, *Initial Study*).

3.6.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, at Valley Water-owned facilities, Valley Water would incorporate a range of BMPs to avoid and minimize adverse effects on the environment that could result from Proposed Project measures. Valley Water BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs conditions are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions. In reference to recreation resources, applicable BMPs focus on public notice, safety, and timing measures during ground-disturbing measures and work along channels and within streams.

BMPs relevant to the analysis of recreation and impacts related to the availability of and access to recreational facilities within the study area include the following:

- **GEN-36**: Public Outreach – Would specify measures to notify the public of Proposed Project measures and allow for public to adjust recreational use to other area facilities
- **GEN-37**: Implement Public Safety Measures – Would specify public safety measures to notify and warn the recreating public of Proposed Project measures and mitigate public safety at recreational facilities and trails
- **GEN-39**: Planning for Pedestrians, Traffic Flow, and Safety Measures – Would schedule bicycle and pedestrian facility closures outside the peak morning and afternoon periods to minimize the impact of Proposed Project measures to recreational access and use

3.6.4 Impact Analysis

3.6.4.1 Impact REC-1: Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (less than significant)

Flow Measures Impact Analysis

Reservoirs

This section discusses the effects of the Proposed Project on recreational use in the study area reservoirs, which is based on comparison of the number of reservoir boating closure days at Calero Reservoir with the Proposed Project relative to the current baseline and future baseline conditions.

The number of Calero Reservoir boating closure days for the Proposed Project was compared with the current baseline and future baseline condition over the period of record, 1990 to 2010, as determined from the WEAP model (see also Appendix G, *Valley Water Daily WEAP Model Technical Memorandum*). More detailed descriptions of the WEAP model and its assumptions can be found in Appendix G. Under all modeled scenarios (that is, Proposed Project, current baseline, and future baseline), Calero Reservoir is never closed to boating. Thus, boaters would not be displaced at Calero Reservoir because of boating closures and would not increase use such that substantial physical deterioration of any one facility would occur or be accelerated.

Streams

Table 3.6-3 and Table 3.6-4 show the summary of days the average daily peak instream flows on creeks in the study area under modeled Proposed Project conditions would exceed the corresponding current baseline instream flows and the future baseline instream flows.

Table 3.6-3. Summary of Days the Average Daily Peak Instream Flows for the Proposed Project Exceed the Current Baseline Instream Flows

Creek	Year	Month	Number of Days	Peak Flow (cfs)	Difference from Current Baseline Peak Flow (cfs)
Alamitos Creek	1997	January	1	824	+181
Stevens Creek	1998	February	3	557	+147
Stevens Creek	1995	March	2	548	+138

Source: FAHCE WEAP Model (refer to Appendix G)

Table 3.6-4. Summary of Days the Average Daily Peak Instream Flows for the Proposed Project Exceed the Future Baseline Instream Peak Flows

Creek	Year	Month	Number of Days	Peak Flow (cfs)	Increase from Future Baseline Peak Flow (cfs)
Alamitos Creek	1997	January	1	753	+172
Alamitos Creek	2000	February	1	698	+118
Stevens Creek	1998	February	3	557	+147
Stevens Creek	1995	March	2	548	+138

Source: FAHCE WEAP Model (refer to Appendix G)

Table 3.6-3 and Table 3.6-4 indicate that the changes in instream flow as part of the Proposed Project would result in very infrequent increased average daily peak flows in Alamitos Creek and Stevens Creek with implementation of the Proposed Project relative to the corresponding current and future baselines. The limited increased number of average daily peak flows all occur in “wet” WYs (that is, 1995, 1997, 1998, and 2000) and, as part of the Proposed Project, reservoir operations result in increased storage capacities in the reservoirs, which then results in higher-intensity reservoir spill events since the Proposed Project reservoirs have less buffer before a spill occurs during a large flow event, resulting in higher average daily peak flows.

In addition, modeling results presented in Table 3.6-3 indicate that the changes in instream flow as part of the Proposed Project would result in increased average daily peak flows only on Alamitos and Stevens Creeks.

The increases in the maximum average daily peak flows on both Alamitos and Stevens Creeks would be very infrequent, would be short in duration, and would not directly affect the existing recreation trails along these creeks or other recreational facilities such that users would be displaced and substantially increase the use of other existing recreational facilities and trails. Therefore, the Proposed Project would not result in the substantial physical deterioration or acceleration of deterioration at any existing recreational facilities or trails in the study area, and impacts would be less than significant.

Compared with both the current baseline and the future baseline, the increases in the maximum average daily peak flows on both Alamitos and Stevens Creeks with the Proposed Project would be very infrequent, would be short in duration, and would not directly affect the existing recreation trails along these creeks or other recreational facilities such that users would be displaced and substantially increase the use of other existing recreational facilities and trails.

Based on the above analysis, the Proposed Project would not result in the substantial physical deterioration or acceleration of deterioration at any existing recreational facilities or trails in the study area. The impact to existing neighborhood and regional parks or other recreational facilities from the flow measures would be less than significant.

Non-flow Measures Impact Analysis

The proposed non-flow measures could result in increases in use at existing recreational facilities and trails through several mechanisms. First, the proposed non-flow measures would require temporary work crews to construct, implement, maintain, and monitor the non-flow measures. Some of these activities would occur in active water-based or adjacent land-based recreational facilities.

Construction and maintenance crews would be sourced locally, small in size, and localized to specific work sites. Construction and maintenance crews would not temporarily live nearby. These construction crews would not substantially change the use levels of recreational facilities and trails in the study area because of the small number of construction workers and those workers being sourced locally, and would not result in substantial physical deterioration of any recreational facilities in the region or the acceleration of the physical deterioration of those facilities.

Second, the Proposed Project measures could result in the temporary disruption of access to and use of existing recreational facilities and trails such that displaced users may cause physical deterioration of alternative recreational facilities and trails in the study area. The potential impact for each type of non-flow measure is detailed below.

Fish Barrier Remediation

Two of the five barrier remediation projects proposed are located in in the immediate vicinity of existing recreational trails, the Moffett Fish Ladder and the Old Dam fish barriers.

The Moffett Fish Ladder site is located in the Stevens Creek watershed where the Stevens Creek Trail runs parallels to Stevens Creek. The Old Dam is located within the Guadalupe River watershed along Guadalupe Creek immediately downstream of Guadalupe Reservoir, where the Guadalupe Trail runs parallel to Guadalupe Creek within Almaden Quicksilver County Park.

Construction

Typical Proposed Project measures that may result in temporary impacts during construction associated with implementation of the fish barrier remediation projects at the above-noted sites may include, but not be limited to, traffic from hauling of heavy equipment and materials to and from the Project site, pruning or removal of riparian vegetation to access the work area, channel dewatering within the limits of the active work area, disturbance of the channel bed and bank, and closure or limited use of public trails during construction.

When fish barrier remediation measures are conducted, portions of nearby trails or trail parking areas may have to be temporarily closed for the duration of the maintenance activity (from less than a day to up to several weeks, in limited instances) to maximize public safety while they are used as access corridors or staging areas for vehicles, supplies, and equipment.

Depending on the extent of area needed to conduct the measures, such closures could temporarily restrict the use of existing recreational trails. However, the closures would be short-term, small in scale, and localized to a specific fish barrier remediation site and abutting trails. The trail systems in the vicinity of the fish barrier remediation sites are extensive, and trail use would still be available outside of the localized fish barrier remediation sites. As such, the Proposed Project would not result in an increase in use of other existing recreational trails or facilities that would in turn result in the substantial physical deterioration of the alternative facilities or trails in the study area.

Implementation of Valley Water's BMPs at Valley Water-owned facilities, including GEN-36 (Public Outreach), GEN-37 (Implement Public Safety), and GEN-39 (Planning for Pedestrians, Traffic Flow, and Safety Measures), would reduce impacts related to the construction measures at Valley Water sites (namely Moffett Fish Ladder along Stevens Creek) in the vicinity of any existing recreation resources by notifying and warning the public of Proposed Project measures and allowing for the public to adjust recreational use to other area facilities, and scheduling bicycle and pedestrian facility closures outside the peak morning and afternoon periods. At non-Valley Water sites along Pheasant, Guadalupe, and Alamitos Creeks, Valley Water would impose similar BMPs as conditions of funding; the impacts, however, would not result in increased use that would result in the substantial physical deterioration of the other existing facilities or trails in the study area. The impact to existing neighborhood and regional parks or other recreational facilities from construction activities related to proposed fish barrier remediation would be less than significant.

Enhancement of Spawning and Rearing Habitat

The Proposed Project includes measures to enhance rearing habitat, including placement of large organic debris, channel modifications (including berms), and riparian canopy enhancements. These enhancement measures would occur in streambed areas, which generally do not support recreational facilities and uses. Users of public trails and associated recreational facilities could experience temporary disruptions during active enhancement measures.

Five of the six representative gravel or LWD augmentation project sites proposed are located in the immediate vicinity of existing recreational trails or facilities. These include the Guadalupe Creek 1-1, Guadalupe River 1-1, Los Gatos 1-1, Los Gatos 2-2, and Stevens Creek 1-1 sites. The Guadalupe Creek 1-1 site is located just downstream of Guadalupe Reservoir adjacent to the Guadalupe Creek Trail that runs parallels to Guadalupe Creek. The Guadalupe River 1-1 site is located within the Guadalupe River watershed along Guadalupe Creek immediately downstream of the confluence of Guadalupe and Alamitos Creeks, where the Guadalupe River Trail runs parallel to Guadalupe River. The Los Gatos 1-1 site is located along Los Gatos Creek immediately downstream of the Camden drop structure, where the Los Gatos Creek Trail runs parallel to the creek. The Los Gatos 2-2 site is located along Los Gatos Creek downstream of the Highway 17 bridge and upstream from the Creekside Way bridge, where the Los Gatos Creek Trail runs parallel to the creek. The Stevens Creek 1-1 site is located within the Stevens Creek watershed along Stevens Creek in Stevens Creek County Park, where the Bay Tree Picnic Area and Stevens Creek Tony Look Trail are located on opposing sides of the creek.

Construction

When enhancement measures are conducted, portions of nearby trails, trail parking areas, or picnic area facilities may have to be temporarily closed for the duration of the activity (from less than a day to up to several weeks, in limited instances) to maximize public safety while they are used as access corridors or staging areas for vehicles, supplies, and equipment.

Depending on the extent of area needed to conduct the measures, such closures could temporarily impede recreational use. However, the closures would be short-term, small in scale, and localized to a specific enhancement site, and would affect only small portions of existing trails or facilities. These disruptions would not result in an increase in use of other existing recreational facilities or trails. Alternative opportunities at the other area trail systems and broader parks provide ample areas for similar recreation opportunities for displaced users. As such, the Proposed Project would not result in an increase in use of other existing recreational trails or facilities that would in turn result in the substantial physical deterioration of the other existing facilities or trails in the study area.

The implementation of Valley Water's BMPs (that is, GEN-36, GEN-37, and GEN-39) would reduce impacts and disruptions related to the construction activities for spawning and rearing habitat enhancement measures in the vicinity of any existing recreation resources at locations on Valley Water land. At non-Valley Water sites, Valley Water cannot guarantee that Valley Water BMPs would be implemented, but the impacts would still not result in increased use that would result in the substantial physical deterioration of the other existing facilities or trails in the study area. The impact to existing neighborhood and regional parks or other recreational facilities from construction activities related to proposed enhancements to spawning and rearing habitat would be less than significant.

Other Non-flow Measures Specific to the Stevens Creek and Guadalupe River Watersheds

The Proposed Project includes the additional non-flow measures specific to each of the Stevens Creek and Guadalupe River watersheds, including the Portable Multiport Outlet and the Geomorphic Function Enhancement Pilot Projects, respectively.

The construction of the Portable Multiport Outlet may result in temporary impacts during construction including, but not limited to, traffic from construction equipment accessing the Project site and closure or limited use of nearby public recreational facilities such as parking areas or trails. Construction impacts in any given location would be temporary. The access to and use of recreational facilities would be restored following the completion of these temporary measures and would not result in a permanent disruption or displaced users that might result in an increase in use of other existing recreational facilities in the study area. The impacts to other parks or recreational facilities during the Portable Multiport Outlet construction would be less than significant.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Portions of nearby trails or trail parking areas may be temporarily closed for the duration of the activity (from less than a day to up to several weeks, in limited instances) to maximize public safety while they are used as access corridors or staging areas for vehicles, supplies, and equipment.

Depending on the extent of area needed to conduct the measures, such closures could temporarily impede recreational use. However, the closures would be short-term, small in scale, and localized to a specific enhancement and restoration site, and would affect only small portions of existing trails or facilities. These disruptions would not result in an increase in use of other existing recreational facilities or trails. Alternative opportunities at the other area trail systems and broader parks provide ample areas for similar recreation opportunities for displaced users. As such, the Proposed Project would not result in an increase in use of other existing recreational trails or facilities that would in turn result in the substantial physical deterioration of the other existing facilities or trails in the study area.

The implementation of Valley Water's BMPs (that is, GEN-36, GEN-37, and GEN-39) would reduce impacts and disruptions related to the construction activities for geomorphic function restoration and enhancement measures at Valley Water sites in the vicinity of any existing recreation resources at locations not on Valley Water land. At non-Valley Water sites, Valley Water cannot guarantee that Valley Water BMPs would be implemented, but the impacts would still not result in increased use that would result in the substantial physical deterioration of the other existing facilities or trails in the study area. The impact to existing neighborhood and regional parks or other recreational facilities from construction activities related to proposed enhancement and restoration to geomorphic functions would be less than significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect recreation. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap and restoration or operational repair of a facility.

Over the long term, the maintenance and monitoring associated with the non-flow measures could affect existing recreational facilities by disrupting access, but these impacts would be short-term in any given location and any disruption would not increase use at other available recreational facilities to a degree that would result in substantial physical deterioration of any recreational facilities or the acceleration of the physical deterioration of those facilities. The access and use of recreational facilities would be restored following the completion of these temporary measures and would not result in a permanent disruption. In addition, the monitoring program indicators could trigger adaptive management actions implemented through subsequent phases.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting performance targets or measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. The impact to existing neighborhood and regional parks or other recreational facilities from maintenance, monitoring, and adaptive management would be less than significant.

Significance Conclusion Summary

The Proposed Project would result in temporary disruptions to existing recreational facilities and trails in the study area, but would not result in increased use of existing recreational facilities in the study area that would cause substantial physical deterioration of any recreational facilities or the acceleration of the physical deterioration of those facilities. Therefore, the impact to recreation would be **less than significant.**

Mitigation

No mitigation would be required for Impact REC-1.

3.6.4.2 Recreation Impacts Summary

Table 3.6-5 summarizes the recreation impacts of the Proposed Project.

Table 3.6-5. Recreation Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
REC-1	Flow Measures	LTS	N/A	LTS	N/A
REC-1	Non-flow Measures	LTS	N/A	LTS	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A = not applicable

3.7 Aquatic Biological Resources

The environmental setting represents the existing conditions of aquatic biological resources in the study area. This setting is also referred to as the current baseline conditions and refers to the 2015 model set. As such, although the current baseline year for the analysis of aquatic biological resources is 2015, more recent data sources are included in the environmental setting where available.

This section describes the study area and associated special-status aquatic biological resources and assesses the impacts of the Proposed Project on these aquatic biological resources compared with the current and future baselines in the study area.

3.7.1 Study Area

The study area in the Stevens Creek watershed is Stevens Creek downstream of Stevens Dam and the Guadalupe River watershed downstream of Almaden Dam, Calero Dam, Guadalupe Dam, and James J. Lenihan Dam in northern Santa Clara County, California (Figure 3.7-1 and Figure 3.7-2).

For the purposes of evaluating fisheries and aquatic habitat, the downstream extents of the study area creeks end at the regions of tidal influence. The tidally influenced areas of the study area creeks generally include downstream reaches of Stevens Creek (approximately midway between Highway 101 and the Crittenden Lane pedestrian bridge) and the Guadalupe River (approximately located at the pedestrian bridge downstream of the Montague Expressway). The tidally influenced reaches represent a gradient from freshwater to brackish to saline tidal marsh vegetation and tidally exposed flats within the channels. The Proposed Project would not substantively affect aquatic habitat conditions in the tidally influenced and estuarine reaches of Stevens Creek and the Guadalupe River (Alviso Slough) because of the dominant influence that tidal conditions have on the habitat in these areas, both historically and under current baseline conditions.

Valley Water recognizes that changes in reservoir flow releases to the upstream reaches of these streams could have some minor effect on flow-dependent habitat availability or salinity conditions in the tidally influenced reaches, depending on the time of year, climatic conditions, tidal influence, and accretions and depletions of flow along the creeks. The study area creeks have the greatest potential to alter aquatic habitat conditions in tidally influenced reaches during relatively high-flow events during the winter and spring because of a combination of reservoir releases and downstream accretions, including urban runoff. However, the Proposed Project is intended to influence controlled reservoir releases only at relatively low flows and would not affect flow rates during flood events, reservoir spill events, or emergency operations. Therefore, the Proposed Project would not substantially affect aquatic habitat conditions in the tidally influenced reaches of the study area. For the reasons described above, the tidally influenced areas of study area creeks are not included in the study area for aquatic resources.

3.7.2 Stevens Creek Watershed Portion of the Study Area

The areas assessed for the Stevens Creek watershed include the portion of Stevens Creek downstream of Stevens Creek Dam, which impounds Stevens Creek Reservoir and upstream of the tidally influenced area, approximately midway between Highway 101 and the Crittenden Lane pedestrian bridge (Figure 3.7-1).

Several small ephemeral and perennial drainages feed into the creek upstream of Stevens Creek Reservoir, which is managed by Valley Water. Heney Creek and diversions from Permanente Creek flow into Stevens Creek downstream of the dam, and Stevens Creek ultimately discharges into San Francisco Bay near the city of Mountain View.

Stevens Creek Reservoir has 3,138 AF of capacity, and Stevens Dam is one of six original systems approved for construction by voters in 1934 and completed in 1935. In addition to Stevens Creek Reservoir and Dam, Valley Water operates the West Pipeline, which can be used to provide imported water to the stream via the Stevens Creek turnout. Stevens Creek does not have any instream diversion facilities.

3.7.3 Guadalupe River Watershed Portion of the Study Area

The areas assessed for the Guadalupe River watershed include the Guadalupe River upstream of the tidally influenced area (approximately located at the pedestrian bridge downstream of the Montague Expressway) and the following major tributaries: Los Gatos Creek, Guadalupe Creek, Alamitos Creek, and Calero Creek downstream of Almaden Dam, Calero Dam, Guadalupe Dam, and James J. Lenihan Dam (Figure 3.7-2). The Guadalupe River ultimately discharges to the San Francisco Bay via Alviso Slough in the community of Alviso, which is part of the city of San José.

The present-day hydrology of the Guadalupe River watershed portion of the study area has been substantially influenced by Valley Water's water supply operations as well as urbanization of the Santa Clara Valley floor. Upper watershed reservoirs capture rainfall runoff during the winter and store the water for use in the dry summer months.

The **Guadalupe River** mainstem begins at the confluence of Guadalupe and Alamitos Creeks approximately 400 feet downstream of Almaden Lake and flows north for 14 miles through heavily urbanized portions of San José before discharging to the San Francisco Bay. In addition to the three major tributaries (Los Gatos, Guadalupe, and Alamitos Creeks), the mainstem also intersects Ross Creek and Canoas Creek, which are trapezoidal channels with earthen and concrete sections throughout that do not provide fish habitat.

Los Gatos Creek, which is the westernmost tributary, begins in the Santa Cruz Mountains. Its waters form Lexington Reservoir and Vasona Reservoir Lake Elsman, a reservoir that is owned by SJWC. Historically, in the late 1800s and early 1900s, the lower part of Los Gatos Creek was a braided stream entering a marsh area at its confluence with the Guadalupe River, but it has been modified over time and is now a defined channel. These channel modifications, which include a series of diversion ditches and off-stream percolation ponds, enhance the creek's ability to protect against floods and function as a water supply facility.

Guadalupe Creek also originates in the Santa Cruz Mountains. Guadalupe Reservoir is located on Guadalupe Creek in a narrow, northwest-trending valley. Water released from the reservoir maintains stream habitat downstream in Guadalupe Creek, as storage allows, to the confluence with Alamitos Creek where they form the Guadalupe River.

Alamitos Creek, which is the easternmost tributary, begins in the Santa Cruz Mountains and crosses the lower-elevation foothills before reaching the Santa Clara Valley floor. Almaden Reservoir is located on Alamitos Creek in the upper watershed. Below Almaden Reservoir Dam, Alamitos Creek joins Guadalupe Creek to form the Guadalupe River.

Calero Creek (also known as Arroyo Calero) is a tributary of Alamitos Creek and supplies water to Calero Reservoir. Downstream of Calero Reservoir, Calero Creek flows northwest to its confluence with Alamitos Creek.

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Figure 3.7-1. Stevens Creek Watershed Points of Interest

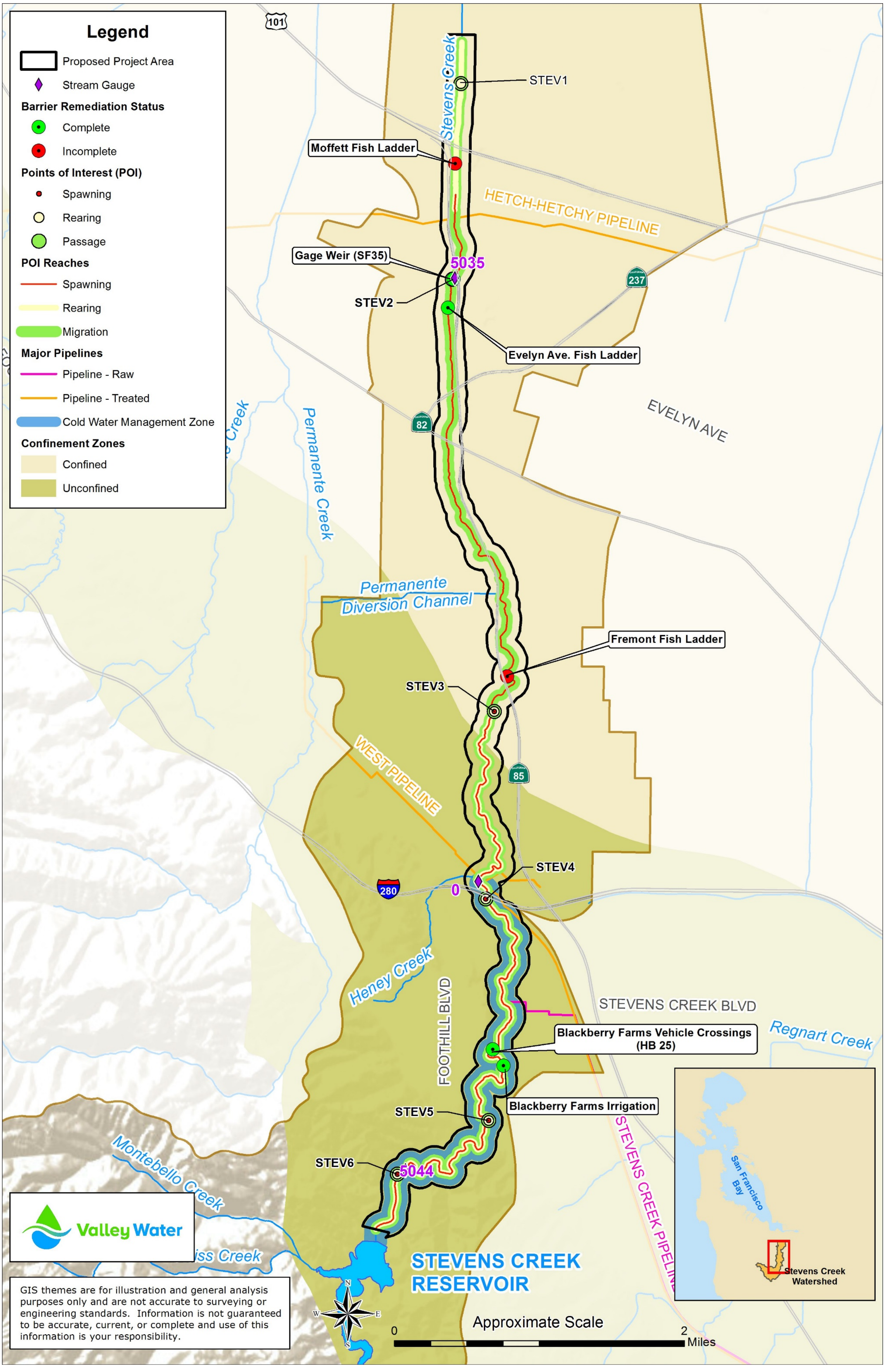
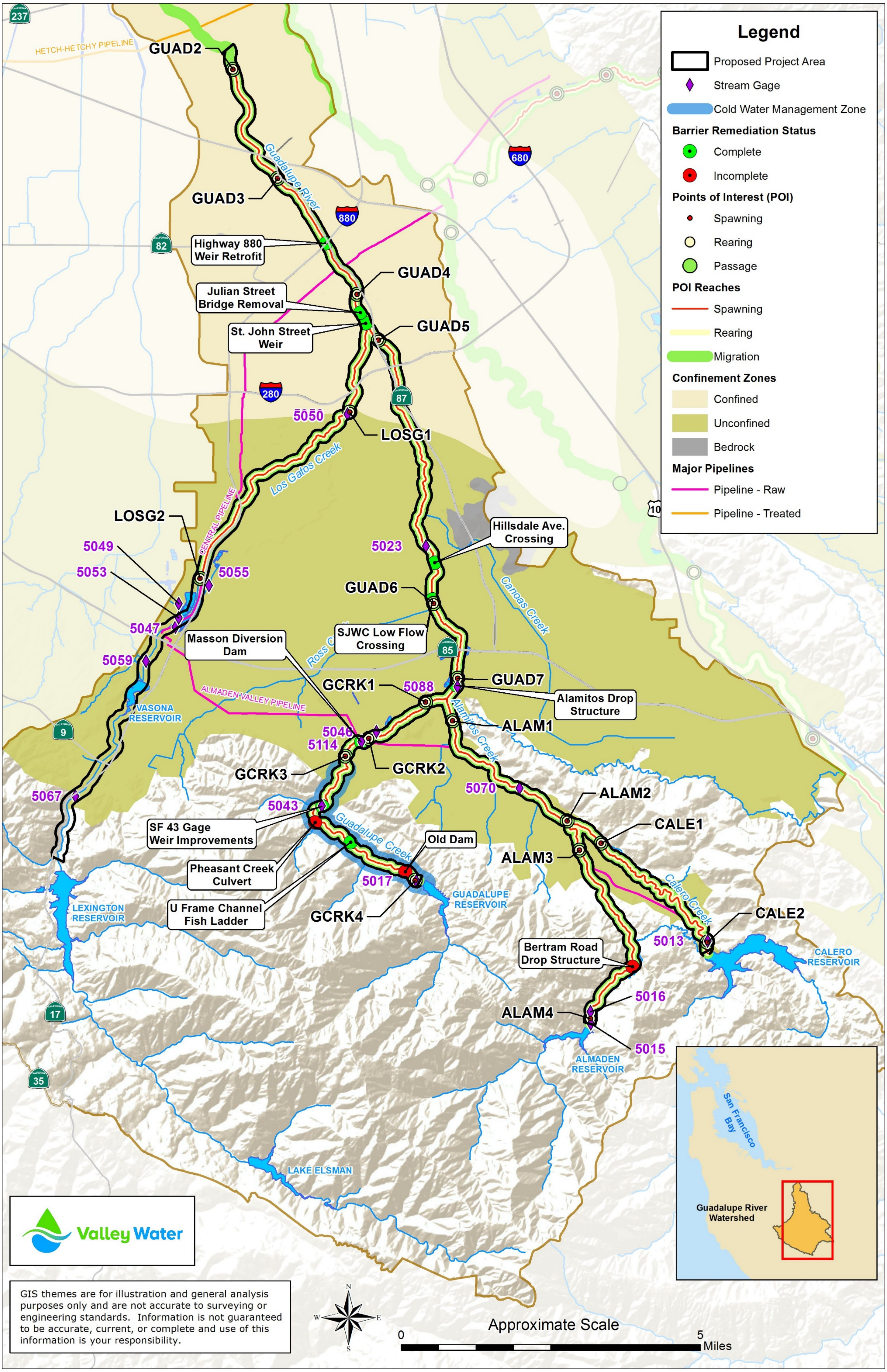


Figure 3.7-2. Guadalupe River Watershed Points of Interest



Almaden Calero Canal connects Almaden and Calero Reservoirs. Water is transferred from Almaden Reservoir to Calero Reservoir during winter when storage in Almaden Reservoir is high enough to facilitate operation of the canal, according to the water rights for this facility.

Points of Interest. The hydrological, hydraulic, and fisheries modeling used POIs within each stream. The POIs are displayed in Figure 3.7-1 and Figure 3.7-2 and detailed further in Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum.*

3.7.4 Environmental Setting

The environmental setting describes the existing conditions of aquatic biological resources in the study area.

3.7.4.1 Fish Species and Related Aquatic Habitat

The analysis for aquatic biological resources in the study area consisted of a review of relevant literature listing fish species observed within the Stevens Creek and Guadalupe River watersheds. Native fish species currently known to reside in the study area are compiled in Attachment K.1 of Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum*.

The assessment of potential impacts and/or benefits of the Proposed Project is an analysis of "candidate, sensitive, or special-status species," as suggested by CEQA Guidelines Appendix G, and of species that may interact with the candidate, sensitive, or special-status species, for which there are sufficient data to support the analysis. Special-status aquatic species with the potential to occur in the study area are summarized in Table 3.7-1. Table 3.7-2 shows the potential seasonal occurrence in the study area, by life stage, for special-status species. In this chapter, the potential impacts of the Proposed Project on special-status species that are known to occur or are likely to occur within the study area, along with impacts to their habitat, are analyzed. In Chapter 4, *Alternatives*, the potential impacts of the alternatives on the same species are analyzed. Special-status species unlikely to occur or that are not present within the study area are not addressed further in this analysis. Assessments for the likelihood of special-status species to occur in the study area are based on known species' ranges, necessary habitat features and preferences for the species, and previous observations within the study area.

Central California Coast Steelhead

Regulatory Status

The CCC steelhead DPS includes naturally spawned populations of steelhead (and their progeny) residing below long-term impassable barriers, both natural and human-made, in locations including, but not limited to, the study area (Stevens Creek, Alamitos Creek, Calero Creek, Guadalupe Creek, and the Guadalupe River mainstem below long-term impassable barriers) (62 Federal Register 159; 71 Federal Register 834). The DPS was federally listed as threatened on August 18, 1997 (62 Federal Register 159).

For ease of communication, "the DPS" is used interchangeably with "steelhead" throughout this EIR. The DPS acronym is used in specific regulatory contexts regarding the CCC steelhead DPS and steelhead is used in the impact analysis and more general discussion regarding steelhead in the study area. The species name abbreviation "*O. mykiss*" is used when referring generally to fish within the species that cannot be differentiated between the resident form (which is not listed) and anadromous form (which is listed and referred to as steelhead or the DPS) (see the *Life History* section below for further explanation).

Table 3.7-1. Potential Special-status Aquatic Species Documented in the Proposed Project Study Area

Common Name Scientific Name	Status Federal/State	Distribution in California	Habitat Association	Likelihood to Occur in the Study Area
Central California Coast steelhead *Oncorhynchus mykiss*	Federally Threatened/—	Coastal California streams from the Russian River, south to Aptos Creek, San Francisco, San Pablo, and Suisun Bays; the drainages of San Francisco, San Pablo, and Suisun Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers; excludes the Sacramento/San Joaquin Delta	Rivers and streams with cold water, clean gravel of appropriate size for spawning, and suitable rearing habitat; typically rear in freshwater for 1 or more years before migrating to the ocean	*Present:* Observed in the study area in both Stevens Creek and Guadalupe River watersheds
Central Valley fall-run Chinook salmon *Oncorhynchus tshawytscha*	—/California SSC	Sacramento River and its tributaries; Sacramento-San Joaquin Delta; San Francisco, San Pablo, and Suisun Bays	Coastal streams and large mainstem rivers; spawns in gravel riffles; juveniles typically rear for a few months before migrating to the ocean	*Present:* Observed in the Guadalupe River watershed
Pacific lamprey *Entosphenus tridentatus*	—/California SSC	Coastal California streams from the Oregon border to Baja; the drainages of San Francisco, San Pablo, and Suisun Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers	Coastal rivers and streams with cold water and clean gravel of appropriate size for spawning; spawns at the upstream edges of riffles in sandy gravel; ammocetes (larvae) typically rear in backwater areas with fine substrate for 5 or more years before migrating to the ocean	*Present:* Observed in the study area in both the Stevens Creek and Guadalupe River watersheds

Common Name Scientific Name	Status Federal/State	Distribution in California	Habitat Association	Likelihood to Occur in the Study Area
Riffle sculpin *Cottus gulosus*	—/California SSC	Central Valley watersheds including the San Joaquin River, Mokelumne River south to the Kawaeah River, Putah Creek and from the American River north to the upper Sacramento and McCloud Rivers; drainages of the San Francisco Bay including Coyote Creek, Guadalupe River, Napa River, Sonoma Creek, Corta Madera Creek, and Green Valley Creek; Salinas and Pajaro Rivers, Russian River, and Redwood Creeks	Headwater rivers and streams with cold water and adequate flow with rock or gravel substrate; adults occupy fairly shallow, fast flowing water with adequate velocity refugia; spawns under rocks in swift riffles or inside cavities in submerged woody debris; all life stages are benthic and do not disperse far from their natal nest	*Present:* Observed in the Guadalupe River watershed in the Guadalupe River and Guadalupe Creek
Sacramento hitch *Lavinia exilicauda*	—/California SSC	Sacramento-San Joaquin, Clear Lake, Russian River, and Pajaro-Salinas drainages; drainages of the San Francisco Bay including Coyote, Alameda, and other creeks draining Santa Clara, Contra Costa, and Alameda Counties; Suisun Creek, and the Sacramento-San Joaquin Delta	Warm, low-elevation sloughs, lakes, low-velocity stretches of rivers, and low-gradient streams; juveniles are typically found in run habitat with abundant cover, while adults are found in deep pools with abundant cover; spawns primarily in riffles of tributary streams to lakes, rivers, and sloughs in clean, fine to medium-sized gravel	*Likely:* The species has not been observed upstream of the Stevens Creek estuary; observed in the Guadalupe River watershed in the lower Guadalupe River downstream of Airport Parkway and in Los Gatos Creek
Eulachon *Thaleichthys pacificus*	Federally Threatened/—	Northeastern Pacific Ocean and coastal streams; northern California (Mad River basin) to southwest and southcentral Alaska; extirpated in the Sacramento River system and farther south in California	Coastal streams and large mainstem rivers thought to have spring freshets	*Unlikely:* The study area does not overlap with the range of the species and the species has not been observed upstream of the Guadalupe River estuary

Table 3.7-2. Potential Seasonal Occurrence in the Study Area by Life Stage for Special-status Species

Life Stage	January	February	March	April	May	June	July	August	September	October	November	December
Steelhead												
Adult Immigration												
Spawning												
Fry Rearing												
Juvenile Rearing												
Smolt Emigration												
Chinook Salmon												
Adult Immigration												
Spawning												
Fry Rearing												
Juvenile Rearing												
Smolt Emigration												
Pacific Lamprey												
Adult Immigration												
Pre-Spawning Holding												
Spawning and Incubation												
Larvae Rearing												
Juvenile Emigration												
Riffle Sculpin												
Spawning												
Fry Rearing												
Juvenile Rearing												
Sacramento Hitch												
Spawning and Incubation												
Juvenile Rearing												

[a] Blue boxes indicate when species life stages are expected to occur in the study area. Yellow boxes show times when species is not expected to occur in the study area.

The final critical habitat designation for the DPS was issued on September 2, 2005 (70 Federal Register 52488), and includes stream reaches in the Santa Clara Hydrologic Unit. Stream reaches designated in the study area are Stevens Creek downstream of Stevens Creek Reservoir and the Guadalupe River downstream of West Hedding Street.

Population Status

Steelhead are known to use most creeks in the study area (Table 3.7-1). The NMFS final *Coastal Multispecies Recovery Plan* categorized the historical Stevens Creek and Guadalupe River watershed steelhead populations as independent populations (NMFS 2016). This “independent” category included both functionally and potentially independent populations. Potentially independent populations have “a high likelihood of persisting over 100-year time scales, but are too strongly influenced by immigration from other populations to exhibit independent [population] dynamics” (Bjorkstedt et al. 2005, p. 16). Functionally independent populations have “a high likelihood of persisting over 100-year time scales” without immigration from other populations (Bjorksted et al. 2005, p. 16). These designations are consistent with McElhany et al.’s (2000) definition of independent “viable salmonid populations.”

Bjorkstedt et al. (2005) concluded that the DPS historically consisted of 37 independent populations and possibly 30 or more dependent populations of winter-run steelhead. These populations were aggregated into five geographically based diversity strata.[6] The Coastal San Francisco Bay diversity stratum includes the Stevens Creek and Guadalupe River watersheds. The Stevens Creek population includes steelhead in Stevens Creek only; the Guadalupe River population includes steelhead in the Guadalupe River and in Los Gatos, Guadalupe, Alamitos, and Calero Creeks (NMFS 2016).

Life History

Table 3.7-2 reflects the potential seasonal occurrence in the study area for steelhead (and other special-status species) according to life stage.

Oncorhynchus mykiss exhibits different life history strategies (NMFS 1998), including anadromy, where juveniles[7] rear in freshwater rivers and creeks, smolts[8] migrate to the ocean where they mature to adults, and adults return to freshwater rivers and creeks to spawn (usually at ages 4 to 5). *Oncorhynchus mykiss* can also exhibit a resident life history, where rearing, maturing, and spawning all occur within freshwater. Steelhead is the term commonly used for the anadromous life histories, while rainbow trout is the term for the freshwater-resident life history. Because they are the same species, in cases where life history is uncertain, the scientific name *O. mykiss* is used.

Steelhead exhibit highly variable life history patterns throughout their range but are broadly categorized into winter and summer reproductive ecotypes. Only winter steelhead are found in the CCC steelhead DPS. Steelhead spawning in California has been reported as early as December and can extend through April, as reflected in Table 3.7-2 (Valley Water et al. 2003; Hallock et al. 1961; Leidy 2007; McEwan and Jackson 1996; Valley Water 2000; Williams 2006); however, migration and

[6] The five strata include North Coastal, Interior, Santa Cruz Mountains, Coastal San Francisco Bay, and Interior San Francisco Bay (Bjorkstedt et al. 2005; Spence et al. 2008).

[7] In this report, juvenile steelhead refers to both young-of-the-year (YOY) and age 1+/2+, unless indicated separately. YOY are age 0+ individuals less than 1 year old that hatched the previous spring or in early summer and are the offspring of adults that spawned the previous winter or early spring. Age 1+/2+ refers to all pre-smolt juveniles 1 year old or older. YOY are likely to be between 3 and 6 months old, and age 1+/2+ are likely between 1.25 and 2.5 years old.

[8] Smolts are juvenile steelhead migrating to the ocean (that is, smolting) that exhibit silver coloration and have no parr marks.

spawning peaks February through March. Adults spawn soon after reaching spawning grounds (Moyle et al. 2008).

Upon emerging from the gravel, fry rear in edgewater habitats and move gradually into pools (a smooth surface and low-velocity, deep water) and riffles (shallow, where water flows over coarse streambed particles and create surface turbulence) as they grow larger. Juvenile steelhead rear for a minimum of 1, and typically 2 or more years, in freshwater before migrating to the ocean during smoltification (the process of physiological change that allows ocean survival) (NMFS 2016). Juvenile steelhead emigration to the ocean in the study area is assumed to occur from February through May (Valley Water 2000; McEwan 2001).

Habitat Requirements

To migrate upstream, adult steelhead require depths greater than 0.5 feet (Thompson 1972; Bell 1991), and velocities less than or equal to 8 feet per second (Thompson 1972; Bell 1991). Thermal migration barriers for adult immigration have frequently been reported for salmonids, including steelhead, when water temperatures reach approximately 70°F (McCullough et al. 2001). Based on a review of various water temperature studies on anadromous salmonids summarized in McCullough et al. (2001), USEPA (2003) found that an overall reduction in migration fitness attributable to cumulative stresses occurred at constant water temperatures greater than 62.6°F to 64.4°F. Telemetry research on summer-run steelhead in the Columbia River basin has identified approximately 19°C (approximately 66°F) as an important behavioral thermal threshold, where adults have been observed to seek out thermal refugia during their upstream migration (Keefer et al. 2009, as cited in Keefer et al. 2018).

Steelhead select spawning sites with gravel substrate and sufficient water velocity to maintain circulation through the gravel, providing a clean, well-oxygenated environment for incubating eggs. The preferred flow velocity for spawning is generally in the range of 1 to 3 feet per second (Raleigh et al. 1984). The preferred gravel substrate for spawning steelhead is in the range of 0.5 to 4 inches in diameter (Bjornn and Reiser 1991; NMFS 2016). In addition to substrate size, the percentage of fine sediment (in terms of cobble embeddedness) is also a primary determinant of spawning and incubation habitat quality. For example, Bjornn and Reiser (1991) present data showing that survival of steelhead (and Chinook salmon) embryos generally begins to decline as the percentage of fine sediment in the redd increases above 25 percent. Additionally, optimal steelhead spawning and embryo incubation water temperatures have been reported to range from 39°F to 52°F (McEwan and Nelson 1991). Based on a review of various water temperature studies on anadromous salmonid embryos summarized in McCullough et al. (2001), USEPA (2003) found that good survival of embryos occurs at constant water temperatures of about 39.2–53.6°F. Based on review of various water temperature studies, including sources identified above, Bratovich et al. (2012) identified an upper optimal water temperature index value of 54°F and an upper tolerable index value of 57°F for steelhead embryo incubation to be applied in an evaluation of the reintroduction of steelhead to the upper Yuba River Watershed.

After they emerge from the gravel, fry inhabit low-velocity areas along the stream margins. As they feed and grow, they gradually move to deeper and faster water. Juvenile salmonids prefer well-shaded pools at least 3.28 feet deep with dense overhead cover, or abundant submerged cover, composed of undercut banks, logs, roots, and other woody debris (NMFS 2016). Cover provides juvenile steelhead with velocity refuge and a means to avoid predation (Shirvell 1990; Meehan and Bjornn 1991). Cover is particularly important in areas where water depths are shallow, such as some stream reaches during summer low-flow conditions. For example, yearling and older *O. mykiss* (less than 4 inches) will reportedly abandon areas that are less than 6 inches deep unless there is abundant cover (Cramer and Ackerman 2009). However, during summer rearing, steelhead tend to use riffles and other habitats not strongly associated with cover (Shapovalov and Taft 1954) and that provide increased prey availability, which can offset increased metabolic demands associated with high water temperatures (Smith and Li 1983). Cover also provides refuge from high flows during the winter and spring, but steelhead in central California streams remain active during the winter, based on high growth rates (Sogard et al. 2009).

Water temperature and food availability are critical factors for rearing juveniles. The reported preferred and tolerable water temperatures for juvenile steelhead can be highly variable, potentially associated with variable acclimation temperatures, local adaptation, and other site-specific conditions. For example, preferred water temperatures for fry and juvenile steelhead across geographic regions have been reported to range from about 45°F to 65°F (Adams et al. 1975; Myrick and Cech 2001; Rich 1987), or less than 55°F (USEPA 2003; McCullough et al. 2001). When additional food is available, juvenile *O. mykiss* and steelhead can also increase feeding to meet increased metabolic demands imposed by above-optimal temperatures, and growth rates can be higher under warmer conditions (Wurtsbaugh and Davis 1977; Hayes et al. 2008). The upper incipient lethal temperature for juvenile rainbow trout is reported to be 75°F to 79°F (Sullivan et al. 2000; McCullough 2001), but juvenile steelhead in Southern California have been observed at 31.5°C (88.7°F) (Sloat and Osterback 2013).

In addition to direct effects of temperature on steelhead metabolic rate, temperature can also influence steelhead indirectly by influencing ecological interactions (for example, competition and predation) and food availability. For example, in some watersheds, warm water temperatures support and provide a competitive advantage for aquatic invasive species such as largemouth bass (*Micropterus salmoides*) (Rahel and Olden 2008). Aquatic invasive species have been documented to prey on juvenile steelhead and compete for habitat and food resources (Carey et al. 2011; Thompson et al. 2012).

Most literature regarding water temperature effects on steelhead smolting suggest that water temperatures less than 52°F are required for successful smoltification to occur (Adams et al. 1975; Myrick and Cech 2001; Rich 1987). However, the Sonoma County Water Agency (2016) identified a value of 59°F for steelhead smoltification in the Russian River (within the CCC steelhead DPS) as resulting in impacts that tend to be less than significant, assuming a short duration of exposure, and outmigration in the study area has been observed during temperatures greater than 52°F (Valley Water unpublished data), suggesting local adaptation of higher thermal tolerance by steelhead in the study area.

It should be noted that the majority of available data used for evaluating temperature tolerance in McCollough et al. (2001) was from steelhead populations in the Pacific Northwest U.S., and since publication, additional studies have provided evidence for population-specific thermal tolerances for steelhead (Myrick and Cech 2001; 2005; Sloat and Osterback 2013; Verhille et al. 2016; Zillig et al. 2021), with populations at the steelhead southern range having higher temperature tolerance compared to more northern populations.

Several habitat characteristics are known to influence *O. mykiss* populations in the study area. Reservoirs in the Guadalupe River system reportedly block sediment transport and access to habitat, and can impair habitat complexity, cover, and effective spawning habitat availability (NMFS 2016). NMFS (2016) also reports water quality as limiting steelhead survival in the Guadalupe River watershed.

Occurrence in the Study Area

Steelhead occur and spawn within the Stevens Creek watershed portion of the study area (FAHCE 2003; Smith 2013, 2020; Abel 2011; Valley Water 2021c). Juvenile *O. mykiss* were captured in surveys conducted downstream of Stevens Creek Reservoir between 2013 and 2020 (Smith 2019; Valley Water 2021c). According to Smith (2020), *O. mykiss* spawning access and population numbers in Stevens Creek were high in 2010, but low in 2014, 2015, and 2016. Steelhead densities in Stevens Creek substantially increased in 2017 and 2019. Steelhead were scarce or absent within downstream reaches of Stevens Creek in 2010, 2014, 2015, 2016, and 2017, but were recorded again after high flows in 2019 (Smith 2020). Sampling conducted by Valley Water in 2020 detected several *O. mykiss* indicated with densities increasing toward the downstream sampling stations, which correspond to STEV4 (Valley Water 2021c). Steelhead captured during the 2020 surveys were likely YOY fish from WY 2020, with the remaining fish likely yearling fish from WY 2019 (Valley Water 2021c).

Steelhead occur and spawn within the Guadalupe River watershed portion of the study area (FAHCE 2003; Leidy 2007; Valley Water 2021b). Surveys in the Guadalupe River and Guadalupe Creek from WYs 2004 through 2013 all consistently reported *O. mykiss* presence (Valley Water and Stillwater Sciences 2013). Repeat surveys between 2015 and 2020 indicate that drought-related conditions may have limited the distribution and abundance of steelhead in the Guadalupe River, with decreased population abundance occurring during periods of drought (Valley Water and Stillwater Sciences 2015, 2016, 2017; Valley Water et al. 2018). Surveys conducted in the Guadalupe River, Guadalupe Creek, Alamitos Creek, Los Gatos Creek, and Calero Creek indicate that juvenile *O. mykiss* are higher in abundance in tributary streams than in the Guadalupe River, with the exception of Los Gatos Creek, where no *O. mykiss* have been detected since 2014 (Hobbs et al. 2014; Valley Water and Stillwater Sciences 2015, 2016, 2017; Valley Water 2019c; Valley Water 2021b). These surveys also indicate that Guadalupe, Alamitos, and Calero Creeks show signs of successful reproduction (Valley Water and Stillwater Sciences 2015, 2016, 2017; Valley Water 2019b, 2020e).

Central Valley Fall-run Chinook Salmon

Regulatory Status

Central Valley fall-run and late fall-run Chinook salmon are considered by NMFS to be the same evolutionarily significant unit (ESU) (64 Federal Register 50394). NMFS determined that listing the Central Valley fall-run Chinook salmon ESU as threatened was not warranted (64 Federal Register 50394), but subsequently classified Central Valley fall-run Chinook salmon as a species of concern because of specific risk factors, including population size and hatchery influence (69 Federal Register 19975). Because the Central Valley fall-run Chinook salmon ESU is not listed as federally endangered or threatened, critical habitat has not been designated for this species. CDFW considers Central Valley fall-run Chinook salmon an SSC and indicates that the species is found within Central Valley rivers and streams, but range maps do not include Santa Clara County (CDFW 2021b).

The study area does not occur within the Central Valley fall-run Chinook salmon ESU boundary or California SSC boundary.

Population Status

The study area is not encompassed by the range of the Central Valley fall-run Chinook salmon. Central Valley fall-run Chinook salmon have been observed in the Guadalupe River watershed within the last 20 years and are native to California and the Sacramento-San Joaquin Province, but historical data suggest that they are not endemic to the Guadalupe or Stevens Creek watersheds and only occur on a transient basis. Specific genetic testing of more than 450 Chinook salmon captured in Santa Clara Valley indicates that the fish are closely related to Central Valley fall-run Chinook salmon, and the presence of fin-clipped hatchery fish with coded wire tags indicates a strong probability of straying (Garcia-Rossi and Hedgecock 2002). Bjorkstedt et al. (2005) suggest that off-site hatchery releases (for example, hatchery releases in San Francisco Bay) have increased straying rates such that Chinook salmon spawning in San Francisco Bay tributaries are heavily affected by, or potentially entirely derived from, Central Valley hatchery stocks. Therefore, no definitive answer can be made on the nativity of Chinook salmon to the Guadalupe River watershed, though it is unlikely that they were historically persistent there, and the current population is of hatchery origins (Valley Water 2018d). Consequently, Chinook salmon populations in the study area are not recognized as reproductively isolated populations. Williams et al. (2011) recommended that populations recently identified in the Napa and Guadalupe Rivers, along with future populations found in basins inclusive of the San Francisco Bay/San Pablo Bay complex that exhibit fall-run timing, should be included in the Central Valley fall-run Chinook salmon ESU. However, the delineation of the Central Valley fall-run Chinook salmon ESU has not been modified (NMFS 2016).

For ease of communication, Central Valley fall-run Chinook salmon are referred to as Chinook salmon, unless they are discussed in a regulatory context specific to the ESU—then they are referred to as Central Valley fall-run Chinook salmon.

Life History

Central Valley fall-run Chinook salmon adult upstream migration has generally been reported to occur between August and December (Valley Water et al. 2003; FAHCE 2003; Leidy 2007; Moyle 2002). However, based on monitoring of adult fall-run Chinook salmon migrating upstream in the Guadalupe River watershed, the adult migration period peaks in October and November but may extend as late as January in the study area (Valley Water 2018e, 2020e).

Literature suggests that Central Valley fall-run Chinook salmon adults spawn from the fall through mid-winter. The FAHCE limiting factors analyses (Valley Water 2000) used a time period for Chinook salmon adult spawning of October through February. Generally, Valley Water expects that Chinook salmon in the study area could spawn from October through December. Laboratory experiments in British Columbia (Beacham and Murray 1989) found that the average incubation duration of Chinook salmon eggs to fry emergence was 77 days at 53.5°F (consistent with water temperatures during winter in the study area), indicating that Chinook salmon embryos that spawned in January would reach the fry emergence stage by the end of March. Therefore, it can be assumed that embryo incubation may extend through March.

Juvenile Chinook salmon rearing is expected to occur from about January through June (Valley Water 2000; Valley Water et al. 2003). Based on juvenile emigration surveys conducted in the Guadalupe River and nearby Coyote Creek (Valley Water unpublished data), fry-sized juveniles (that is, less than 2 inches fork length) may emigrate from January through April. Central Valley fall-run Chinook salmon generally emigrate from Central Valley rivers as YOY (Kimmerer and Brown 2006). Chinook salmon juvenile emigration in the study area is assumed to occur from about February through June, particularly April through June, associated with storm events (Valley Water 2000; Valley Water et al. 2003).

Habitat Requirements

Adult Chinook salmon require flows of adequate depth and velocity to successfully migrate upstream in freshwater river systems. Thermal migration barriers have frequently been reported for adult salmonid upstream migration, including Chinook salmon (McCullough et al. 2001). Based on a review of various water temperature studies on anadromous salmonids summarized in McCullough et al. (2001), USEPA (2003) found that an overall reduction in migration fitness attributable to cumulative stresses occurred at constant water temperatures greater than 62.6°F to 64.4°F. However, recent literature suggests that salmonids in southerly locations, including Chinook salmon, may have thermal physiologies capable of tolerating higher water temperatures compared with more northerly populations that were evaluated to establish temperature tolerances (Zillig et al. 2021).

Chinook salmon depend on suitable substrate and water temperature conditions for successful spawning and embryo incubation. Specifically, spawning Chinook salmon require clean, loose gravel in swift, relatively shallow areas. Because of their larger size, Chinook salmon can spawn in higher water velocities and use coarser substrates than other salmon species (Pacific Fishery Management Council [PFMC] 1999). Spawning Chinook salmon in California's Trinity River reportedly preferred gravel and cobble from 2 to 6 inches in diameter that was less than 40 percent embedded in fine sediment (USFWS 1997). In Clear Creek (a tributary to the Sacramento River), spawning Chinook salmon used substrate sized between about 1 and 6 inches, with a preference for substrate between 1 and 3 inches (Giovanetti and Brown 2013). Raleigh et al. (1984) assumed that particles must be at least 0.5 inch in diameter to permit adequate percolation for successful embryonic development. In general, water temperature-related Chinook salmon embryo survival has been suggested to be optimal at approximately 43–54°F (Myrick and Cech 2004). Based on a review of various water temperature studies on anadromous salmonid embryos summarized in McCullough et al. (2001), USEPA (2003) found that survival is optimized at constant water temperatures of about 39.2–53.6°F. Chinook salmon-specific studies indicate that Chinook salmon egg and alevin survival decreased rapidly when water temperatures exceed approximately 56°F (Seymour 1956; Boles 1988; USFWS 1999).

The percentage of fine sediment (in terms of cobble embeddedness) is a primary determinant of spawning and incubation habitat quality. For example, Bjornn and Reiser (1991) present data showing that the survival of Chinook salmon embryos generally begins to decline as the percentage of fine sediment in the redd increases above 25 percent.

Juvenile Chinook salmon are known to prefer slower water habitats than many other salmonid species (Quinn 2005) and have been reported to actively seek out slow backwaters, pools, or floodplain habitat for rearing (Sommer et al. 2001; Jeffres et al. 2008). However, juvenile Chinook salmon have been reported to show a clear preference for faster water (up to an average of about 1.8 feet per second) as they grow, consistent with trends found with salmonids in other rivers (Bjornn and Reiser 1991). Juvenile Chinook salmon use water depth (deep, low-velocity pools and bank eddies), surface turbulence, instream structures, and substrate as cover, with substrate being a primary source of escape and winter cover (Raleigh et al. 1986).

Water temperature is generally considered to be a key limiting factor for the Central Valley fall-run Chinook salmon juvenile rearing life stage, particularly during late spring. The water temperature reported to allow for maximum growth of juvenile Central Valley fall-run Chinook salmon with maximal rations is 66.2°F (Cech and Myrick 1999). Similar to results reported by Cech and Myrick (1999), Marine (1992) found that maximum growth rates of Sacramento River fall-run Chinook salmon were observed in juveniles reared at 62.6–68.0°F, with lower growth rates for juveniles reared at 69.8–75.2°F. Overall, based on water temperature effects on growth, saltwater adaptation, and predation avoidance, Marine and Cech (2004) found that juvenile Central Valley fall-run Chinook salmon reared at water temperatures of 68°F or greater experienced decreased growth, altered smolt physiology, and increased predation vulnerability compared with juveniles reared at water temperatures considered to be near optimal (55.4–60.8°F).

Occurrence in the Study Area

Chinook salmon have not been documented in Stevens Creek historically or under existing conditions. Chinook salmon have been documented in the Guadalupe River watershed within the Guadalupe River (including estuarine reaches), Guadalupe Creek, Alamitos Creek, Calero Creek, and Los Gatos

Creek (Valley Water unpublished data; Valley Water and Stillwater Sciences 2017) over the past 20 years, although Chinook salmon were not documented in the Guadalupe River watershed until the mid-1980s (Leidy 2007). Valley Water reported fluctuating numbers of spawning Chinook salmon from 1995 through 2018 in the Guadalupe River watershed (Valley Water 2018e). Since 2002, Chinook salmon range has expanded as a result of barrier remediation, so that fish occurrences decreased in the Guadalupe River but increased in upstream tributaries, including Los Gatos, Guadalupe, Calero, and Alamitos Creeks (Valley Water 2018e).

Pacific Lamprey

Regulatory Status

USFWS was petitioned to list Pacific lamprey under the ESA in 2003 (Nawa et al. 2003). USFWS discontinued status review in December 2004 because of inadequate information (USFWS 2004). As a result of the petition, the USFWS recognized the declining status of Pacific lamprey throughout its range and established the “Pacific Lamprey Conservation Initiative” (PLCI) to facilitate conservation of the species (Luzier et al. 2011; Goodman and Reid 2012). Through the PLCI, the USFWS is working to improve the status of the species by proactively engaging in a concerted, collaborative conservation effort to address threats, restore habitat, increase knowledge, and improve distribution and abundance. The PLCI includes the San Francisco Bay Regional Management Unit, which is contained in the study area, and its component Coyote hydrologic unit code (HUC) watershed, which contains reaches in the study area (Goodman and Reid 2017).

The Pacific lamprey is listed by the state of California as an SSC, with a status rating of “Moderate Concern” (Moyle et al. 2015). This rating denotes the species was “considered to be under no immediate threat of extinction” but were in “long-term decline or had naturally small, isolated populations which warrant frequent status re-assessment” (CDFW 2015).

Population Status

Pacific lamprey were historically distributed along the Pacific Rim from Mexico to Japan (Goodman and Reid 2017), including the entire California coast and major inland river systems (Moyle et al. 2009). Limited abundance data indicate that abundance of Pacific lamprey has declined sharply throughout their range, including the San Francisco Bay Regional Management Unit, within the past 50 to 75 years relative to historical levels (Goodman and Reid 2017). Moyle (2009) reports that populations of Pacific lamprey across California are in decline, but there is no immediate threat of extinction in the state. Current distribution of the species is restricted in many river systems because of the presence of large dams or other impassable structures (Moyle et al. 2009; Goodman and Reid 2017). According to USFWS (2019), fish passage is the primary constraint to lamprey distribution in the San Francisco Bay Regional Management Unit.

According to Docker (2010), Pacific lamprey across the west coast of North America do not show major genetic differences between populations. This suggests a lack of natal homing in the species, meaning Pacific lamprey do not necessarily spawn in the stream where they were born (Docker 2010). Because Pacific lamprey are not listed as endangered or threatened, critical habitat has not been designated. The species does not currently have USFWS-designated DPSs.

Life History

Pacific lamprey are anadromous fish with three developmental stages: larvae (ammocoete), juvenile (macrophthalmia), and adult. Larvae reside entirely in freshwater before transforming into juveniles, which migrate to the ocean where they feed parasitically and grow into adults. Adults return to freshwater, where they spawn and die.

Adult Pacific lamprey migrate into freshwater at a length of approximately 20 to 30 inches (Chase 2001). Once adults enter freshwater, they stop feeding and primarily expend energy towards upstream migration and sexual maturation (Johnson et al. 2015).

Freshwater entry typically occurs during winter and spring (Kan 1975; Chase 2001). The adult freshwater residence period can be divided into three distinct stages: (1) initial migration from the ocean to holding areas, (2) pre-spawning holding, and (3) secondary migration to spawning sites (Clemens et al. 2010; Starcevich et al. 2014). The pre-spawning holding stage begins when individuals cease upstream movement, generally in early summer, and continues until fish begin their secondary migration to spawn the following spring (Robinson and Bayer 2005; Starcevich et al. 2014). Pacific lamprey do not necessarily home to natal spawning streams (Moyle et al. 2009; Spice et al. 2012). Instead, migrating adults appear to select spawning streams, at least in part, based on bile acid compounds secreted by ammocoetes that act as migratory pheromones (Robinson et al. 2009; Yun et al. 2011). This mode of selecting spawning streams induces migratory adults to select locations where ammocoete rearing has been successful as a result of suitable habitat and, therefore, has been called the “suitable river strategy” (Waldman et al. 2008).

Spawning typically takes place between March and June, and redds are constructed in gravel and cobble substrates within pool and run (sections without flow obstructions, even stream beds, and water flows faster than pools) tailouts or low-gradient riffles (Brumo et al. 2009; Gunckel et al. 2009). Larvae emerge from spawning gravels about 1 to 2 months after spawning, depending on water temperature, at a size of about 0.3 inch (Meeuwig et al. 2005; Brumo 2006). After hatching, the larvae drift downstream to backwater areas and burrow into fine sediment substrate, feeding on algae and detritus (Torgerson and Close 2004). Depending on growth rate, the larval phase lasts approximately 4 to 8 years, during which time individuals grow to about 6 inches (Dawson et al. 2015). After reaching sufficient size, larval Pacific lamprey transform into juveniles in late summer to fall (Dawson et al. 2015). During this metamorphosis, they develop eyes, a suctoral disc, sharp teeth, more-defined fins, and counter-shaded coloration (with silvery sides) in preparation for migration to the ocean (McGree et al. 2008; Manzon et al. 2015).

While little is known about Pacific lamprey juvenile outmigration timing in the study area, outmigration in other watersheds typically occurs at night in the winter and spring and is associated with high-flow events (Goodman et al. 2015). In the study area, summer and fall flows in the downstream portions of the two watersheds tend to be relatively low with intermittent, dry reaches; therefore, downstream migration likely occurs primarily in the winter and spring when sufficient stream flow is present to facilitate movement.

After juveniles migrate to the ocean, they spend 1 to 3 years in the marine environment, during which time they parasitize a wide variety of ocean fishes, including Pacific salmon, flatfish, rockfish, and pollock (Murauskas et al. 2013).

Habitat Requirements

Pacific lamprey are distributed across the northern margin of the Pacific Ocean, from central Baja California north along the west coast of North America to the Bering Sea in Alaska and off the coast of Japan (Lin et al. 2008; USFWS 2019). They spawn in a wide range of river systems, from short coastal streams to inland tributaries of large rivers (USFWS 2019).

The natural distribution of Pacific lamprey in California includes most streams with anadromous access and suitable spawning and rearing habitats, although they generally do not occupy small coastal drainages (less than approximately 10 square miles), even when suitable habitat is available (Swift and Howard 2009; Goodman and Reid 2012, 2017; Reid and Goodman 2016a). In general, over-summering habitat consists of protected areas associated with large cobble or boulder substrates, bedrock crevices, man-made structures such as bridge abutments, and large wood (Robinson and Bayer 2005; Lampman 2011; Starcevich et al. 2014). Effective spawning habitat consists of gravel and cobble substrates within pool and run tailouts and low-gradient riffles (Stone 2006; Brumo et al. 2009; Gunckel et al. 2009). Pacific lamprey can utilize a wide range of substrate sizes for redd construction, but most spawning occurs in locations with dominant particle sizes ranging from approximately 10 to 100 mm (0.4 to 3.9 inches) (Stone 2006; Gunckel et al. 2009). The principal habitat characteristics required for larvae are perennial water, fine sediments (sands and silts), and suitable water temperatures (generally below 74°F) (Claire 2004; Torgersen and Close 2004; Stone and Barndt 2005).

Unlike salmonids that can swim through or jump over high-velocity barriers, Pacific lamprey are specialized anguilliform swimmers, with high-efficiency but relatively low-speed swimming (Mesa et al. 2003; Reid and Goodman 2016b). Swimming Pacific lamprey are often challenged by structural features (for example, waterfalls, dams, fish ladders) (Goodman and Reid 2017). Often, they travel along the shallow periphery or even out of the water over wetted surfaces of a feature. This allows them to climb substantial waterfalls, beyond the leaping or swimming ability of salmonids; however, simple angular edges or porous surfaces (for example, grates) can block their passage.

Water temperature requirements for larval Pacific lamprey have not been well described. Meeuwig et al. (2005) found a sharp decline in survival and increase in development abnormalities in embryos as incubation temperature increased from 64°F to 71°F. However, lamprey larvae appear to tolerate higher temperatures than embryos (Potter and Beamish 1975). Four lamprey species from eastern North America were found to have incipient lethal water temperatures ranging from 82°F to 87°F after being acclimated at 59°F (Potter and Beamish 1975), but it is uncertain whether Pacific lamprey have a similar tolerance. Larval Pacific lamprey are commonly found in locations with water temperatures greater than 75°F, and there is some evidence that they can behaviorally thermoregulate through burrowing into streambed substrates, which are cooler than ambient water (Claire 2004).

Occurrence in the Study Area

Pacific lamprey have been found in Stevens Creek downstream of Stevens Creek Reservoir, but records of their occurrence are rare, suggesting that Pacific lamprey may be present in the Stevens Creek watershed under existing conditions, but their abundance is inferred to be relatively low compared with the Guadalupe River watershed (Stillwater Sciences 2004). It is assumed that Pacific lamprey have been historically abundant in the San Francisco Bay region, and there are historical records of their presence in the Guadalupe River (Goodman and Reid 2017). Observations over the last 100 years suggest that Pacific lamprey were relatively abundant in the Guadalupe River watershed (Leidy 2007). Pacific lamprey have been documented in the Guadalupe River (including estuarine reaches) and Alamitos Creek over the past couple of decades (Leidy 2007). Pacific lamprey were detected and caught during annual surveys in freshwater reaches of the Guadalupe River from 2004 through 2017 (Valley Water unpublished data). During a 2018 fish salvage effort, seven adults and one larva were captured in Los Gatos Creek (Stillwater Sciences 2018). Migrant trapping in the downstream reaches of the Guadalupe River also suggests that Pacific lamprey were common in downstream reaches in the past (Leidy 2007). Annual surveys for juvenile steelhead have not resulted in detections of lamprey in the Guadalupe River watershed portion of the study area from 2013 to 2020; however, monitoring methods are aimed at detecting *O. mykiss* and may be less effective for lamprey detection. Valley Water detected a presumed lamprey in 2019 at the Alamitos fishway on the Guadalupe River, but the species identification was not conclusive (Valley Water 2020e).

Riffle Sculpin

Regulatory Status

Riffle sculpin are not federally listed but are a California SSC (CDFW 2021b).

Population Status

Riffle sculpin are endemic to California (Moyle 2002). Little is known of the species' population trends, as most fish surveys conducted in California do not identify sculpin to species level; however, Leidy (2007) and Moyle (2002) indicate that riffle sculpin were more widely distributed in California in the past and have been extirpated from San Mateo Creek (CDFW 2015; Leidy 2007). Most populations of riffle sculpin are geographically isolated from other populations, which make them vulnerable to local extinctions (CDFW 2015). Additionally, because of their physiology, the species is vulnerable to habitat changes that result in reduced flows or increased instream temperatures (CDFW 2015).

Riffle sculpin in the San Francisco Bay region are found in Coyote Creek, the Guadalupe River watershed, the Napa River, Sonoma Creek, Corte Madera Creek, and Green Valley Creek (Leidy 2007). In these systems, riffle sculpin are typically restricted to the upper or middle reaches in headwater tributaries.

Life History

The age and growth structures of riffle sculpin are not well understood and are based primarily on length-frequency distributions (Moyle 2002). Riffle sculpin can grow up to 6 inches; however, most adults are typically 2–3 inches long (CDFW 2015). Adults are thought to mature at the end of their second year, with spawning occurring from February through March (Moyle 2002). Spawning occurs under rocks in swift riffles or inside cavities in submerged logs (CDFW 2015). Males choose spawning locations and remain in the nest to guard embryos until they hatch (CDFW 2015). A female can lay between 400 and 1,000 eggs with embryos typically hatching within 11–24 days later at water temperatures ranging from 59°F to 75°F (Moyle 2002). Fry are benthic and do not move far after emerging from their nests. Juvenile and adults are poor dispersers and generally stay close to where their natal nests were located (CDFW 2015).

Riffle sculpin are opportunistic feeders and feed mostly at night. They prey primarily on benthic macroinvertebrates, mainly the larvae of caddisflies, stoneflies, and mayflies, but also eat amphipods and small fish (Moyle 2002).

Habitat Requirements

Riffle sculpin are found exclusively in permanent headwater streams with rocky or gravel substrates. They prefer cold, well-oxygenated streams with DO levels near saturation, which restricts their occurrences to areas with ample flowing water (CDFW 2015). Riffle sculpin are most abundant in streams with water temperatures that do not exceed 77°F to 79°F while temperatures above 86°F are typically lethal (Moyle 2002).

They occupy riffles and pools but prefer areas that have adequate cover in the form of rocks, gravel, woody debris, or undercut banks (CDFW 2015). Riffle sculpin also require suitable habitat for benthic macroinvertebrates, their primary prey source (CDFW 2015). Riffle sculpin are typically found in headwater streams and upper watersheds and generally utilize the same headwater and upper watershed habitats as steelhead and Pacific lamprey (Leidy 2007).

Occurrence in the Study Area

Riffle sculpin have been documented in the Guadalupe watershed within the past 20 years. Sampling conducted by Valley Water from 2004 to 2020 resulted in observations of riffle sculpin in Guadalupe Creek in all years, and one individual was captured in the Guadalupe River in 2018 (Valley Water unpublished data 2004–2017; Valley Water 2019c, 2020b, 2021b). Riffle sculpin in Guadalupe Creek are found predominantly in the upstream reaches and generally decline downstream of Camden Avenue (GCRK3) (Smith 2013; Valley Water 2019c, 2020b, 2021b). Sampling conducted by Valley Water from 2018 to 2020 has resulted in no detections of riffle sculpin in Alamitos, Calero, or Los Gatos Creeks (Valley Water 2019c, and 2020b).

Sacramento Hitch

Regulatory Status

Sacramento hitch are not federally listed but are a California SSC (CDFW 2021b).

Population Status

Sacramento hitch are endemic to California (Leidy 2007) and occur historically in the region. Little documentation is available on the abundance and distribution of Sacramento hitch, although it is believed that population numbers are decreasing (CDFW 2015). The species is fragmented into isolated populations because of major dams and agriculture (CDFW 2015). The decline is also attributed to loss of spawning flows in the spring, loss of summer rearing and holding habitat, pollution, and predation by nonnative fishes (Moyle 2002).

Sacramento hitch in the San Francisco estuary region tend to exhibit narrow geographic distribution, but high abundance in the areas they do occupy (Leidy 2007). Sacramento hitch likely reside in fewer than 15 watersheds in the San Francisco estuary region (Leidy 2007), including the Guadalupe River watershed. Sacramento hitch can survive in impaired habitats, as evidenced by their ability to persist in urban streams (CDFW 2015).

Life History

Sacramento hitch are cyprinids that can grow up to 14 inches, with females growing faster and larger than males, although there are notable differences in body size and proportions throughout populations (Moyle 2002). Growth rates appear to be related directly to summer temperatures and the productivity of their environments, with hitch growing faster in warmer and more productive environments (Moyle 2002). Sacramento hitch can reach up to 6 inches at the end of their first year (Moyle 2002). Females generally mature in their second or third year, and males in their first, second, or third year (Moyle 2002). They are omnivores, and in streams can feed on filamentous algae as well as aquatic and terrestrial insects (Moyle 2002). They feed in open water, and juvenile Sacramento hitch (2–3 inches in length) will feed on drift at the heads of pools in the summer (Moyle 2002). Sacramento hitch primarily feed, and are most active, during the day (Moyle 2002).

Sacramento hitch can spawn as early as February and as late as July (Table 3.7-2). Spawning is known to occur in riffles of streams after increased flows resulting from spring rains (Moyle 2002). Sacramento hitch require clean, fine to medium gravel for spawning, and water temperatures of 57°F to 79°F (Moyle 2002). Sacramento hitch spawn in groups, with one to five males following each female (Moyle 2002). Spawning movements typically involve chasing, rapid swimming, and splashing (Kimsey 1960). Often, pairs or groups of fish move to shallow water to spawn, exposing their backs and pressing their bodies closely together (Kimsey 1960). Sacramento hitch can also spawn in ponds and reservoirs and are known to hybridize with Sacramento blackfish and California roach (Moyle 2002).

Female Sacramento hitch have been known to contain more than 26,000 eggs, but larger numbers are likely possible in the correct conditions (Moyle 2002). Males fertilize the eggs immediately after release, and the fertilized eggs then sink into the gravel below (Moyle 2002). The eggs absorb water and swell considerably, about four times their original size, which lodges them into the gravel (Moyle 2002). Hatching occurs 3 to 7 days later at temperatures of 59–72°F, with larvae free-swimming in 3 to 4 days (Moyle 2002). Young Sacramento hitch spend about 2 months in shallow water or near aquatic plant beds before moving to open water when they are around 2 inches in length (Moyle 2002). Juvenile rearing can occur year-round (Table 3.7-2). Much is still unknown of Sacramento hitch spawning and life cycle characteristics (Moyle 2002).

Habitat Requirements

Sacramento hitch prefer warm, lowland waters, but are also known to be abundant in cool, clear streams (Moyle 2002). They can reside in clear streams, turbid sloughs, lakes, and reservoirs (CDFW 2015). In streams, smaller fish are often associated with beds of aquatic or emergent vegetation that are utilized as cover, and larger fish reside in deep pools with overhanding trees (Moyle 2002). Juvenile (2–3 inches) Sacramento hitch have also been seen schooling at pool edges, and adults have been observed in undercut banks bordering pools (Leidy 2007). Sacramento hitch are known to prefer stream habitat that includes riffles and shallow waters with smaller gravel (CDFW 2015). Sacramento hitch are also associated with unshaded pools with low water clarity and silt or sand substrates, where they can occur in high densities (Leidy 2007). They are known to use flooded marshes as cover for their young (Moyle 2002). Like nonnative fishes in the San Francisco estuary region, Sacramento hitch tend to utilize middle to lower reaches of large streams (Leidy 2007).

Sacramento hitch have the highest temperature tolerance of any native fish in the Central Valley, with juvenile fish able to acclimate to temperatures around 86°F in the lab (Moyle 2002). However, adults tend to select temperatures of 80–84°F and are most abundant in water temperatures cooler than 77°F during the summer (Moyle 2002). Sacramento hitch can also survive in brackish water, with reports of Sacramento hitch being found in salinities as high as nine parts per thousand (Moyle 2002).

Occurrence in the Study Area

There are several historical records of Sacramento hitch within the Stevens Creek estuary from the late 1970s and early 1980s, but no documentation upstream of the estuary (Leidy 2007). No hitch were detected in the Stevens Creek watershed during surveys conducted by Smith (2019) from 2015 to 2019.[9] Also, Valley Water (2021c) conducted electrofishing surveys in six locations downstream of the dam from 2013 to 2020 and no hitch were detected. Therefore, the species has not been documented upstream of the estuary and is considered absent from the Stevens Creek watershed portion of the study area.

Sacramento hitch have been documented in the Guadalupe River portion of the study area within the past 20 years (Leidy 2007). Sacramento hitch were first documented in the lower reaches of the Guadalupe River (downstream of the Norman Mineta Airport) in 1986 (Smith 2013). Electrofishing surveys conducted by Valley Water from 2004 to 2020 resulted in no detections of hitch in the Guadalupe River or Guadalupe Creek upstream of Airport Parkway (Valley Water unpublished data 2004–2017; Valley Water 2019c, 2020b, 2021b). Sampling conducted by Valley Water from 2018 to 2020 has resulted in no detections of hitch in Alamitos, Calero, or Los Gatos Creek (Valley Water 2019c, 2020b, 2021b). However, during a 2018 fish salvage effort, seven Sacramento hitch were observed and captured in Los Gatos Creek (Stillwater Sciences 2018). Therefore, hitch are

[9] June 2015; July 2015 and 2016; August 2013; September 2014; October 2013, 2016, 2017, 2018, and 2019; and November 2014 and 2015

considered potentially present in Los Gatos Creek and the Guadalupe River mainstem downstream of the Norman Mineta Airport.

3.7.4.2 Physical Habitat Descriptions

Stevens Creek Watershed and Study Area

Stevens Creek Reservoir was constructed in 1935 and was raised an additional 10 feet in 1985 to increase the reservoir capacity to 3,128 AF of water. Reservoir releases and changes in seasonal precipitation cause variations in flow within Stevens Creek. There are two reaches that contain perennial flows: one downstream of the reservoir and another downstream of Middlefield Road. There is also a dry-back zone during spring and fall between Fremont Avenue and Middlefield Road (Smith 2020). Stillwater Sciences (2004) reported that the reaches just downstream of the reservoir that are wet year-round have the highest habitat complexity. Stevens Creek watershed above the reservoir is mostly undeveloped forest and rangeland, while much of the watershed downstream of Stevens Creek Reservoir is dominated by high-density residential neighborhoods, including the cities of Cupertino, Sunnyvale, and Mountain View. Stevens Creek is bounded by a sinuous channel in the upstream reaches (STEV6 to STEV4), contains dense vegetation growing on well-established alluvial floodplains, and consists of dark algae-covered grains embedded in clay-rich substrate (Stillwater Sciences 2004). Beginning at STEV4, the channel becomes constricted, narrow, and straight, with locations containing higher incisions, bank failure, and greater bed mobility (Stillwater Sciences 2004). Smith (2020) reported high amounts of alluvial sediment below the reservoir and before STEV4 between 2013 to 2020. Those same years, there was high turbidity recorded at sampled locations upstream and downstream of the reservoir before STEV4. These sediments and turbidity levels have resulted in a fairly silty streambed (Smith 2020). In the upstream reaches above the reservoir, debris jams resulting from flattened vegetation are present (Stillwater Sciences 2004). From 2013 through 2020, the mean water temperature was 70°F immediately downstream of Stevens Creek Reservoir by September (Smith 2020). The reach from the reservoir to STEV3 had a mean water temperature of 64.4 to 68°F by September, with temperatures typically declining after July (Smith 2020). Steelhead spawning gravel has been observed in one perennial reach, occurring in the first 2 miles downstream of the dam (Stillwater Sciences 2004). Stevens Creek contains several partial barriers that can impede fish migration (Smith 2020). Passage barriers include fish ladders between STEV3 and STEV1, at Moffett Boulevard and along Highway 85 downstream Fremont Avenue, and a potential barrier at a partial weir/logjam directly downstream of STEV4 (Smith 2020). Stevens Creek Reservoir is considered impaired because of mercury in fish (Valley Water 2020d).

A CWMZ is identified in the Proposed Project in upstream Stevens Creek between STEV4 and STEV6 (Figure 3.7-1), which is downstream from the Stevens Creek Dam to I-280. The CWMZ was designated in the Settlement Agreement (Valley Water et al. 2003). The purpose of the CWMZ is to provide habitat with suitable temperatures for growth year-round, and especially during summer and fall months when water temperatures are the highest. However, the duration and magnitude of cold-water releases is highly dependent on water storage in Stevens Reservoir.

See Section 2.2.1 and Section 3.2.1 for more information on the Stevens Creek watershed.

Guadalupe River Watershed Portion of the Study Area

As with Stevens Creek watershed, reservoir releases from several reservoirs and changes in seasonal precipitation cause variations in flow within the Guadalupe River watershed portion of the study area. In the Guadalupe River watershed, Vasona, Guadalupe, Calero, and Almaden Reservoirs were built in 1935. Lexington Reservoir was constructed in the 1950s, increasing storage in the Los Gatos Creek system (Smith 2013) (Figure 3.7-2). Much of the watershed lies in urbanized areas, and an estimated 6,500 tons of mercury have entered the local streams as a result of historic mining in the area that continued until the 1970s.

Guadalupe River

The Guadalupe River mainstem is perennial in most WYs (Smith 2013) with dry back conditions observed during droughts. Valley Water conducts steelhead rearing surveys annually that document fish species and habitat observed in sampled reaches of the Guadalupe River watershed portion of the study area. While these surveys are not comprehensive of the entire study area, they still provide valuable information regarding the types of habitats observed in the field in each of the reaches. During 2020, survey teams observed dense riparian corridors, pools, riffles, and runs in the lower reaches of the Guadalupe River mainstem downstream of GUAD5. Survey teams also observed gravel, cobble, and boulder substrates in the most downstream reaches of the Guadalupe River mainstem downstream of GUAD5 (Valley Water 2021b). A segment directly upstream of GUAD5 contains a channel bottom of cellular concrete mattress with natural substrate deposits (Valley Water 2021b). Stretches from GUAD5 to GUAD6 consisted of runs, pools, riffles, and glides (little turbulence and faster velocity than pools) (Valley Water 2021b). The primary substrate observed from GUAD5 to GUAD6 was silt, boulders, cobbles (Valley Water 2021b). The survey teams observed variable complexity throughout the Guadalupe River mainstem reaches, such as emergent or overhanging vegetation, boulders or artificial structures, and LWD (Valley Water 2021b). Surveys conducted in 2019 and 2020 reported a large homeless encampment and high anthropogenic disturbances including trash and debris directly upstream of GUAD5 (Valley Water 2020e, 2021b). Mercury levels in the Guadalupe River are considered high because of a history of mercury mining in the region, and no fish caught at those locations can be consumed (Office of Environmental Health Hazard Assessment [OEHHA] 2020).

Los Gatos Creek

Most of Los Gatos Creek is located within developed urban or residential locations. Surveys conducted in 2019 and 2020 reported human disturbances including homeless encampments and debris at sites downstream of LOSG2 (Valley Water 2020e, 2021b). The majority of the creek contains high habitat complexity, including undercut banks, LWD, and submerged roots (Valley Water 2020e). The downstream reach of Los Gatos Creek, near the confluence with Guadalupe River, was historically altered from a braided stream entering a marsh to a defined channel. Los Gatos Creek contains stream habitats of glides, runs, riffles, and pools (Valley Water 2020e). Substrate consists of cobble and sand in the reaches downstream of LOSG1 and cobble, gravel, and boulders between LOSG2 and LOSG1 (Valley Water 2020e). One reach upstream of LOSG2 within Los Gatos Creek was the location of the Valley Water Stream Maintenance Los Gatos Creek Instream Habitat Complexity Project, which installed LWD and augmented gravel. This reach also contains riffles, runs, and glides, as well as a cobble and gravel substrate (Valley Water 2020e). Vasona Dam lies below Vasona Reservoir on Los Gatos Creek, and a high-drop structure on Los Gatos Creek near Camden Avenue currently obstructs fish passage upstream of the drop to Vasona Reservoir (Smith 2013).

Guadalupe Creek

Constructed in 1935, Guadalupe Reservoir impounds the channel of Guadalupe Creek. The primary purpose for storing winter rainfall runoff is downstream groundwater recharge through controlled releases from Guadalupe Dam. Streamflow in Guadalupe Creek from Guadalupe Reservoir that does not recharge groundwater eventually flows into the Guadalupe River. Releases from Guadalupe Reservoir and water discharged from the Almaden Valley Pipeline typically maintain the 1.65 miles of perennial stream habitat of Guadalupe Creek down to the confluence with the Guadalupe River (Appendix A, *Draft Fish Habitat Restoration Plan*). Guadalupe Reservoir is impounded by Guadalupe

Dam, which is located near GCRK4. As part of the Downtown Guadalupe Flood Protection Project, an extensive geomorphic and riparian restoration completed in 2002 took place in the reaches downstream of GCRK2 on Guadalupe Creek. Reaches downstream of GCRK2 sampled by Valley Water on Guadalupe Creek contain gravel and cobble substrates, pools, riffles, and runs (Valley Water 2020e). In between GCRK2 and GCRK3, a small impoundment known as Masson Dam diverts water from Guadalupe Creek. Upstream of Masson Dam, the substrate is made up primarily of gravel and cobble, aside from some boulders in upstream stretches (Valley Water 2020e). The reach upstream of Masson Dam (near GCRK3) contain a variety of habitat types, including riffles, runs without obstructions, glides, pools, and cascades (Valley Water 2020e). The majority of Guadalupe Creek contains emergent vegetation or is surrounded by overhanging vegetation (Valley Water 2020e). Stream complexity varies throughout the creek and it contains few artificial structures, minimal woody debris and roots, and boulders and undercut banks in the upstream reaches (Valley Water 2020e).

Masson Diversion Dam is located on Guadalupe Creek, approximately one-half mile northeast of the intersection of Camden Avenue and Hicks Road in San José. The dam is a concrete sill that holds a removable wooden flashboard during water diversion operations, creating a barrier to upstream and downstream movement of anadromous fish. In 2000, a concrete fish ladder and steel fish screen were constructed, enabling both upstream and downstream fish passage around the dam.

A barrier to upstream and downstream movement of anadromous fish was also found adjacent to Hicks Road upstream of the Pheasant Road intersection in San José. The barrier was a 4-foot jump height and flat concrete channel bottom at the concrete-lined structure. In 2008, Valley Water constructed a step-pool fish ladder within the concrete channel (that is, concrete u-frame channel fish ladder). The jump height was reduced to less than 6-inches, enabling easier upstream and downstream fish passage (Smith 2013) (Appendix A, *Draft Fish Habitat Restoration Plan*). Surveys conducted in 2019 reported human disturbances including a homeless encampment near GCRK1 (Valley Water 2020e). Mercury levels in Guadalupe Reservoir and Guadalupe Creek are considered high because of a history of mercury mining in the region, and no fish caught at those locations can be consumed (OEHHA 2020).

A CWMZ was designated in the FAHCE Settlement Agreement (Valley Water et al. 2003) on Guadalupe Creek from the outlet of Guadalupe Reservoir downstream to approximately the creek's intersection with Camden Avenue in the Montevideo neighborhood of South San José, California (Figure 3.7-2). The purpose of the Guadalupe Creek CWMZ is to support steelhead juvenile rearing by maintaining a suitable water temperature for growth year (that is, not to exceed 18°C) throughout as much of the CWMZ as the available cold water supply in the reservoir will allow between May 1 and October 31, when stream temperatures are highest.

Alamitos Creek

Alamitos Creek, within the Guadalupe River watershed, is situated primarily in urban, residential areas (Valley Water 2020e). Alamitos Creek contains Almaden Dam, which sits below Almaden Reservoir near ALAM4. Coyote Alamitos Canal, a stormwater canal designed to funnel runoff from the Santa Teresa Foothills to Lake Almaden, runs from Almaden Lake County Park to Coyote Creek Parkway (City of San José 2007). Alamitos Lake is downstream of ALAM1, near the confluence of Guadalupe Creek, the Guadalupe River, and Alamitos Creek (Figure 3.7-2). Calero Creek flows into Alamitos Creek near ALAM2. The reach near ALAM3 is the location of the Valley Water SMP's Alamitos Creek Instream Habitat Complexity Project (Valley Water 2021b). Mercury levels in Almaden Reservoir, Almaden Lake, and Alamitos Creek are considered high because of a history of gold mining in the region, and no fish caught from those locations can be consumed (OEHHA 2020).

Alamitos Creek includes emergent vegetation, is surrounded by overhanging vegetation, and contains boulders, root structures, woody debris, undercut banks, and artificial structures (Valley Water 2020e). Reaches of Alamitos Creek downstream of ALAM2 contain riffles, pools, and runs (Valley Water 2020e). The reaches upstream of the Calero Creek confluence contain riffles, runs, and pools, cascades, glides, and step-runs (a series of runs, separated by short riffles) (Valley Water 2020e). Substrate throughout the creek generally consists of cobble, gravel, boulders, and silt (Valley Water 2020e).

Calero Creek

From Calero Reservoir, Calero Creek flows for approximately 4 miles to the confluence with Alamitos Creek. The majority of Calero Creek contains riffles, pools, and runs (Valley Water 2020e). According to Smith (2013), substrate is generally silty in Calero Creek, but there are records of gravel, cobble, and sandy substrates (Valley Water 2020e). Calero Creek is surrounded by urban residential and agricultural land uses (Valley Water 2020e). The creek contains emergent vegetation and is surrounded by overhanging vegetation, and contains undercut banks, boulders, emergent roots, and woody debris (Valley Water 2020e). Calero Dam is a fish passage barrier, limiting movement to the upstream portion of Calero Creek, though habitat upstream of the dam does not support adequate conditions for steelhead (Smith 2013). Mercury levels in Calero Reservoir and Calero Creek are considered high because of a history of mercury mining in the region, and no fish caught at those locations can be consumed (OEHHA 2020).

See Section 2.2.2, Section 3.2.1, and the following subsections for more information about the Guadalupe River, Los Gatos Creek, Guadalupe Creek, Alamitos Creek, and Calero Creek.

3.7.5 Regulatory Setting

This section summarizes the federal and state laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to aquatic biological resources.

3.7.5.1 Federal

Federal Endangered Species Act (16 U.S. Code 35)

The ESA requires that both USFWS and NMFS maintain lists of endangered and threatened species. An "endangered species" is defined as "… any species which is in danger of extinction throughout all or a significant portion of its range." A "threatened species" is defined as "… any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (16 USC 1532). The CCC steelhead DPS was listed as a threatened species under the ESA on August 18, 1997 (62 Federal Register 43937).

Under the ESA, species listed as endangered or threatened are afforded protection primarily though prohibitions of Section 9 and the requirements of Section 7. ESA Section 9 prohibits the take of endangered species and prohibits the violation of any protective regulation established for a threatened species under Section 4(d) of the ESA (16 USC 1538). The ESA defines "take" to mean harass, harm, pursue, hunt, shoot, wound, trap, capture, or collect, or attempt to engage in any such conduct. For threatened species, the ESA does not automatically prohibit take, but instead authorizes the Secretaries to adopt regulations deemed necessary for species conservation [ESA Section 4(d)]. Such Section 4(d) regulations may include the take prohibitions of ESA Section 9. Under the current Section 4(d) rule for listed salmon and steelhead applicable to the threatened CCC steelhead (50 CFR 223.203), NMFS prohibits take, but may authorize take associated with otherwise lawful activities under ESA Section 7 or Section 10(a).

ESA Section 7 states that all federal agencies must ensure that their actions do not jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat. Consultation under Section 7 can be initiated only by federal agency project-related activities and may result in an incidental take statement that authorizes activities that may result in take, but would not jeopardize the continued existence of a listed species or adversely modify critical habitat. Section 10 (a)(1)(B) allows issuance of permits for take that is incidental to otherwise lawful project-related activities completed as part of non-federal projects.

If a project-related activity would result in the take of a federally listed species, one of the following is generally required: (1) an Incidental Take Permit issued as part of an approved HCP under Section 10(a) of the ESA; or (2) an Incidental Take Statement issued pursuant to federal interagency consultation under Section 7 of the ESA. In addition, scientific monitoring, research, and enhancement activities that may result in take may receive a scientific research and/or enhancement permit under ESA Section 10(a)(1)(A). Valley Water currently holds an ESA Section 10(a)(1)(A) permit for research and recovery that covers incidental take of steelhead during monitoring activities.

For the Proposed Project, it is anticipated that ESA incidental take authorization would not be required for flow measures because proposed flow measures are not predicted or expected to result in take of steelhead, as documented in Section 3.7.7. Incidental take authorization may be required for construction-related impacts of individual non-flow measures in the future when Valley Water proposes specific projects for implementation, depending on the anticipated effectiveness of BMPs and VHP conditions and particularly the need, if any, to implement fish rescue to facilitate construction work. If required, Valley Water would seek take authorization based on the BMPs and VHP construction conditions set forth in this EIR. Incidental take that may occur during AMP monitoring would be covered by a Section 10(a)(1)(A) permit.

Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265, as amended by Public Law 109-479)

The Magnuson Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act (Public Law 104 to 297), requires that all federal agencies consult with NMFS on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect essential fish habitat (EFH). EFH is identified for anadromous Pacific salmon stocks managed by the PFMC under the Pacific Coast Salmon Fishery Management Plan. These managed salmon include most of the Chinook salmon stocks from Washington, Oregon, Idaho, and California. The geographic extent of freshwater EFH is specifically identified in the Pacific Coast Salmon Fishery Management Plan as all waterbodies currently or historically occupied by PFMC-managed salmon in Washington, Oregon, Idaho, and California.

Freshwater EFH is described using fourth field HUCs developed by the U.S. Geological Survey (defined in U.S. Geological Survey and U.S. Department of Agriculture, Natural Resources Conservation Service: Federal guidelines, Requirements, and Procedures for the National Watershed Boundary Dataset: U.S. Geological Survey Techniques and Methods 11-A3, 2009). Both the Stevens Creek and Guadalupe River watersheds are included in HUC 18050003 (PFMC 2014). No Habitat Areas of Particular Concern or EFH Protected from Fishing for Chinook salmon are identified within HUC 18050003 (https://www.habitat.noaa.gov/application/efhmapper/index.html).

Central Valley fall-run Chinook salmon are reported to use the Guadalupe River watershed for spawning and rearing (Bjorkstedt et al. 2005; Leidy 2007). Chinook salmon are not known to occur in Stevens Creek (Leidy 2007). California coast winter steelhead are reported to use the Stevens Creek watershed (Bjorkstedt et al. 2005; Leidy 2007); however, EFH is not designated for steelhead by the PFMC.

Fish and Wildlife Coordination Act (16 U.S. Code 651 et seq.)

The Fish and Wildlife Coordination Act gives the U.S. Secretary of the Interior the authority to provide assistance to federal, state, public, or private agencies in developing, protecting, rearing, or stocking all wildlife, wildlife resources, and their habitats (16 USC 661). Under the Fish and Wildlife Coordination Act, whenever waters of any stream or other waterbody are proposed to be impounded, diverted, or otherwise modified by any public or private agency under federal permit, that agency must consult with the USFWS (16 USC 661–667e, March 10, 1934, as amended 1946, 1958, 1978, and 1995). The USFWS then coordinates with NMFS (if the activity affects waterbodies that might support federally listed anadromous or marine fishes) and CDFW.

Clean Water Act

See Section 3.5, *Water Quality,* regarding Sections 401 and 404 of the CWA.

Coastal Multispecies Final Recovery Plan (ESA, as amended, 16 U.S. Code 1531 et seq.)

ESA Section 4(f)(1) requires NMFS and USFWS to develop and implement recovery plans for the conservation and survival of listed endangered and threatened species. A recovery plan has no legal effect, and its implementation is voluntary.

In 2016, NMFS developed a final Coastal Multispecies Recovery Plan (Recovery Plan) for three salmon and steelhead species: the California Coastal Chinook salmon ESU and the Northern California and CCC steelhead DPS. For each species, individual populations were classified as functionally independent, potentially independent, or dependent populations, and the populations were grouped into Diversity Strata, which are geographically distinct areas with similar environmental conditions. Within the Coastal San Francisco Bay diversity stratum: (1) the Stevens Creek population of CCC steelhead is classified as an independent population, with a spawner abundance target of 900 adults; and (2) the Guadalupe River population of CCC steelhead is classified as an independent population, with a spawner abundance target of 1,800 adults (NMFS 2016).

Threats and stressor analyses in the Recovery Plan suggest that all life stages of CCC steelhead are limited by impaired conditions within Stevens Creek and the Guadalupe River watershed. To prevent the extinction of CCC steelhead and shift their trajectory toward recovery, the Recovery Plan (NMFS 2016) indicates that the following conditions be met: clean water, sufficient stream flows, absence of barriers to migration, suitable habitats, and limited harvest.

3.7.5.2 State

California Endangered Species Act (Fish and Game Code Sections 2050 to 2089)

The CESA establishes various requirements and protections regarding species listed as threatened or endangered under state law. There are no state listed aquatic biological resources in the study area, but Central Valley fall-run Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin are considered species of special concern. See Section 3.8, *Terrestrial Biological Resources,* for a discussion of these laws with respect to state listed terrestrial species in the study area.

Water Quality Control Plan for the San Francisco Bay Basin

The San Francisco Bay RWQCB has developed, has adopted, keeps updated, and implements the Basin Plan for the San Francisco Bay Basin (Region 2).

The Basin Plan establishes beneficial uses constitute regulatory water quality standards that apply to surface waterbodies, which must be attained to reach the objectives of the federal CWA and the Porter Cologne Water Quality Control Act. Related to fisheries, existing beneficial uses designated for

Stevens Creek and the Guadalupe River include cold freshwater habitat, warm freshwater habitat, fish migration, preservation of rare and endangered species, and fish spawning (SWRCB 2020).

The other waterbodies in the study area have similar but not exactly the same beneficial uses, as shown in the Table 3.7-3.

Table 3.7-3. Beneficial Uses in the Study Area and Associated Reservoirs

Waterbody	Cold Freshwater Habitat	Fish Migration	Preservation of Rare and Endangered Species	Fish Spawning	Warm Freshwater Habitat
Stevens Creek	X	X	X	X	X
Stevens Reservoir	X	X	X	X	X
Guadalupe River	X	X	X	X	X
Los Gatos Creek	X	P	X	P	X
Vasona Reservoir	X	N/A	N/A	X	X
Lexington Reservoir	X	N/A	N/A	X	X
Guadalupe Creek	X	X	X	X	X
Guadalupe Reservoir	X	N/A	N/A	X	X
Alamitos Creek	X	X	X	X	X
Arroyo Calero	X	X	X	X	X
Calero Reservoir	N/A	N/A	N/A	X	X
Almaden Reservoir	X	N/A	X	X	X

Notes: X = existing beneficial use, P = potential beneficial use, N/A = not applicable

For additional information about the Basin Plan, see Section 3.5, *Water Quality*.

California Fish and Game Code Section 1600 et seq. – Lake and Streambed Alteration Program

CDFW regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to Fish and Game Code Sections 1600–1607. Any action that substantially diverts or obstructs the natural flow or changes the bed, channel, or bank of any river, stream, or lake, or uses material from a streambed, must be previously authorized by CDFW in an LSAA under Section 1601 (public projects) or Section 1603 (projects proposed by nonpublic entities) of the Fish and Game Code. As a general rule, this requirement applies to diversions or such work done within the annual high-water mark of a wash, stream, or lake that contains or once contained fish and wildlife, or that supports riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is dependent upon the value of those waterways to fish and wildlife.

Valley Water has obtained LSAAs, as required, for stream diversions within the study area. As needed, Valley Water would obtain an LSAA for construction activities associated with implementation of the non-flow measures being evaluated in this EIR.

California Fish and Game Code Sections 5901 and 5937

Section 5901 of the California Fish and Game Code states that it is unlawful to construct or maintain any device in a stream that prevents, impedes, or tends to impede the passing of fish upstream and downstream. Fish and Game Code Section 5937 requires dam owners to allow sufficient water to pass to keep in any fish existing below the dam in good condition.

California Aquatic Invasive Species Management Plan

The California Aquatic Invasive Species Management Plan proposes management actions for addressing aquatic invasive species threats to the state of California (CDFG 2008). It focuses on the nonnative algae, crabs, clams, fish, plants, and other species that continue to invade California's creeks, wetlands, rivers, bays, and coastal waters (CDFG 2008). Valley Water BMPs have been established to avoid and minimize the transport and introduction of invasive species. Valley Water would be incorporating appropriate BMPs in the Proposed Project related to invasive species management.

3.7.5.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies the other regional and local regulations relevant to aquatic biological resources.

Safe, Clean Water and Natural Flood Protection Program (Measure B, the Safe, Clean Water and Natural Flood Protection Program)

As noted in Section 3.2.2.3, this Valley Water program is designed with five priorities, including the following: (1) ensure a safe, reliable water supply; (2) reduce toxins, hazards, and contaminants; (3) protect the water supply from earthquakes and natural disasters; (4) restore wildlife habitat and provide open space; and (5) provide flood protection. Valley Water prepares an annual report providing a progress update for each of these program priorities, along with FY accomplishments.

Water Resources Protection Ordinance of The Santa Clara Valley Water District (as amended by Ordinance 081)

The Water Resources Protection Ordinance (as amended by Ordinance 081) was adopted by the District Board to help implement the Guidelines and Standards for Land Use near Streams (Santa Clara Valley Water Resources Protection Collaborative 2006). The ordinance is intended to protect the water resources managed by the District and provides a set of model guidelines and standards for land use along stream corridors, and it regulates access to and use of the District's facilities and easements. The ordinance specifies the project review and permitting process for projects located within 50 feet of a creek or waterway or within 50 feet of a District-owned property or easement. The *Water Resources Protection Manual* provides guidance for complying with the ordinance.

Valley Water Stream Maintenance Program

Under the SMP, work occurs annually to improve the environment, reduce the risk of flooding, and keep communities safe. Work under the SMP can improve fish habitat. See the description in Section 3.2.2.3.

Santa Clara County General Plan

As first introduced in Section 3.2.2, the *Resource Conservation Element of the Santa Clara County General Plan* (1994) includes the following conservation and management strategies:

Reduce Non-Point Source Pollution

Restore Wetlands, Riparian Areas, and Other Habitats That Improve Bay Water Quality

Prepare and Implement Comprehensive Watershed Management Plans

Improve Current Knowledge and Awareness of Habitats and Natural Areas

Protect the Biological Integrity of Critical Habitat Areas

City of Mountain View General Plan

As first introduced in Section 3.2.2, the Mountain View 2030 *General Plan* (2012) includes the following goal and policies related to aquatic biological resources:

Goal INC-16 Rich and biologically diverse ecological resources which are protected and enhanced.

Policy INC 16.3 Habitat – Protect and enhance nesting, foraging, and other habitat for special-status species and other wildlife.

Policy INC 16.4 Invasive species – Contain and reduce the amount of invasive species.

City of Cupertino General Plan: Community Vision 2015–2040

As first introduced in Section 3.2.2, the City of Cupertino 2040 *General Plan* (2014) includes the following policies relevant to aquatic biological resources:

Policy ES-7.3 Ensure that surface and groundwater quality impacts are reduced through development review and voluntary efforts.

Policy ES-7.8 Retain and restore creek beds, riparian corridors, watercourses and associated vegetation in their natural state to protect wildlife habitat and recreation potential and assist in groundwater percolation.

Town of Los Gatos General Plan

As first introduced in Section 3.2.2, the Town of Los Gatos 2020 *General Plan* (2010) identifies the following goal and policies to protect aquatic biological resources:

Policy ENV-3.4 Require setbacks or other protective measures as appropriate to protect riparian corridors.

City of Campbell General Plan

As first introduced in Section 3.3.2, the City of Campbell *General Plan* (2001) includes the following goal and policy related to aquatic biological resources:

Goal CNR-3 Protect and maintain animal and plant species and supporting habitats within Campbell.

City of San José 2040 General Plan

As first introduced in Section 3.2.2, the City of San José 2040 *General Plan* (2011) includes the following policies relevant to aquatic biological resources:

Policy ER-2.1 Ensure that new public and private development adjacent to riparian corridors in San José are consistent with the provisions of the City's Riparian Corridor Policy Study and any adopted Santa Clara Valley HCP/natural community conservation plan (NCCP).

Policy ER-2.2 Ensure that a 100-foot setback from riparian habitat is the standard to be achieved in all but a limited number of instances, only where no significant environmental impacts would occur.

Policy ER-2.4 When disturbances to riparian corridors cannot be avoided, implement appropriate measures to restore, and/or mitigate damage and allow for fish passage during construction.

Policy ER-2.5 Restore riparian habitat through native plant restoration and removal of nonnative/invasive plants along riparian corridors and adjacent areas.

Policy ER-4.1 Preserve and restore, to the greatest extent feasible, habitat areas that support special-status species. Avoid development in such habitats unless no feasible alternatives exist and mitigation is provided of equivalent value.

City of Santa Clara General Plan (Chapter 5.10.4)

As first introduced in Section 3.2.2, the City of Santa Clara 2010 to 2035 *General Plan* (2010), Chapter 5, *Goals and Policies*, Environmental Quality element, identifies several goals and policies related to the Proposed Project and riparian areas along the Guadalupe River, which defines the City's northeast boundary:

Goal 5.10.1 G1 The protection of fish, wildlife, and their habitats.

Goal 5.10.1 G2 Conservation and restoration of riparian vegetation and habitat.

Policy 5.10.1 P1 Require environmental review prior to approval of any development with the potential to degrade the habitat of any threatened or endangered species.

Policy 5.10.1 P2 Work with Santa Clara Valley Water District and require that new development follow the "Guidelines and Standards for Lands near Streams" to protect stream and riparian habitats.

3.7.6 Methodology

The analysis of impacts to aquatic biological resources considered the impacts of both flow measures and non-flow measures to aquatic resources and included quantitative and qualitative methods. The current and future baseline conditions for flow and non-flow measures are described in Section 3.1.2.

3.7.6.1 Flow Measures Impact Analysis Methodology

The flow measures are intended to improve aquatic habitat conditions in the watersheds. These flow measures are intended to work with the non-flow measures to improve current aquatic habitat conditions once fully implemented. Hydrologic, hydraulic, water temperature, and fisheries modeling was performed to provide a quantitative basis from which to assess the impacts of the flow measures on fish species and aquatic habitats. Specifically, the modeling analyses represent operational conditions that would occur as a result of the Proposed Project and FAHCE-plus Alternative, which are compared with modeled data that represent operational conditions that occur under the current baseline conditions and the future baseline conditions (Appendix M, *Water Supply Technical Memorandum*).

This impact analysis evaluates these re-operation rule curves at a project level, using data from the hydrologic and hydraulic modeling completed in conjunction with the development of the FHRP specific to targeted fish species for both the existing conditions and future conditions baselines.

Existing operation of each reservoir is governed by rule curves developed to achieve specific purposes (for example, water supply, flood control and environmental flows) for that reservoir. The reservoir re-operation rule curves were developed to add operational criteria that benefit steelhead and salmon by providing winter base flows, pulse flows, and summer base flows to support each life stage, as well as providing a framework for ramping flows and reservoir operations under low-flow conditions.

In general, the winter operational period runs from November 1 to April 30 and the summer operational period runs from May 1 to October 31 for all streams with a reservoir, with slight variations in the naming of these operational periods based on the purpose of the releases made during these periods. The winter operational period contains both Winter Base Flow Operations and any applicable pulse flow operations. The Stevens Creek operational periods are defined slightly differently for this analysis than in the FAHCE Settlement Agreement to better characterize the potential changes in habitat availability from flow variations. Stevens Creek winter operations are evaluated from January 1 to April 30 (here, “Winter Base Flow Operations (excluding Fall Flows)”), and Stevens Creek summer operations are evaluated from May 1 to December 31 (here, “Summer Cold Water Program and Fall Flows”) since Stevens Creek winter flow operations from November 1 to December 31 are similar to those defined for the summer operations. Table 3.7-3 summarizes the reservoir operational periods used in this analysis. Note that although operational periods are defined for tributaries within the Guadalupe River portion of the study area, there are no operational periods defined for the Guadalupe River since there is no reservoir with a release rule-curve in the Guadalupe River itself.

More details on reservoir operations in the context of aquatic biological resource impacts assessments are provided in Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum*.

Application of the FAHCE Water Evaluation and Planning Model

The FAHCE WEAP model uses professionally accepted methods to evaluate changes in the Stevens Creek and the Guadalupe River portions of the study area and conduct flow-based aquatic analyses of the Proposed Project and FAHCE-plus Alternative compared to current and future baseline conditions.

In this analysis, the following parameters were analyzed over a 20-year analysis period (1991–2010) to assess the effects of the Proposed Project and FAHCE-plus Alternative on aquatic biological resources:

- Habitat (square feet) − represented by the daily Habitat Availability Index (HAI) for steelhead and Chinook salmon effective spawning, fry rearing, and juvenile rearing, as calculated by the FAHCE WEAP Model. HAI evaluates the composite suitability of depth, velocity, water temperature, and stream substrate for effective spawning, and depth, velocity, water temperature, and cover for fry and juvenile rearing.
- Adult upstream passage and juvenile downstream passage (days) for steelhead and Chinook salmon, as calculated by the FAHCE WEAP Model.
- Wetted area (square feet or acres), as calculated by the FAHCE WEAP Model.
- Water discharge (that is, flow; cfs), as calculated by the FAHCE WEAP Model.
- Water depth (feet), as calculated by the FAHCE WEAP Model.
- Water temperature as the 7-day moving mean weekly average temperature (MWAT; °F), calculated from daily average temperatures output by the FAHCE WEAP Model.

While the FAHCE WEAP Model estimated conditions from 1990 to 2010 (that is, a 21-year modeling period), model initial conditions would influence the results during the beginning of 1990 (that is, the model spin-up period) and introduce uncertainties that do not represent the impact of the reservoir operations on watershed conditions. The influence of model initial conditions would become negligible as precipitation during winter and spring 1990 became more significantly influential on model results. A consistent number of years needs to be used when calculating daily statistics to avoid biasing the statistics during part of the year, so the analysis presented here calculated the statistics using model results from 1991 to 2010 (that is, the 20-year analysis period) to characterize watershed conditions most accurately considering reservoir operations scenarios independent of model initial conditions. In addition to calculating statistics for the individual baselines and the Proposed Project model scenarios over a 20-year period, the absolute differences and relative percent change between the baselines and respective Proposed Project model scenarios were calculated.

Variations in the above-listed hydrological and biological parameters at each POI within each tributary from 1991 to 2010 were summarized by calculating the maximum, average, and minimum for each day of the calendar year.[10] Overall averages across the entire lifestage, as well as during the relevant summer and winter operational periods (described below for each watershed), were calculated for habitat during each lifestage (that is, effective spawning, fry rearing, and juvenile rearing). While the averages across entire lifestages or operational periods quantified the general trends across the time period, these averages frequently resulted in very low habitat areas when there were long periods of zero habitat (for example, effective spawning) and they should not be used to quantify the habitat area on individual days during the averaging period. Annual average upstream and downstream passages during the relevant period of occurrence (Table 3.7-2) were also calculated for each stream. Subsequently, the difference (annual average change) for each relevant parameter and statistic (maximum, average, minimum) resulting from the Proposed Project or FAHCE-plus Alternative, compared with the current and future baselines, was calculated for each POI. The overall average differences across all POIs across the entire life-stage, as well as during the relevant summer and winter operational periods (described below for each watershed), were also calculated. The overall average differences across life-stages and operational periods also frequently resulted in very low habitat areas when there were long periods of zero habitat (for example, effective spawning), so they should not be used to quantify the habitat area on individual days during the averaging period.

The modeled habitat and wetted area reported for each POI represent the habitat or wetted area for the stream reach between that POI and the nearest downstream POI (for example, a habitat estimate at POI 6 in a stream would represent all habitat between POI 6 and POI 5). Alternatively, modeled water depth and water temperature characterize the conditions at the specific POI point and do not represent conditions along a reach of the stream.

Individual POIs were generally grouped for comparisons based on similarities in known physical habitat, presence and timing of species, and life stage within reaches of the watershed, as well as based on operational and management considerations. For example, POIs in Stevens Creek are grouped as upstream and downstream because the upstream area is within a CWMZ and contains more suitable habitat compared to the downstream reaches. STEV4, STEV5, and STEV6 are within the CWMZ, although STEV4 is at the downstream extent (Figure 3.7-1), so habitat model outputs for STEV5 and STEV6 are relevant to analyses of habitat and passage conditions in the Stevens Creek CWMZ. Within the Guadalupe River portion of the study area, locations were grouped and discussed by tributaries (for example, Los Gatos, Guadalupe, and Alamitos Creeks) or the mainstem Guadalupe River. In Guadalupe Creek, GCRK4 is at the upstream extent of the CWMZ and GCRK3 is at the downstream extent (Figure 3.7-2); therefore, habitat model outputs for GCRK4 are relevant to analyses of habitat and passage conditions in the Guadalupe Creek CWMZ.

[10] The parameter variations were also calculated over a WY basis instead of a calendar year basis, but differences in analysis results were negligible. As such, only the parameter variations over a calendar year basis are presented in this analysis.

For the purposes of this analysis, habitat model results from Guadalupe River POIs GUAD1 and GUAD2 were excluded since the modeled water temperature necessary to correctly estimate the habitat availability was not available.

Fish Habitat and Migration Conditions

Where FAHCE WEAP modeled HAI and passage were available (that is, for steelhead and Chinook salmon), the differences in the modeled daily life-stage habitat availability and daily upstream and downstream passage between the Proposed Project or the FAHCE-plus Alternative and the current and future baselines were calculated to quantitatively evaluate how conditions for steelhead and Chinook salmon would change. Differences were calculated as the Proposed Project or FAHCE-plus Alternative minus the applicable baseline, such that a positive difference indicates an increase in habitat or passage and a negative difference indicates a decrease under the Proposed Project or FAHCE-plus Alternative. The statistics used to analyze variations in habitat and passage are summarized in Section 3.1.4.

To evaluate impacts of the Proposed Project or FAHCE-plus Alternative on steelhead and Chinook salmon habitat and passage, the absolute and proportional changes were both assessed to ensure a biologically meaningful analysis. For example, a large proportional change in habitat may not be biologically meaningful if the absolute amount of habitat is very small. Generally, relatively small differences in either the absolute or proportional changes in habitat or passage were considered negligible since they would be within the range of the model uncertainty.

Habitat and passage methods are detailed further in the subsections below.

Habitat Availability Index

Differences were calculated only during the applicable lifestage during the operational periods. For example, the difference in the fry-rearing steelhead habitat during Winter Base Flow Operations only considered the March 1 to April 30 portion of the fry-rearing life stage. Daily habitat differences were calculated for each life stage at each POI, and these were summed across all POI for a stream group (for example, the Guadalupe River) to determine the total daily habitat differences across this stream group. In figures, the daily habitat difference is presented as the absolute daily maximum, daily average, and absolute daily minimum across the entire 20-year analysis period (1991 to 2010) to characterize the potential range of variation between the Proposed Project or the FAHCE-plus Alternative and the current and future baselines. Additionally, the total number of days adult steelhead and Chinook salmon passage occurred throughout the 20-year analysis period was calculated by summing the days with suitable conditions from 1991 to 2010.

Daily habitat availability was not modeled for Pacific lamprey, Sacramento hitch, or riffle sculpin in the Stevens Creek or the Guadalupe River portion of the study area because these three species were not the focal species of the Settlement Agreement (Valley Water et al. 2003) and therefore were not included during model development. Please see the *Wetted Area and Water Temperature Model Outputs* section immediately below for details of the analyses for these species.

Wetted Area and Water Temperature Model Outputs

When the FAHCE WEAP Model was not able to estimate the daily habitat availability at a POI for effective spawning, fry rearing, and/or juvenile rearing, the effects of the Proposed Project on these habitat types were evaluated using a combination of the FAHCE WEAP Model wetted area and water temperature results. This was the case for all the Pacific lamprey, Sacramento hitch, and riffle sculpin results, as well as for Calero Creek, and results for specific POIs in other streams. Daily maximum, average, and minimum values for wetted area and water temperature were calculated for each day of the year (that is, January 1 to December 31) from the 1991 to 2010 FAHCE WEAP Model results under the current and future baselines and the corresponding Proposed Project scenarios. Additionally, the difference between the wetted area and water temperature for the respective baseline and Proposed Project model scenarios were calculated for each day in the 20-year analysis period, and then the daily maximum, average, and minimum values for the difference between the flow, wetted area, and water temperature were estimated for each day of the year.

In addition to wetted area and temperature, modeled HAI for steelhead was considered when life cycles and habitat preference overlap between species. For example, Pacific lamprey, riffle sculpin, Sacramento hitch, and steelhead overlap in timing of spawning and rearing and share some habitat preference during spawning (for example, they prefer gravel substrate with flowing, cool water) and temperature tolerances. Additionally, Pacific lamprey and steelhead overlap in timing of migration. Habitat preferences can vary during rearing (see Section 3.7.4 for additional details on habitat preferences), and temperature tolerances can also vary between species and life stage. Sacramento hitch can occupy more diverse habitat and can tolerate warmer temperatures (up to 86°F) compared with steelhead.

Passage

The average number of days per year when stream conditions were suitable at individual POIs for adult steelhead and Chinook salmon passage during the modeling period was estimated from the FAHCE WEAP Model predicted daily upstream adult passage suitability. Additionally, the total number of days when adult steelhead and Chinook salmon passage could occur throughout the 20-year analysis period was calculated by summing the days with suitable passage conditions from 1991 to 2010.

The average number of days per year when stream conditions were suitable for juvenile downstream steelhead and Chinook salmon passage from the upstream-most POI in the stream to the downstream-most POI to reach the San Francisco Bay was estimated from the FAHCE WEAP Model predicted daily downstream juvenile passage suitability. Additionally, the total number of days when juvenile steelhead and Chinook salmon passage could occur throughout the 20-year analysis period was calculated by summing the days with suitable passage conditions from 1991 to 2010. The number of passage events per year was estimated from the number of days with suitable juvenile downstream passage conditions estimated by the FAHCE WEAP Model. A passage event occurred when there were suitable juvenile downstream passage conditions from the upstream-most POI in the stream to the downstream-most POI to reach San Francisco Bay for a consecutive number of days listed in the *Fisheries Habitat Estimation Methodology Technical Memorandum* (Valley Water 2021c). When the consecutive number of days for juvenile downstream passage to occur was a fraction of a day based on the juvenile downstream migration rates, the number of days required for a passage event was always rounded up (for example, 3.1 days would become 4 days).

The number of days when the thalweg water depth was suitable for downstream juvenile steelhead passage was calculated for each stream during the 20-year analysis period to evaluate the influence of juvenile steelhead water temperature criteria on the FAHCE WEAP Model predicted daily downstream juvenile passage suitability. The number of days with suitable downstream juvenile steelhead passage without water temperature criteria was calculated for a stream by comparing the FAHCE WEAP Model predicted thalweg depth with the minimum juvenile steelhead water depth criteria listed in the *Fisheries Habitat Estimation Methodology Technical Memorandum* (Valley Water 2021c). A day was classified as having suitable downstream juvenile steelhead passage when the FAHCE WEAP Model predicted thalweg depth was greater than 0.4 feet from the upstream-most POI to the downstream-most POI for that stream. For example, a day was classified as having suitable downstream steelhead passage in Guadalupe Creek when the thalweg water depth was greater than 0.4 feet in all the POI in Guadalupe Creek (that is, GCRK1 to GCRK4) and the Guadalupe River (that is, GUAD1 to GUAD7), since juvenile steelhead in the upstream reaches of Guadalupe Creek (that is, GCRK4) would have to migrate past all these POIs to reach San Francisco Bay. The daily downstream juvenile steelhead passage suitability was calculated in each stream for each day during the downstream juvenile steelhead migration period in the 20-year analysis period.

Additionally, the number of downstream juvenile steelhead passage events per year without water temperature criteria was estimated using the number of days with suitable downstream juvenile steelhead passage without water temperature criteria. A juvenile downstream steelhead passage event occurred when there were suitable juvenile downstream passage conditions without water temperature criteria from the upstream-most POI in the stream to the downstream-most POI to reach San Francisco Bay for the consecutive number of days listed in the *Fisheries Habitat Estimation Methodology Technical Memorandum* (Valley Water 2021c). When the consecutive number of days for juvenile downstream steelhead passage to occur was a fraction of a day based on the juvenile downstream steelhead migration rates, the number of days required for a juvenile downstream steelhead passage event was always rounded up (for example, 3.1 days would become 4 days).

Downstream-migrating juvenile Chinook salmon can tolerate higher water temperatures than downstream-migrating juvenile steelhead, so the juvenile Chinook salmon water temperature criteria in the FAHCE WEAP Model (that is, 65°F) would not have frequently limited downstream juvenile Chinook salmon passage in the Stevens Creek or the Guadalupe River portions of the study area (Williams 2010). The number of days when the thalweg water depth was suitable for downstream juvenile Chinook salmon passage was calculated and compared to the analysis of both thalweg water depth and temperature together. There was very little difference between the two analyses. The effect of the Proposed Project on downstream juvenile Chinook salmon passage suitability was evaluated primarily using the FAHCE WEAP Model predicted daily downstream juvenile passage suitability results that considered both thalweg depth and water temperature.

Given that there was no FAHCE WEAP Model passage output available for Pacific lamprey, but that thalweg depth was available, the number of days when the thalweg water depth was suitable for downstream juvenile Pacific lamprey passage and adult upstream Pacific lamprey passage was calculated for each stream during the 20-year analysis period to evaluate FAHCE WEAP Model predicted daily downstream juvenile passage suitability. The number of days with suitable downstream juvenile Pacific lamprey passage and adult upstream Pacific lamprey passage was calculated for a stream by comparing the FAHCE WEAP Model predicted thalweg depth with the minimum relevant Pacific lamprey water depth criteria (Lamprey Technical Working Group 2020) across the relevant period (Table 3.7-2). A day was classified as having suitable passage when the FAHCE WEAP Model predicted thalweg depth was greater than 1 inch from the upstream-most POI to the downstream-most POI for that stream. The daily downstream juvenile Pacific lamprey passage and daily adult upstream Pacific lamprey passage suitability was calculated in each stream for each day during the relevant migration time periods (Table 3.7-2) in the 20-year analysis period. Additionally, because the minimum depth requirement for adult Pacific lamprey upstream passage (1 inch; Lamprey TWG 2020) is less than for adult steelhead (0.7 feet), the FAHCE WEAP Model passage suitability results were also used to support the analyses of Pacific lamprey passage.

To evaluate impacts of the Proposed Project or FAHCE-plus Alternative on steelhead and Chinook salmon habitat and passage, the absolute and proportional changes were both assessed to ensure a biologically meaningful analysis. For example, a large proportional change in habitat may not be biologically meaningful if the absolute amount of habitat is very small. Generally, relatively small differences in either the absolute or proportional changes in habitat or passage were considered negligible since they would be within the range of the model uncertainty.

Hydrology and Hydraulics

As described above, for each of the Proposed Project and FAHCE-plus Alternative, the modeled differences in wetted area and water depth from the current and future baselines were calculated to quantitatively evaluate how conditions for steelhead, Chinook salmon, Pacific lamprey, and Sacramento hitch would change.

Water Temperature

Water temperature was calculated as the 7-day moving MWAT (°F) from daily average temperatures output by the FAHCE WEAP Model. As described above, for each of the Proposed Project and FAHCE-plus Alternative, the difference in MWAT from the current and future baselines was calculated to quantitatively evaluate how conditions for steelhead, Chinook salmon, Pacific lamprey, and Sacramento hitch would change. The daily MWAT statistics are the maximum, average, or minimum MWAT value for an individual day in the 20-year analysis period (1991–2010). The MWAT exceedance probability also was calculated from the daily 1991 to 2010 MWAT to estimate the frequency at which water temperature thresholds would be exceeded.

Climate Change

The region's hydrology is projected to experience an increase of year-to-year variability between wet years and dry years attributable to climate change. In an environment that already sees a significant trend in the variability of annual precipitation (Figure 3.1-2), according to *California's Fourth Climate Change Assessment* from the Governor's Office of Planning and Research (2019), these trends or cycles of wet and dry periods are projected to become very wet and very dry periods, being further exacerbated by climate change. In addition to the increased annual variability in precipitation events, individual storm events are projected to increase in intensity as well. Atmospheric theory and climate models both indicate that the largest individual storms are becoming more intense with climate change (Prein et al. 2017).

While the potential for change in the flood hydrology of the Stevens Creek and Guadalupe River basins exists because of changes in the nature of precipitation, so does the nature of drought in the region. According to *California's Fourth Climate Change Assessment* (Governor's Office of Planning and Research 2019), future increase in temperature, regardless of whether total precipitation goes up or down, will likely cause longer and deeper California droughts, posing major problems for water supplies, natural ecosystems, and agriculture. The CalSim II model that was used to represent future conditions imported water supplies to Valley Water included a 2030 emissions scenario in regard to temperature and sea level rise (15 cm), and changes to Central Valley inflows reflecting changes to precipitation patterns and snow melt.

3.7.6.2 Non-flow Measures Impact Analysis Methodology

These non-flow measures are intended to work with the flow measures to improve current aquatic habitat conditions once fully implemented. The non-flow measures include fish passage barrier remediation, spawning and rearing habitat improvements, bank stabilization guidelines, completion of the *Advanced Recycled and Other Urban Water Plan*, and implementation of other non-flow measures specific to each of the two watersheds. No physical changes to the environment and therefore no impacts would be caused by preparation of the Bank Stabilization Guidelines, *Advanced Recycled and Other Urban Water Plan*, and the various plans and studies in development (that is, trap-and-truck feasibility study and *Alamitos Creek Facilities Plan* consisting of the *Plan for Almaden Dam*). The primary objective of non-flow measure implementation is to improve aquatic habitat conditions once fully implemented. As a result, in contrast to other resource sections, extra detail is provided for each non-flow measure to analyze the short-term and long-term impacts of implementation to aquatic species. The analysis methodology for each non-flow measure that could affect aquatic resources is described below.

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation that could temporarily affect aquatic species include removal of riparian vegetation to access the work area, use and staging of heavy equipment within the channel, channel dewatering within the limits of the active work area, modification of channel bed and bank dimensions, and installation of new structures. The impact analysis considered whether these short-term construction activities and corresponding future maintenance could result in significant adverse impacts, as well as how fish barrier remediation would provide benefits to aquatic species in the short term and the long term through increased available habitat, migration opportunities, and improving species' access to the habitat upstream of the current barriers and allowing more timely and safer passage downstream.

The fish passage barrier remediation projects include removal or remediation of fish passage impediments including Moffett Fish Ladder and Fremont Fish Ladder in Stevens Creek watershed and Pheasant Creek Culvert, Old Dam, and (Bertram Road) Drop Structure in the Guadalupe River watershed. In the cases where Valley Water owns the facility (Moffett Fish Ladder and Fremont Fish Ladder), barriers would be remediated by replacing or removing the existing barrier. Where the facility is owned by another entity (Pheasant Creek Culvert, Old Dam, and [Bertram Road] Drop Structure), Valley Water would make reasonable best efforts to partner with the owner of the facility to remove or remediate the fish barrier.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects that could temporarily affect aquatic resources include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, placement of appropriately sized gravels within the limits of the bank channel, and installation activities (for example, channel dewatering within the limits of the active work area and use and staging of heavy equipment within or near the channel). Six representative gravel or LWD augmentation project sites have been identified, one in Stevens Creek watershed and five in the Guadalupe River watershed, as noted in Table 2.4-5, on which to base this programmatic analysis. Impacts were assessed based on whether these construction activities could result in short-term direct (for example, harm or mortality to species) and/or indirect (for example, water quality impacts, reduced benthic community health, and increased predation) impacts to aquatic resources. The impact analysis considered whether these construction and corresponding future maintenance activities could result in significant adverse impacts, as well as how spawning and rearing habitat projects would provide benefits to aquatic resources in the short term and the long term.

Other Non-flow Measures

The Proposed Project also includes the Portable Multiport Outlet on Stevens Creek and the Geomorphic Function Enhancement Pilot Project in the Guadalupe River watershed. Construction of a Portable Multiport Outlet would allow for greater operational flexibility for cooler flow releases during the summer from Stevens Creek Reservoir while meeting instream water temperature objectives and improve cold-water pool management in the reservoir benefiting the fisheries.

The geomorphic functions study and pilot project in the Guadalupe watershed could include any of the following channel enhancements: modifying channel dimensions for carrying bankfull flow; varying the meander shape; planting riparian vegetation; removing culverts, riprap, and other structures; and stabilizing the area with the use of bioengineering techniques. This pilot project is a Guadalupe River watershed-specific improvement because a 2,100-linear-foot geomorphic restoration already occurred in Stevens Creek in 2009. The impact analysis considered whether these short-term construction and corresponding future maintenance activities could result in short-term adverse impacts, as well as how pilot projects would provide benefits to aquatic resources in the short term and the long term.

3.7.6.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect groundwater.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed Phase 1 non-flow measures. After implementation of proposed Phase 1 measures, the Proposed Project would also include monitoring, non-flow measure maintenance, and implementation of the AMP for the purpose of complying with Phase 1 measures and validating that measurable objectives are met given the available water for fish passage, spawning, and rearing of steelhead and Chinook salmon. The monitoring program indicators that could then trigger adaptive management actions implemented through subsequent AMP phases would relate to habitat qualities affected by Valley Water facilities and operations, recognizing that Valley Water is not responsible for other environmental conditions that may limit the population or distribution of fish species in the Stevens Creek or Guadalupe River watershed. Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance of non-flow measures would involve activities similar to those laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 flow and non-flow measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.7.6.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to fish aquatic biological resources if it would:

- **AQUA-1a,b**: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS

Impact AQUA-1a is focused on the Stevens Creek watershed portion of the study area, while the Impact AQUA-1b is focused on the Guadalupe River watershed portion of the study area. Each analysis then focuses on the impacts from the proposed flow and non-flow measures and the collective monitoring, maintenance, and AMP implementation to each fish species, as explained in the methodology section.

Appendix G of the CEQA Guidelines also suggests that a project may have a significant environmental effect if it would interfere substantially with the movement of any native resident or migratory fish species. For migratory (anadromous) fish species, this impact is evaluated in Impact AQUA-1. For native resident fish species, this EIR does not evaluate movement impacts because these species are not highly migratory and because the Project would likely benefit such species through providing instream flows to support movement of fish and removal of passage barriers under the non-flow measures. Further, the Project does not involve establishing any new passage barriers in the study area.

Appendix G of the CEQA Guidelines suggests that a proposed project should also be assessed for a conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP. The only HCP, NCCP, or other approved local, regional, or state HCP relevant to the study area is the VHP. Several plant and animal species are covered by the VHP; however, no specific fish species are included in the VHP. Therefore, impacts to fish species aquatic resources (that is, CCC steelhead, Central Valley fall-run Chinook salmon, Pacific lamprey, Sacramento hitch, or riffle sculpin covered in this section) would not conflict with an adopted HCP, NCCP, or other approved HCP. The potential conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP as it applies to terrestrial and other non-fish aquatic resources is analyzed in Section 3.8, *Terrestrial Biological Resources*.

In the following analysis, an adverse impact is referred to as an “impact” and beneficial impacts are referred to as “benefits” or the Proposed Project “benefitting” the species. The term “no impact” should not imply that there is no benefit, only that there is no adverse impact considered in the context of the thresholds of significance from the Proposed Project on the focal fish species.

3.7.6.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during project implementation, Valley Water would incorporate a range of BMPs and VHP conditions to avoid and minimize undesired adverse effects on the environment that could result from the Proposed Project. Although VHP does not provide take authorization for fish species, several of the BMPs and VHP conditions would avoid and minimize impacts to aquatic habitat and species. Valley Water BMPs and VHP conditions applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and VHP conditions are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions.

BMPs relevant to this analysis of aquatic biological resources (along with a brief discussion of their effects on project activities) include the following:

- Water Quality BMPs
  - **WQ-1:** Conduct Work from Top of Bank – Would reduce the effect of machinery on streambed and water quality.
  - **WQ-3:** Limit Impact of Pump and Generator Operations and Maintenance – Would reduce impacts on water quality and aquatic species.
  - **WQ-4:** Limit Impacts from Staging and Stockpiling Materials – Would reduce runoff and erosion and reduce impacts on instream biota and water quality.
  - **WQ-5:** Stabilize Construction Entrances and Exits – Would reduce runoff and erosion and reduce impacts on instream biota and water quality.
  - **WQ-6:** Limit Impact of Concrete near Waterways – Would reduce runoff from increasing impervious surfaces and eliminate contact with uncured concrete.
  - **WQ-8:** Minimize Hardscape in Bank Protection Design – Would reduce downstream or adjacent bank scour and erosion.
  - **WQ-10:** Prevent Scour Downstream of Sediment Removal – Would decrease scour downstream of sediment removal by grading the channel transitions and ensuring that there are no rapid changes in the slope.

  - **WQ-15:** Prevent Water Pollution – Would reduce impact to aquatic species and reduce transport of pollution in the channel network.
  - **WQ-16:** Prevent Stormwater Pollution – Would reduce impact to aquatic species and reduce transport of pollution in the channel network.
- Biological Resources BMPs[11]
  - **BI-3:** Remove Temporary Fills – Would remove temporary fill material upon finishing work to reduce impacts on water quality.
  - **BI-9:** Restore Riffle/Pool Configuration of Channel Bottom – Would enhance aquatic habitat and restore its functions to native biota.
  - **BI-11:** Minimize Predator-Attraction – Would reduce the likelihood of predation on native species.
- Animal Conflict BMPs
  - **ANI-5:** Slurry Mixture near Waterways – Would reduce impacts on terrestrial and aquatic resources by ensuring that slurry does not enter waterways.
- Pre-project Planning and General BMPs[12]
  - **GEN-1:** In-Channel Work Window – Would reduce water quality impacts and impacts on anadromous special-status fish and other aquatic species.
  - **GEN-2:** Instream Herbicide Application Work Window – Would reduce herbicide impacts on aquatic species.
  - **GEN-3:** Avoid Exposing Soils with High Mercury Levels – Would reduce impacts on water quality from mercury.
  - **GEN-4:** Minimize the Area of Disturbance – Would reduce impacts on terrestrial and aquatic habitats and species.
  - **GEN-15:** Salvage Native Aquatic Vertebrates from Dewatered Channels – Would reduce the impacts on native aquatic vertebrates.
  - **GEN-17:** Employee/Contractor Training – Would reduce impacts on biological resources because all appropriate Valley Water staff and contractors would receive annual training on SMP BMPs.
  - **GEN-20:** Erosion and Sediment Control Measures – Would reduce impacts on aquatic resources by ensuring that erosion and sediment discharge into waterways and riparian vegetation is minimized.
  - **GEN-21:** Staging and Stockpiling of Materials – Would reduce impacts on water quality by preventing sediment-laden water from being released back into waterways.
  - **GEN-22:** Sediment Transport – Would reduce impacts on aquatic resources by preventing sediment-laden water from being released back into waterways.
  - **GEN-23:** Stream Access – Would reduce impacts on aquatic resources by using existing access to streams where possible.
  - **GEN-27:** Existing Hazardous Sites – Would minimize impacts on water quality from hazardous materials at a site.
  - **GEN-30:** Vehicle and Equipment Maintenance – Would reduce impacts on aquatic resources by maintaining vehicles in authorized areas.
  - **GEN-31:** Vehicle Cleaning – Would reduce impacts on aquatic resources by maintaining vehicles in authorized areas.

[11] Best Management Practices Handbook Santa Clara Valley Water District Comprehensive List, 2014
[12] Santa Clara Valley Water District 2011 Stream Maintenance Program Update (Valley Water 2011)

  - **GEN-32:** Vehicle and Equipment Fueling – Would reduce impacts on aquatic resources by preventing accidental spills.
  - **GEN-33:** Dewatering for Non-Tidal Sites – Would reduce impacts on water quality and aquatic resources by diverting water around the work area and incorporating recommendations by a qualified fisheries biologist (for example, relocating aquatic resources, screening pumps, installing energy dissipators, maintaining flow downstream of the work site, avoiding stranding of aquatic resources, reducing turbidity downstream of the work site, restoring work area to pre-project conditions).
  - **GEN-35:** Pump/Generator Operations and Maintenance – Would reduce water quality impacts by maintaining pumps and generators.
- Sediment Removal BMPs
  - **SED-2:** Prevent Scour Downstream of Sediment Removal – Would reduce the potential for scour by enforcing grading zones.
  - **SED-3:** Restore Channel Features – Would effectively restore channel features by installing contouring within low flow channels within low flow channels within nontidal streams.
- Vegetation Management BMPs
  - **VEG-1:** Minimize Local Erosion Increase from In-channel Vegetation Removal – Would minimize the potential effect of localized erosion and degradation of water quality.
  - **VEG-3:** Use Appropriate Equipment for Instream Removal – Would reduce the effect of machinery on streambeds and riparian vegetation.
- Post-project Restoration BMPs and VHP Conditions
  - **REVEG-1:** Seeding – Would reduce erosion and water quality impacts and promote native species.
  - **Condition 1:** Avoid Direct Impacts on Legally Protected Plant and Wildlife Species – Would reduce the impacts on protected species.
  - **Condition 3:** Maintain Hydrologic Conditions and Protect Water Quality – Would maintain hydrologic condition in an effort to protect water quality.
  - **Condition 4:** Avoidance and Minimization for Instream Projects – Would avoid and reduce impacts on instream biota and water quality.
  - **Condition 5:** Avoidance and Minimization Measures for Instream Operations and Maintenance – Would avoid and reduce impacts on instream biota and water quality.
  - **Condition 8:** Avoidance and Minimization Measures for Rural Road Maintenance – Would minimize potential impacts on covered species and sensitive land cover types.
  - **Condition 10:** Fuel Buffer – Would reduce the potential for fire damage to covered biota.
  - **Condition 11:** Stream and Riparian Setbacks – Would minimize and avoid impacts on aquatic and riparian land cover types, covered species, and wildlife corridors.
  - **Condition 12:** Wetland and Pond Avoidance and Minimization – Would minimize potential impacts on these habitats and associated species.

In addition, the methods described in the Best Management Guidelines for Native Lampreys During In-water Work (Lamprey Technical Working Group 2020) would be implemented during the construction phase, if feasible.

3.7.7 Impact Analysis

Both the project- and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur during implementation. This section evaluates the effects of Proposed Project measures on aquatic biological resources, as compared with current and future baseline conditions. Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum,* includes a more detailed description of each impact analysis.

3.7.7.1 Impact AQUA-1*a*: Have a substantial adverse effect, either directly, through habitat modifications, of through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Stevens Creek watershed portion of the study area (less than significant)

The following subsections analyze the potential impacts of the Proposed Project on special-status species and their habitat as well as migration conditions for anadromous fish within the Stevens Creek portion of the study area. For ease of communication, “downstream Stevens Creek” or “downstream reaches” refer to reaches between POIs STEV1 and STEV3, and “upstream Stevens Creek” or “upstream reaches” refer to the reaches between POIs STEV4 and STEV6, which are within the Cold Water Management Zone (Figure 3.7-1). The modeled habitat and wetted area reported for each POI represent the habitat or wetted area for the stream reach between that POI and the nearest downstream POI (for example, a habitat estimate at POI 6 in a stream would represent all habitat between POI 6 and POI 5). Alternatively, modeled water depth and water temperature characterize the conditions at the specific POI point and they do not represent conditions along a reach of the stream. Therefore, the FAHCE WEAP Model outputs for habitat between STEV5 and STEV6 are representative of conditions in the Stevens Creek CWMZ. A more detailed discussion of results with regard to specific POIs is provided in Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum*.

Steelhead

Flow Measures Compared with Current Baseline Impact Analysis

Effective Spawning Habitat

Based on the FAHCE WEAP Model, there would be an increase in effective spawning habitat in the Stevens Creek watershed compared with the current baseline. The Proposed Project would result in a 55 percent (3,800 square feet) average increase in effective spawning habitat compared with the current baseline as a result of increased flow, resulting in more wetted area within the creek being available for effective spawning habitat. An increase in effective spawning habitat would support increased abundance of anadromous adult spawners, add to the spatial diversity of available effective spawning habitat, decrease competition among spawners, and increase resiliency of spawning to temporal and spatial changes in habitat conditions.

Fry Rearing Habitat

The Proposed Project would also result in an 8 percent (17,000 square feet) average increase in modeled fry rearing habitat compared with the current baseline over the fry rearing period. Increased habitat is primarily driven by an increase in flow and the corresponding increase in the total wetted area available for fry rearing in Stevens Creek. Increased fry rearing habitat would support greater abundance of fry, increase the spatial diversity of available fry rearing habitat, decrease intra-specific competition, and improve resiliency of fry to temporal and spatial changes in habitat conditions. The amount of suitable fry rearing habitat would not be consistently increased under the Proposed Project throughout the fry rearing period (March 1 through May 31). A 13 percent (31,000 square feet) increase in fry rearing habitat would be observed from March 1 through April 30) and there would be a 4 percent decrease in fry rearing habitat from May 1 through May 31 under the Proposed Project compared with the current baseline. The modeled decrease late in the fry rearing season is attributable to the operational regimen, which is required to change to the Summer Cold Water Program and Fall Flows in May, as outlined in the Settlement Agreement (Valley Water et al. 2003). The Summer Cold Water Program and Fall Flows would result in decreased flows, primarily to retain cold water in the reservoirs for release. Therefore, the operational regimen results in a slight reduction in fry rearing habitat and a higher quality habitat in the form of maintaining temperatures within the optimal range for juvenile growth within the CWMZ during the late summer/early fall. Despite a slight decrease in fry rearing habitat predicted to occur late in the fry rearing season, the Proposed Project would provide a net increase in the total amount of suitable fry rearing habitat compared with the current baseline.

Juvenile Rearing Habitat

The Proposed Project would result in a 10 percent (16,000 square feet) average increase to modeled juvenile rearing habitat compared with the current baseline, mostly because of increases in juvenile rearing habitat in downstream reaches during the winter. There would be negligible change in downstream Stevens Creek juvenile habitat during the summer under the Proposed Project compared with the current baseline.

There would be a 3 percent (3,800 square feet) increase in modeled juvenile rearing habitat in the upstream reaches, driven mostly by increased habitat during Winter Operations, because there would be an 8 percent (8,100 square feet) decrease in modeled juvenile rearing habitat in the upstream reaches in the summer during the Stevens Creek Summer Cold Water Program and Fall Flows (further discussed in Section 2.4.1 and Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum*). This decrease in juvenile rearing habitat during the Summer Cold Water Program and Fall Flows is attributable to reduced stream flows, an operational measure in favor of maintaining cooler water temperatures within the CWMZ (see Section 3.1.4.1 for additional details on the Summer Cold Water Program and Fall Flows). Temperatures greater than 64°F are considered near the upper range of tolerance for juveniles (McCullough et al. 2001), and the upper temperature threshold for optimal growth typically ranges from 64°F to 66°F (Myrick and Cech 2004 2005), although steelhead in Central California may be capable of tolerating and even benefiting from higher temperatures (Myrick and Cech 2001). Under the current baseline, modeled MWATs in the CWMZ would exceed 64.4°F

The Stevens Creek Cold Water Management Program aims to provide cooler temperatures to rearing juveniles in the hottest times of the year, but must do so by decreasing the amount of water released, allowing a slower draw on the coldest part of the reservoir to maintain temperatures as near to optimal as possible. Therefore, the modeled habitat shows a decrease in wetted area and not enough of a temperature decrease to avoid an overall decrease in juvenile rearing habitat.

The FAHCE rule curves increase winter releases to promote spawning and passage, which results in increased wetted area during the winter months; this also reduces the amount of available water during the summer when compared to current baseline. A reduction in modeled juvenile rearing habitat area during the summer could result in higher densities, increased competition, and reduced growth of juvenile steelhead. However, given that the modeled habitat is based on temperature thresholds developed from literature focused on Pacific Northwest salmonids, the modeled decrease in habitat is likely conservative, as there is evidence that juvenile steelhead in the CCC steelhead population likely can tolerate higher temperatures than steelhead and other salmonids in the Pacific Northwest (Exponent 2020).

Modeled suitable juvenile rearing habitat would increase across all sites during the winter. Because winter habitat was previously identified as limiting for steelhead in Stevens Creek as a result of high water velocities during winter flow conditions (Stillwater Sciences 2004), increased winter rearing habitat is predicted to support greater productivity of the population. However, downstream of the Stevens Creek CWMZ there would be slight decreases in rearing habitat during the hottest months in the summer with not enough compensatory decrease in temperature to avoid a decrease in summer habitat. Decreases in juvenile rearing habitat within the CWMZ are a result of decreases in wetted areas. Overall, modeled juvenile rearing habitat would increase under the Proposed Project, and increases in winter rearing habitat would likely offset any decreases during the summer.

Conditions for Migration

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in an average increase in adult upstream passage of 25 percent (23 days per year) in the downstream reaches of Stevens Creek and would have a negligible decrease (reduced by an average of 4 percent or 1 day per year) on adult passage in upstream Stevens Creek. Despite a loss of 4 percent (or 1 day per year) of adult upstream passage to the upstream reaches of Stevens Creek, steelhead would still have a total average of 28 days of passage opportunities to the upstream reaches under the Proposed Project. Although the downstream reaches have less available effective spawning habitat than the upstream reaches, a loss of 1 day is not anticipated to significantly affect the steelhead population.

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in an average increase in juvenile downstream passage of 20 percent (8 days per year) from upstream Stevens Creek, providing additional opportunities for steelhead smolts to emigrate to the ocean from rearing habitat.

An increase in adult and smolt migration opportunities under the Proposed Project increases the potential for anadromous *O. mykiss* life history production in the Stevens Creek watershed compared with the current baseline.

Summary of Impacts Compared with Current Baseline

To improve conditions for the anadromous steelhead population, the Proposed Project prioritizes allocating the available water in the Stevens Creek watershed portion of the study area to increases in flow that support steelhead upstream and downstream migration as well as flows that produce more habitat to support steelhead spawning, incubation, fry rearing, and juvenile rearing (from late fall to spring). However, the available water in the Stevens Creek watershed does not change between the Proposed Project and the current baseline, so allocating more water to increase flow for migration and steelhead habitats in late fall through spring necessarily results in less water available for flow releases during summer and early fall (that is, May through November). As a result, there is lower modeled flow and less modeled juvenile rearing habitat during summer and early fall in Stevens Creek under the Proposed Project than under the current baseline. Overall, increases in modeled water for flow during late fall and spring support habitat for more steelhead life stages (that is, spawning, incubation, fry rearing, and winter/spring juvenile rearing) than the decrease in water for flow during summer through early fall (that is, summer/fall juvenile rearing). The decreases in modeled summer/fall juvenile rearing habitat do not occur during the lifestage time period identified as limiting for steelhead in Stevens Creek, and the decreases in modeled summer/fall juvenile rearing habitat are relatively small compared with the total available summer/fall juvenile rearing habitat.

Spring rearing habitat is critical for juvenile steelhead. It is expected that most growth in a California coastal stream would occur during spring, and this is often sufficient to support juveniles through the typically harsh conditions during summer (Harvey et al. 2006; Stillwater Sciences 2007; Sogard et al. 2009). In addition, late winter and spring rearing habitat is critical to support growth for steelhead smolts to reach sufficient size (approximately 170 millimeters fork length) to survive in the marine environment (Bond et al. 2008). Thus, the modeled increases in late fall through spring steelhead habitat under the Proposed Project would increase the likelihood that the Stevens Creek watershed would successfully support a year-class of steelhead from egg to smolt, despite a slight decrease in summer to early fall juvenile rearing habitat.

When compared with the current baseline, the Proposed Project would benefit modeled steelhead spawning, fry rearing, and juvenile rearing habitat and would increase modeled upstream passage opportunities for adult steelhead to the lower reaches of the watershed. The 1 lost day on average of modeled passage opportunities to the upper reaches would not substantially interfere with adult upstream migration given that an average of 28 days per year of passage to the upper reaches would still be maintained under the Proposed Project. The Proposed Project would increase downstream passage opportunities throughout the Stevens Creek portion of the study area, benefiting steelhead downstream migration conditions. Therefore, given the increases in habitat and net benefit to upstream and downstream passage opportunities, in terms of adverse impacts, the Proposed Project would result in **no impact** to steelhead, steelhead habitat, and steelhead migration opportunities compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project compared with the future baseline would result in nearly identical increases in effective spawning habitat. For the reasons outlined in the current baseline, the Proposed Project would result in an average increase in effective spawning habitat compared with the future baseline as a result of increased flow, resulting in more wetted area within the creek being available for effective spawning habitat. The negligible difference between the comparisons of the Proposed Project with the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to more future increases in reservoir storage, as is the case in the Guadalupe River watershed.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project compared with the future baseline would result in nearly identical increases in fry rearing habitat. For the reasons outlined in the current baseline, the Proposed Project would result in an increase in flow and the corresponding expansion in the total wetted area available for fry rearing compared with the future baseline in Stevens Creek.

Juvenile Rearing Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project compared with the future baseline would result in nearly identical increases in juvenile rearing habitat in the winter and decreases in the summer. For the reasons outlined in the current baseline, suitable juvenile rearing habitat would increase across all sites during the winter. Alternatively, there would be slight decreases in rearing habitat during the hottest months in the summer with not enough compensatory decrease in temperature to avoid an overall decrease in summer juvenile rearing habitat.

Conditions for Migration

Based on the results of the FAHCE WEAP Model, the Proposed Project compared with the future baseline would result in nearly identical changes to migration conditions. For the reasons outlined in the current baseline, there would be an increase in upstream passage to the lower reaches of the system and all but 1 day of passage maintained, on average, to the upstream reaches.

Summary of Impacts Compared with Future Baseline

For the same reasons outlined in the comparison of the Proposed Project to the current baseline, the Proposed Project would have benefits, and in terms of adverse impacts, would result in **no impact** to steelhead, steelhead habitat, and steelhead migration opportunities compared with the future baseline.

Pacific Lamprey

Assessments of the effects of the Proposed Project on Pacific lamprey, Pacific lamprey habitat, and Pacific lamprey migration conditions within the Stevens Creek portion of the study area are provided in the following subsections. There were no HAI or passage model outputs for Pacific lamprey. Thus, the effects of the Proposed Project on Pacific lamprey habitat and passage were evaluated using other modeled data, including wetted area and thalweg depth, and review of water temperature for suitability, as well as based on modeled HAI for steelhead when life cycles and habitat preference overlap between the species.

Flow Measures Compared with Current Baseline Impact Analysis

Pre-spawning Holding Habitat

The adult freshwater residence period can be divided into three distinct stages: (1) initial migration from the ocean to holding areas, (2) pre-spawning holding, and (3) secondary migration to spawning sites (Clemens et al. 2010; Starcevich et al. 2014). The pre-spawning holding stage begins when individuals cease upstream movement, generally in early summer, and continues until fish begin their secondary migration to spawn the following spring (Robinson and Bayer 2005; Starcevich et al. 2014).

Based on the results of the FAHCE WEAP Model, there would be increased pre-spawning holding habitat during the winter as a result of increased flows and wetted area, and variable effects on pre-spawning holding habitat during the summer between downstream and upstream Stevens Creek**.** Decreases in modeled pre-spawning holding habitat would occur in upstream reaches of Stevens Creek during the Summer Cold Water Program release because of reduced flows and wetted area, and there is effectively no change in pre-spawning holding habitat in downstream Stevens Creek during the summer between the current baseline and Proposed Project. Both the current baseline and Proposed Project would have very little flow in the summer in the downstream reaches.

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in increased effective spawning habitat for 2 months (March 1 through April 31) of the spawning and incubation period and, depending on the location in Stevens Creek, would remain unchanged or decrease during 4 months of the spawning and incubation period for this species (March 1 through August 31) compared with the current baseline. Increases in modeled spawning and incubation habitat would occur from March 1 through April 31 under the Proposed Project because of increased flows that increase wetted area under the Winter Base Flow Operations (excluding Fall Flows) release, but spawning and incubation habitat would decrease after May 1 because of the Summer Cold Water Program and Fall Flows releases that reduce flows and wetted area in Stevens Creek. Incubation temperatures for successful hatching (ranging from 50 to 71°F) occur under the current baseline and would be maintained under the Proposed Project. Based on the model, the Proposed Project would result in a truncated spawning and incubation window for Pacific lamprey. However, spawning typically ends by mid-June, and thus there would be minimal effects of decreased flows during the Summer Cold Water Program and Fall Flows releases because they would be offset by increased effective spawning habitat during Winter Base Flow Operations (excluding Fall Flows).

Larvae Rearing Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in increased rearing habitat during the winter because of increased flows and wetted area and would have variable effects on rearing habitat during the summer between downstream and upstream Stevens Creek. Decreases in rearing habitat would occur in upstream Stevens Creek during the Summer Cold Water Program and Fall Flows releases as a result of reduced flows and wetted area. There is effectively no flow in downstream Stevens Creek during the summer, but wetted area would increase under the Proposed Project. Increased wetted area in downstream Stevens Creek could provide additional rearing habitat given temperatures remain suitable. Modeled temperature was not available for STEV1 and STEV2 in downstream Stevens Creek, but modeled MWAT at STEV3 would remain suitable (that is, the average temperature was less than 66°F and the maximum temperature was less than 70°F) during the summer. Also, Pacific lamprey utilize slower-moving waters with fine silt substrates compared to juvenile steelhead, and Pacific lamprey larvae have been shown to withstand prolonged periods of dewatering if they can burrow deep enough in the hyporheic zone to remain wetted (Rodriguez-Lozano 2019), potentially making them more robust to decreases in wetted area than steelhead.

Conditions for Migration

During the adult Pacific lamprey upstream migration period (January 1 through June 30), the FAHCE WEAP Model results for thalweg depth indicate a 28 percent average increase (29 days per year on average) in adult upstream passage opportunities in the Stevens Creek watershed under the Proposed Project when compared with the current baseline. In addition to the thalweg depth analysis, modeled results for adult steelhead upstream passage, which overlaps with the timing of upstream passage of adult Pacific lamprey (January through April), also indicate increases in adult Pacific lamprey upstream passage opportunities in downstream Stevens Creek and little to no change in passage to the upstream reaches of Stevens Creek (STEV4 through STEV6). During May and June, the Proposed Project would provide fewer passage opportunities compared with the current baseline because of reduced flows. However, Pacific lamprey migrations in Central California are associated with high flow events that provide longitudinal connectivity in streams that are normally intermittent under baseline flows, especially in the summer. High flow events are typically restricted to winter and spring months in Central California, and there are likely few high flow events that would provide upstream passage after May under the current baseline, resulting in a negligible effect of the Proposed Project on upstream migrations in May and June.

During the juvenile Pacific lamprey downstream migration period (December 1 through May 31), the FAHCE WEAP Model results for thalweg water depth indicate a 30 percent (34 days per year) average increase in downstream migration compared with the current baseline. Additionally, modeled downstream passage for steelhead (with the water temperature criteria included), which overlaps with the timing of downstream passage of juvenile Pacific lamprey between December and May, was increased from February to May under the Proposed Project. Overall, Pacific lamprey juvenile downstream passage would increase under the Proposed Project compared with the current baseline. Reduced flows under the Summer Cold Water Program and Fall Flows could reduce downstream passage for Pacific lamprey if critical riffles become dry during low flows in the summer and fall. As described in the paragraph above with respect to adult passage, there are likely few high flow events that would provide juvenile downstream passage after May under the current baseline, resulting in a negligible effect of the Proposed Project on downstream migrations in summer in fall. The Proposed Project would result in increased opportunities for downstream passage for juvenile Pacific lamprey.

Summary of Impacts Compared with Current Baseline

Although the operations associated with the Proposed Project are management actions that benefit federally listed steelhead and salmon, the actions would provide an overall benefit to Pacific lamprey as well.

For Pacific lamprey, implementing the Proposed Project flow measures would result in benefits to winter pre-spawning holding habitat, larvae rearing habitat in the downstream reaches, and upstream and downstream passage opportunities, along with decreases in pre-spawning holding habitat in the summer and negligible changes of larvae rearing habitat in the upstream reaches.

The Proposed Project would result in a truncated spawning and incubation window for Pacific lamprey. However, spawning typically ends by mid-June, and thus decreased flows during the period of the Summer Cold Water Program and Fall Flows would be offset by increased effective spawning habitat during Winter Base Flow Operations (excluding Fall Flows).

There would be a net increase in larvae rearing habitat during the winter and variable changes to larvae rearing habitat during the summer under the Proposed Project. Increases in larvae rearing habitat during the winter would offset reduced habitat in the upstream reaches of Stevens Creek during the summer. Lamprey larvae have been shown to withstand prolonged periods of dewatering if they can burrow deep enough in the hyporheic zone to remain wetted (Rodriguez-Lozano 2019).

On balance, the Proposed Project flow measures would benefit Pacific lamprey in the Stevens Creek portion of the study area.

Therefore, the Proposed Project would have benefits and, in terms of adverse impacts, would result in **no impact** to lamprey, lamprey habitat, and lamprey migration opportunities compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Pre-spawning Holding Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project compared with the future baseline would result in nearly identical benefits to pre-spawning holding habitat as the current baseline, resulting in increases in the winter and decreases in pre-spawning holding habitat in the summer. The negligible difference between the comparisons of the Proposed Project with the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to more future increases in reservoir storage (as is the case in the Guadalupe River watershed portion of the study area).

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project compared with the future baseline would result in nearly identical benefits to effective spawning habitat as the current baseline, resulting in increases in the winter and decreases in effective spawning habitat in the spring and summer.

Larvae Rearing Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project compared with the future baseline would result in nearly identical benefits to larvae rearing habitat as the current baseline, resulting in increased rearing habitat in the downstream reaches and decreased rearing habitat in the upstream reaches.

Conditions for Migration

Based on the results of the FAHCE WEAP Model, the Proposed Project compared with the future baseline would result in nearly identical benefits to migration conditions as the current baseline, resulting in a net benefit to upstream and downstream migration opportunities overall.

Summary of Impacts Compared with Future Baseline

For the same reasons outlined in the comparison of the Proposed Project to the current baseline, the Proposed Project would have benefits and, in terms of adverse impacts, would result in **no impact** to lamprey, lamprey habitat, and lamprey migration opportunities compared with the future baseline.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures on steelhead and Pacific lamprey, their habitat, and migration opportunities in the Stevens Creek watershed. The non-flow measures included in the Proposed Project analyzed in this section are fish passage barrier remediation, spawning and rearing habitat improvements, geomorphic functions enhancement, and the Portable Multiport Outlet specific to Stevens Creek watershed, as well as implementation of the AMP Phase 1 adaptive measures. The impacts from each of these non-flow measures are discussed in the subsections below.

Fish Passage Barrier Remediation

The locations of the barrier remediation projects are known and include the Fremont Fish Ladder and Moffett Fish Ladder in Stevens Creek watershed. The Fremont Fish Ladder may include removal or remediation of fish passage impediments. The Moffett Fish Ladder may include retaining the existing fish ladder structure and constructing a low-flow channel downstream of the existing Denil Fish Ladder to extend to Highway 101.

Implementation of the fish passage barrier remediation projects could result in short-term impacts to steelhead and Pacific lamprey, their habitat, and migration opportunities within Stevens Creek watershed during construction. Utilizing heavy equipment and the presence of construction equipment and personnel within the wetted areas could result in harm or mortality to steelhead and Pacific lamprey through trampling, heavy equipment strike, or stress from construction noise or vibrations. Specifically, concrete and asphalt demolition may result in harm or mortality through heavy equipment strike or stress from construction noise or vibrations. Utilizing heavy equipment and the presence of construction equipment and personnel within the wetted areas could result in construction noise and/or vibrations that may cause steelhead and Pacific lamprey to avoid the vicinity of the construction footprint, limiting migration. In addition, steelhead and Pacific lamprey habitat would be decreased during the construction implementation period. Riparian vegetation removal within the watershed could reduce cover and shaded habitat for steelhead and Pacific lamprey to rest or rear. Dewatering could result in water quality impairment (for example, increased temperature and reduced DO), crowding, and stranding of steelhead and Pacific lamprey of all life history stages (that is, fry, juvenile, adults, and larvae) and redds or could limit migration of the steelhead and Pacific lamprey. In addition, dewatering within the construction footprint could result in reduced upstream and downstream movement for steelhead and Pacific lamprey. However, the fish passage barrier remediation projects would not impact adult steelhead upstream migration, as the project's timeline (June 15 through October 15) would occur outside the species' spawning window (December 1 through April 31). If the channel bed and bank are altered for construction, this may result in a reduction of beneficial steelhead and Pacific lamprey habitat and decreased water quality within, upstream, and downstream of the construction zone. The presence of construction personnel may result in increased trash in the vicinity, which may attract predatory bird and mammal species to the area, increasing predation risk.

Implementation of BMPs would reduce the impacts of construction to steelhead and Pacific lamprey. Implementation of WQ-1 (Conduct Work from Top of Bank), BI-9 (Restore Riffle/Pool Configuration of Channel Bottom), BI-11 (Minimize Predator-Attraction), GEN-4 (Minimize the Area of Disturbance), GEN-17 (Employee/Contractor Training), GEN-23 (Stream Access), VEG-3 (Use Appropriate Equipment for Instream Removal), Condition 1 (Avoid Direct Impacts on Legally Protected Plant and Wildlife Species), Condition 3 (Maintain Hydrologic Conditions and Protect Water Quality), and Condition 11 (Stream and Riparian Setbacks) would minimize the direct harm, mortality, and migration-related impacts to steelhead and Pacific lamprey by minimizing the duration and footprint of habitat affected by construction activities, limiting predator attraction, enhancing aquatic habitat (which would benefit fish migration), maintaining flow downstream of the construction site, protecting riparian vegetation that may provide cover and shade for species, and training construction personnel to reduce harm to steelhead and Pacific lamprey during in-channel construction. In addition, GEN-33 (Dewatering for Non-Tidal Sites) would reduce any direct impacts (that is, harm or mortality) to steelhead and Pacific lamprey by incorporating the recommendations of a qualified fisheries biologist specific to each barrier remediation project, which may include steelhead and Pacific lamprey relocation, screening pumps, maintaining flow downstream of the work site, and fish rescue and relocation.

Potential adverse impacts and/or take as defined in the ESA may occur during the fish rescues and relocation. However, proper fish-handling procedures would be implemented as listed in the *Fish Relocation Guidelines* (Valley Water 2010c) to minimize impacts, and incidental take coverage pursuant to the federal ESA would be obtained, as appropriate.

GEN-1 (In-channel Work Window) would be implemented to limit ground-disturbing maintenance activities that occur in the channel to between June 15 and October 15. All bank stabilization projects must be winterized prior to a forecasted significant rainfall event of 0.5 inch within 24 hours. Appropriate resource agencies (for example, CDFW, NMFS, USFWS) would be notified prior to fish relocation activities, and fish species would be relocated in a manner to minimize handling time and stress (Valley Water 2010c). In addition, water would be diverted around the work area to avoid fish species presence in the active work area. Steelhead fry, juvenile, and adult individuals and Pacific lamprey juvenile and adults would be rescued and relocated per GEN-33 (Dewatering for Non-Tidal Sites). However, while burrowed in fine substrate, Pacific lamprey larvae have the potential to become desiccated or suffocate during dewatering or may be crushed during construction activities, as they can be difficult to salvage if present, and may not move out of construction areas on their own volition. GEN-1 and GEN-33 would limit impacts to Pacific lamprey larvae.

In addition, GEN-15 would result in a fish and native aquatic vertebrate relocation plan to be established if aquatic vertebrates, including Pacific lamprey larvae, are present when cofferdams, water bypass structures, and silt barriers are to be installed to avoid fish stranding. A relocation effort would be conducted by a qualified biologist prior to the installation of water diversion structures and may include netting and/or electrofishing the area. GEN-33 (Dewatering for Non-Tidal Sites) would result in recommendations by a qualified fisheries biologist to be incorporated during construction.

As stated prior, the fish passage barrier remediation projects are analyzed here on a programmatic level, and additional CEQA analysis would be conducted prior to project implementation. Jurisdictional waters permits (for example, pursuant to the CWA, the Porter-Cologne Act, and the California Fish and Game Code) would be obtained prior to project implementation and would further reduce impacts. These permits would include avoidance and mitigation measures to protect sensitive fish species. The methods described in the *Best Management Guidelines for Native Lampreys During In-water Work* (Lamprey Technical Working Group 2020) would be implemented during the construction phase, if feasible.

Given the small size of the construction footprint relative to the watershed, water diversion measures to be followed to maintain flow downstream of the working area, water quality measures implemented to maintain water quality downstream of the work area, the relocation of sensitive species prior to dewatering the project reach, future permit measures to limit impacts to sensitive fish species, and the recommendations of a qualified fisheries biologist specific for each project, impacts to sensitive fish species, including Pacific lamprey larvae, would be minimized.

In addition, the application of WQ-1 (Conduct Work from Top of Bank), WQ-3 (Limit Impact of Pump and Generator Operations and Maintenance), WQ-4 (Limit Impacts from Staging and Stockpiling Materials), WQ-5 (Stabilize Construction Entrances and Exits), WQ-6 (Limit Impact of Concrete near Waterways), WQ-8 (Minimize Hardscape in Bank Protection Design), WQ-10 (Prevent Scour Downstream of Sediment Removal), WQ-15 (Prevent Water Pollution), WQ-16 (Prevent Stormwater Pollution), BI-3 (Remove Temporary Fills), ANI-5 (Slurry Mixture near Waterways), GEN-1 (In-channel Work Window), GEN-2 (Instream Herbicide Application Work Window), GEN-3 (Avoid Exposing Soils with High Mercury Levels), GEN-17 (Employee/Contractor Training), GEN-20 (Erosion and Sediment Control Measures), GEN-21 (Staging and Stockpiling of Materials), GEN-22 (Sediment Transport), GEN-23 (Stream Access), GEN-27 (Existing Hazardous Sites), GEN-30 (Vehicle and Equipment Maintenance), GEN-31 (Vehicle Cleaning), GEN-32 (Vehicle and Equipment Fueling), GEN-33 (Dewatering for Non-Tidal Sites), GEN-35 (Pump/Generator Operations and Maintenance), SED-2 (Prevent Scour Downstream of Sediment Removal), VEG-1 (Minimize Local Erosion Increase from In-channel Vegetation Removal), VEG-3 (Use Appropriate Equipment for Instream Removal), REVEG-1 (Seeding), Condition 3 (Maintain Hydrologic Conditions and Protect Water Quality), Condition 4 (Avoidance and Minimization for Instream Projects), and Condition 5 (Avoidance and Minimization Measures for Instream Operations and Maintenance) would minimize the effects of short-term water quality impairments to the Stevens Creek watershed during and after the construction period (for example, limiting construction to dewatered areas, limiting hazardous materials in the channel, and installing vegetation post-construction), which would minimize water quality impacts to steelhead and Pacific lamprey.

Implementation of WQ-1 (Conduct Work from Top of Bank), WQ-8 (Minimize Hardscape in Bank Protection Design), WQ-10 (Prevent Scour Downstream of Sediment Removal), BI-3 (Remove Temporary Fills), BI-9 (Restore Riffle/Pool Configuration of Channel Bottom), GEN-1 (In-channel Work Window), GEN-4 (Minimize the Area of Disturbance), GEN-22 (Sediment Transport), GEN-33 (Dewatering for Non-Tidal Sites), SED-2 (Prevent Scour Downstream of Sediment Removal), SED-3 (Restore Channel Features), VEG-3 (Use Appropriate Equipment for Instream Removal), REVEG-1 (Seeding), Condition 3 (Maintain Hydrologic Conditions and Protect Water Quality), Condition 10 (Fuel Buffer), Condition 11 (Stream and Riparian Setbacks), and Condition 12 (Wetland and Pond voidance and Minimization) would minimize the short-term construction impacts to habitat for steelhead and Pacific lamprey by limiting the construction footprint, reducing scour, maintaining flow downstream of the construction footprint, enhancing habitat of steelhead and Pacific lamprey post-construction, protecting riparian vegetation, protecting potential steelhead rearing habitat (such as wetlands and ponds), installing vegetation, and reducing the potential for fires within the vicinity of the construction footprint, which would benefit riparian vegetation that may provide cover and shade and improve water quality for steelhead and Pacific lamprey.

There would be some potential for adverse impacts to steelhead and Pacific lamprey, their habitat, and migration opportunities in the short term from construction during fish passage barrier remediation; however, the implementation of the BMPs would substantially decrease any potential impacts. Overall, fish passage barrier remediation projects would provide many benefits to steelhead and Pacific lamprey in the long term through increasing the amount of pre-spawning holding, spawning, rearing, and migration habitat; improving species' access to the habitat upstream of the current barriers; and allowing more timely and safer passage downstream. Increased habitat within the Stevens Creek watershed could support increased abundance of steelhead and Pacific lamprey in the system, improve access to available effective spawning habitat and cover, decrease competition among individuals, and enhance resiliency of individuals to temporal and spatial changes in conditions. Increased abundance would lead to better population health and greater genetic diversity. In addition, BMP implementation (that is, BI-9 [Restore Riffle/Pool Configuration of Channel Bottom] and REVEG-1 [Seeding]) would enhance the habitat within the construction footprint by promoting native vegetation growth and creating in-channel habitat (for example, riffle and pool configurations) to benefit steelhead and Pacific lamprey in the long term.

Overall, when short- and long-term impacts of non-flow measures are evaluated together, the Proposed Project would provide many benefits to steelhead and Pacific lamprey, their habitat, and migration opportunities in the Stevens Creek watershed.

Spawning and Rearing Habitat Improvements

The locations of the spawning and rearing habitat improvement projects would generally occur within the upper watershed below Stevens Creek Dam near STEV6. The locations of the spawning and rearing habitat improvement projects would be proposed by Valley Water and reviewed by the AMT in its annual work plan. These habitat improvements would help meet the overall objectives of the Proposed Project. Habitat restoration and enhancement restoration measures within the program would be implemented at those locations where the benefit to aquatic species is greatest. Specific restoration sites would be selected based on data collected as part of the Draft FHRP monitoring (Appendix A). Site selection and Project design would follow the methods and techniques of the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al. 2010).

Implementation of the spawning and rearing habitat improvements projects could result in short-term impacts to steelhead and Pacific lamprey, their habitat, and migration conditions within the Stevens Creek watershed during construction. Utilizing heavy equipment and the presence of construction equipment and personnel within the wetted areas could result in harm or mortality to steelhead and Pacific lamprey through trampling, heavy equipment strike, or stress from construction noise or vibrations. Specifically, removal and placement of habitat improvement components (for example, gravel, LWD, boulders) within various locations within the watershed may harm or crush steelhead and Pacific lamprey (for example, Pacific lamprey larvae present within substrate). Utilizing heavy equipment and the presence of construction equipment and personnel within the wetted areas could result in construction noise and/or vibrations that may cause steelhead and Pacific lamprey to avoid the vicinity of the construction footprint, limiting migration. In addition, steelhead and Pacific lamprey habitat would be decreased during the construction implementation period.

Dewatering could result in water quality impairment (for example, increased temperature and reduced DO), crowding, and stranding of steelhead and Pacific lamprey of all life history stages (that is, fry, juvenile, adults, and larvae) and dewatering of redds or could limit migration of steelhead and Pacific lamprey. In addition, dewatering within the construction footprint could result in reduced upstream and downstream movement for steelhead and Pacific lamprey. However, the fish spawning and rearing habitat improvement projects would not impact adult upstream steelhead migration, as the project's timeline (June 15 through October 15) would occur outside the species' spawning window (December 1 through April 31). If the channel bed and bank is altered for construction, this may result in a reduction of steelhead and Pacific lamprey habitat and decrease water quality within and downstream of the construction zone (for example, increased suspended sediments downstream of the installed gravel) during the construction period. The presence of construction personnel may result in increased trash in the vicinity, which may attract predatory species to the area, increasing predation risk.

The application of the BMPs listed within the fish passage barrier remediation section would also be applied to the spawning and rearing habitat improvements projects and would result in reduced impacts to steelhead and Pacific lamprey through direct harm or mortality or impacts to migration by minimizing the duration and footprint of habitat affected by construction activities, limiting predator attraction, training construction personnel to reduce harm to steelhead and Pacific lamprey during in-channel construction, and enhancing aquatic habitat, which may benefit fish migration. In addition, water would be diverted around the work area to avoid steelhead and Pacific lamprey presence in the active work area and maintain flow and improve water quality downstream of the construction site.

Steelhead fry, juvenile, and adult individuals and Pacific lamprey juveniles and adults would be rescued and relocated per GEN-33. Potential adverse impacts and/or take as defined in the ESA may occur during the fish rescues and relocation. However, proper fish-handling procedures would be implemented as listed in the *Fish Relocation Guidelines* (Valley Water 2010c) to minimize impacts, and incidental take coverage pursuant to the federal ESA would be obtained, as appropriate.

The measures would also limit impacts to Pacific lamprey larvae for the reasons stated within the *Fish Passage Barrier Remediation* section above. GEN-15 would result in a fish and native aquatic vertebrate relocation plan to be established if aquatic vertebrates, including Pacific lamprey larvae, are present when cofferdams, water bypass structures, and silt barriers are to be installed to avoid fish stranding. A relocation effort would be conducted by a qualified biologist prior to the installation of water diversion structures and may include netting and/or electrofishing the area. GEN-33 (Dewatering for Non-Tidal Sites) would result in recommendations by a qualified fisheries biologist to be incorporated.

As stated prior, the spawning and rearing habitat improvement projects are analyzed here on a programmatic level, and additional CEQA analysis would be conducted prior to project implementation. Jurisdictional waters permits (for example, pursuant to the CWA, the Porter-Cologne Act, and the California Fish and Game Code) would be obtained prior to project implementation, and would further reduce impacts. These permits would include avoidance and mitigation measures to protect sensitive fish species. The methods described in the *Best Management Guidelines for Native Lampreys During In-water Work* (Lamprey Technical Working Group 2020) would be implemented during the construction phase, if feasible. Given the small size of the construction footprint relative to the watershed, water diversion measures to be followed to maintain flow downstream of the working area, water quality measures implemented to maintain water quality downstream of the work area, the relocation of sensitive species prior to dewatering the project reach, future permit measures to limit impacts to sensitive fish species, and the recommendations of a qualified fisheries biologist specific for each project, impacts to sensitive fish species, including Pacific lamprey larvae, would be minimized.

There would be potential for short-term adverse impacts to steelhead and Pacific lamprey, their habitat, and migration opportunities from construction; however, the implementation of the BMPs would substantially decrease any potential impacts. Overall, spawning and rearing habitat improvement projects would provide many benefits to steelhead and Pacific lamprey in the long term through increasing the habitat complexity within the watershed and allowing a more timely and safer passage in the watershed. Spawning and rearing habitat improvements would result in increased cover and effective spawning habitat within the watershed. Increased habitat within Stevens Creek watershed would support greater abundance of steelhead and Pacific lamprey in the system, increase available effective spawning habitat and cover, decrease competition among individuals, and improve resiliency of individuals to temporal and spatial changes in conditions. Increased steelhead and Pacific lamprey populations would lead to better population health and greater genetic diversity. In addition, BMP implementation (that is, BI-9 [Restore Riffle/Pool Configuration of Channel Bottom] and REVEG-1 [Seeding]) would enhance the habitat within the construction footprint by promoting native vegetation growth and creating in-channel habitat (for example, riffle and pool configurations) to benefit steelhead and Pacific lamprey.

Overall, when the short- and long-term impacts of non-flow measures are evaluated together, the Proposed Project would benefit steelhead and Pacific lamprey, their habitat, and migration opportunities in the Stevens Creek watershed. Maintenance, monitoring, and habitat enhancement would result in long-term benefits to the species notwithstanding short-term impacts during the construction period.

Portable Multiport Outlet

Operation of the portable multiport outlet would allow cooler water to be released from Stevens Creek Reservoir in more than one location in the water column. The flow releases and water temperatures would be the same as analyzed for the Proposed Project flow measures analysis; therefore, there is no need for discussion of flow-related or water temperature impacts to steelhead and Pacific lamprey specifically in this non-flow measures analysis. The altered release rate of the Stevens Creek watershed as a result of the portable multiport outlet project was included in the modeling used in the flow measures section analysis above. As a result, the non-flow measures analysis does not require further discussion of steelhead and Pacific lamprey, habitat, or migration conditions relative to hydrologic, hydraulic, water temperature, and fisheries modeling, as this analysis is captured in the flow measures sections. In addition, the multiport outlet would be constructed within the existing outlet system within the reservoir, and no work is proposed within Stevens Creek channel; therefore, steelhead and Pacific lamprey would not be affected by the construction. Therefore, there would be no short-term construction impacts to steelhead and Pacific lamprey and their habitat during construction.

The portable multiport outlet project would provide many benefits to steelhead and Pacific lamprey in the long term overall through substantial channel enhancements throughout the watershed. The project would result in less force during flow releases and improvements in cold-water pool management, which are beneficial to steelhead and Pacific lamprey, particularly in the CWMZ. In addition, the Project would result in cooler flow releases and instream water temperatures, as discussed in the flow measures section above. These enhancements would result in reduced sedimentation and erosion during releases and increased habitat availability throughout low-flow periods, allowing more timely and safer passage of steelhead and Pacific lamprey throughout the watershed downstream of the dam. Increased habitat within the Stevens Creek watershed would support increased abundance of steelhead and Pacific lamprey in the system, improve the diversity of available effective spawning habitat and cover, decrease competition among individuals, and increase resiliency of individuals to temporal and spatial changes in conditions. Increased steelhead and Pacific lamprey populations would lead to better population health and greater genetic diversity.

Overall, when the short- and long-term impacts of non-flow measures are evaluated together, the Proposed Project would benefit steelhead and Pacific lamprey and their habitat in the Stevens Creek watershed. Maintenance, monitoring, and habitat enhancement would result in long-term benefits to steelhead and Pacific lamprey and there would be no short-term impacts during the construction period.

Summary of Short-term Impacts from Non-flow Measures

The implementation of the non-flow measures could result in some short-term adverse impacts to steelhead and Pacific lamprey directly, their habitat, and their conditions for migration. However, BMPs would be implemented, and seasonal timing of the work would reduce these impacts. Therefore, implementation of the non-flow measures would result in **less-than-significant** impacts in the short-term construction period for the non-flow measures.

Summary of Long-term Impacts from Non-flow Measures

In the long-term, implementation of the non-flow measures would benefit steelhead and Pacific lamprey individuals, their habitat, and improved migration conditions through increasing and enhancing habitat and conditions for migration, allowing for more abundance of steelhead and Pacific lamprey in the Stevens Creek portion of the study area. Therefore, implementation of the non-flow measures would, in terms of adverse impacts, have **no impact** and would benefit steelhead and Pacific lamprey individuals, habitat, and migration conditions.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect aquatic biological resources. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations.

Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys and would have no impact to steelhead and Pacific lamprey. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or in-channel PIT tag reader stations and would have no impact to steelhead and Pacific lamprey.

Long-term monitoring would also include electrofishing, capturing, DNA sampling, and PIT tagging, which would cause some adverse impacts to steelhead and Pacific lamprey. During electrofishing, steelhead and Pacific lamprey would be stunned, captured, crowded (although the Fish Rescue and Relocation Plan would include measures to minimize crowding), and handled, which could cause acute physiological stress and may cause occasional incidental injury and/or mortality. Additionally, juvenile steelhead would be sampled for DNA and PIT tagged, which would cause acute physiological stress and may cause occasional incidental injury and/or mortality. Electrofishing would follow standard NMFS survey protocols, which would minimize injury and mortality during sampling and tagging. Electrofishing and associated sampling would be conducted under incidental take coverage pursuant to the federal ESA and a scientific collecting permit pursuant to the California Fish and Game Code. These permits would provide limits on incidental take during monitoring and would include measures designed to minimize and avoid adverse effects to aquatic resources during electrofishing activities. The monitoring program would provide valuable long-term population information for steelhead that could be used to adjust components of the Proposed Project through the AMP to be more beneficial to native fish, including steelhead and Pacific lamprey, over the long term.

Maintenance of non-flow measures would involve activities similar to those laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility, and would cause fisheries impacts similar to those of the non-flow measure being maintained.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

Stevens Creek Impact Overview

When compared with the current and future baselines, implementing the flow measures would result in overall increases in steelhead upstream and downstream passage opportunities, as well as increased spawning and rearing habitat from late fall to spring. Alternatively, decreases in flow from May through November would result in decreased juvenile rearing habitat during this period. Overall, increases in water for flow during late fall and spring support habitat for more steelhead life stages (that is, spawning, incubation, fry rearing, and winter/spring juvenile rearing) than the decrease in water for flow during summer through early fall (that is, summer/fall juvenile rearing). The decreases in summer/fall juvenile rearing habitat do not occur during the lifestage time period identified as limiting for steelhead in Stevens Creek, and the decreases in summer/fall juvenile rearing habitat are relatively small compared with the total available summer/fall juvenile rearing habitat. Potential decreases in steelhead modeled habitat resulting from flow measures (that is, summer/fall juvenile rearing habitat) would be offset by net benefits in spawning and rearing habitat and upstream and downstream passage opportunities for the species, all of which are crucial for anadromous steelhead. In addition, the potential short-term impacts of implementing the non-flow measures would be reduced with the implementation of BMPs, as specified, and offset by the long-term benefits of increased habitat and migration conditions. Maintenance, monitoring, and the Phase 1 AMP adaptive measures would be consistent with the Proposed Project and would likewise result in few impacts to steelhead, steelhead habitat, and migration conditions. These overall benefits would improve conditions for the anadromous steelhead population.

When compared with the current and future baseline, implementing the flow measures would result in overall increases in Pacific lamprey pre-spawning holding habitat in the winter, rearing habitat in the downstream reaches, and upstream and downstream passage opportunities. Alternatively, decreases would occur in pre-spawning holding habitat in the summer and in rearing habitat in the upstream reaches. Benefits to winter pre-spawning holding habitat, larvae rearing habitat in the downstream reaches, and upstream and downstream passage opportunities habitat would occur, while there would be decreases in pre-spawning holding habitat in the summer and in larvae rearing habitat in the upstream reaches. The Proposed Project would result in a truncated spawning and incubation window for Pacific lamprey. However, spawning typically ends by mid-June, and thus there would be minimal effects of decreased flows during the Summer Cold Water Program and Fall Flows releases because they would be offset by increased effective spawning habitat during Winter Base Flow Operations. The operations associated with the Proposed Project are management actions aimed to optimize benefits to federally listed steelhead and salmon; therefore, there are some reductions in modeled habitat suitability for certain life stages of Pacific lamprey, but the modeled reductions are not anticipated to impact the Pacific lamprey individuals or habitat as a whole, and migration conditions would be improved. The potential short-term impacts of implementing the non-flow measures would be reduced with the implementation of BMPs and offset by the long-term benefits of increased habitat and migration conditions, including increased larvae rearing habitat and migration opportunities. There would be net benefits of implementing the flow and non-flow measures notwithstanding the habitat decreases from the flow measures (decreases to pre-spawning holding habitat in the summer and in larvae rearing habitat in the upstream reaches) and the short-term impacts of the non-flow measures. Maintenance, monitoring, and the Phase 1 AMP adaptive measures would be consistent with the Proposed Project and would likewise result in few impacts to Pacific lamprey, Pacific lamprey habitat, and migration conditions. Overall, the Proposed Project would support increased abundance of Pacific lamprey in the watershed, which would lead to increased population health and greater genetic diversity.

When the results of the Proposed Project are analyzed within the Stevens Creek watershed, the effects of the flow and non-flow measures provide an overall benefit to native fish species populations analyzed in this discussion (steelhead and Pacific lamprey) within the study area.

Mitigation

No mitigation would be required for Impact AQUA-1a.

3.7.7.2 Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, of through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area (less than significant)

The impacts to special-status species and their habitat that would result from implementation of the Proposed Project within the Guadalupe River watershed portion of the study area compared with the current and future baselines for flow and non-flow measures are provided in the following subsections as well as an assessment of Phase 1 adaptive management measures.

Steelhead and Chinook salmon have been observed in all reaches of the Guadalupe portion of the study area. Sacramento hitch have been observed only in the Guadalupe River and Los Gatos Creek, and therefore impacts to hitch habitat were assessed for those reaches in the study area. Riffle sculpin have been observed only in the Guadalupe River and Guadalupe Creek, and therefore impacts to riffle sculpin were assessed for those reaches in the study area.

The WEAP model does not report steelhead or Chinook salmon effective spawning habitat in Calero Creek given limited sample sizes of reference data. Therefore, effective spawning habitat for steelhead, Chinook salmon, and Pacific lamprey was assessed using modeled wetted area.

The effects of the Proposed Project on Pacific lamprey passage were evaluated based on a combination of modeled data wetted area and based on modeled passage for steelhead when life cycles overlap between the species. Since Pacific lamprey require less depth for passage compared with steelhead, increases to steelhead passage would likely also increase Pacific lamprey passage when migration overlaps between the two species. Sacramento hitch and riffle sculpin do not undergo large migrations like steelhead, Pacific lamprey, and Chinook salmon. Suitable spawning locations for Sacramento hitch consist of riffles with clean, fine to medium-sized gravel within the watershed (Moyle 2002). Suitable spawning locations for riffle sculpin consist of riffles with clean, fine to medium-sized gravel or inside cavities in submerged logs within the watershed (CDFW 2015). There were no HAI model outputs for Sacramento hitch or riffle sculpin. Thus, the effects of the Proposed Project on Sacramento hitch and riffle sculpin habitat were evaluated based on a combination of modeled data for flow, wetted area, and temperature, as well as on modeled HAI for steelhead when life cycles and habitat preference overlap between the species.

Steelhead

Flow Measures Compared with Current Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, there would be an increase in effective spawning habitat in the Guadalupe River compared with the current baseline. The Proposed Project would result in a 35 percent (1,793 square feet) average increase across POIs in the Guadalupe River mostly in December, with little change during the rest of the spawning period (January through May).

There would be an average decrease in modeled effective spawning habitat in Los Gatos Creek compared with the current baseline. The Proposed Project would result in a 19 percent (199 square feet) average decrease across POIs in Los Gatos Creek, mostly in late December through early January, with little change during the rest of the spawning period (early January through May).

There would be an average increase in modeled effective spawning habitat in Guadalupe Creek compared with the current baseline. The Proposed Project would result in a 30 percent (223 square feet) increase across POIs in Guadalupe Creek reflected in all POIs except GCRK1, near the confluence with the Guadalupe River where there would be a slight decrease (28 square feet) in effective spawning habitat, mostly in late December through early January, with little change for the rest of the spawning period (early January through May). In the Guadalupe Creek CWMZ, there would be a 29 percent (117 square feet) increase in steelhead effective spawning habitat.

There would be an average decrease in modeled effective spawning habitat in Alamitos Creek compared with the current baseline. The Proposed Project would result in a 19 percent (12 square feet) average decrease in effective spawning habitat across POIs in Alamitos Creek.

There were no FAHCE WEAP Model predictions for effective spawning habitat in Calero Creek despite known occurrence of spawners. Based on the results of the FAHCE WEAP Model for wetted area, effective spawning habitat would decrease across POIs in Calero Creek compared with the current baseline because of decreased wetted area during Winter Base Flow Operations.

The Proposed Project has variable effects on modeled effective spawning habitat within the Guadalupe River watershed portion of the study area. The Guadalupe River and Guadalupe Creek had modeled average increases in effective spawning habitat overall, while Los Gatos Creek, Alamitos Creek, and Calero Creek had modeled slight average decreases in effective spawning habitat. Effective spawning habitat increases overall would provide a net benefit in habitat, particularly in December, which is the early part of the steelhead spawning season. Effective spawning habitat is not considered limiting for this steelhead population (Moyle 2002); therefore these increases and decreases observed within the sub-watersheds would likely have limited effects on the steelhead population in either direction. However, increases in effective spawning habitat overall would provide the potential for the study area to support an increased abundance of spawners in the Guadalupe River and Guadalupe Creek, particularly in December.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, there would be a 0.3 percent average increase (3,100 square feet) average increase in fry rearing habitat in the Guadalupe River compared with the current baseline.

There would be a 2 percent (6,000 square feet) average increase in modeled fry rearing habitat in Los Gatos Creek compared with the current baseline.

There would be a 0.9 percent (780 square feet) average increase in modeled fry rearing habitat in Guadalupe Creek compared with the current baseline. An 11 percent (10,500 square feet) average increase would be observed from March to April and a 22 percent (18,440 square feet) average decrease would be observed during May compared with the current baseline. In the Guadalupe Creek CWMZ, modeled fry rearing habitat decreased by a total of 2 percent (500 square feet), with a less than 1 percent (200 square feet) decrease observed during Winter Base Flow Operations and a larger decrease of 4 percent (1,200 square feet) observed during the Summer Cold Water Program.

There would be a 2 percent (1,130 square feet) average increase in modeled fry rearing habitat in Alamitos Creek compared with the current baseline.

Based on the results of the FAHCE WEAP Model, there would be a 10 percent (6,220 square feet) decrease in fry rearing habitat in Calero Creek compared with the current baseline. A 23 percent (11,530 square feet) decrease would be observed from March to April and a 4 percent (4,000 square feet) average increase would be observed during May compared with the current baseline. These changes are likely attributable to decreases in wetted area during Winter Base Flow Operations and increases in wetted area during the Summer Release Program.

Based on the above analysis, the Proposed Project would result in increases in modeled fry rearing habitat in the Guadalupe River watershed portion of the study area. Increases were observed mostly during Winter Base Flow Operations from March to April and decreases in fry rearing habitat would be observed at some locations (Guadalupe and Los Gatos Creeks) during the summer releases in May, except for Calero Creek, where fry rearing habitat decreased during the winter and increased during the summer. The observed increases in modeled fry rearing habitat in the winter would be beneficial for steelhead growth in these reaches; however, growth could be reduced in May in Los Gatos creek because of increased metabolic demands from elevated temperature or because of increased competition for resources when wetted area is reduced. However, decreases in growth rate in May are not expected to adversely affect the steelhead population, particularly given that more habitat in March through April would support fry growth.

Juvenile Rearing Habitat

Based on the results of the FAHCE WEAP Model, there would be a 0.04 percent (500 square feet) average decrease in juvenile rearing habitat in the Guadalupe River compared with the current baseline, with most decreases apparent during June and November.

There would be a 4 percent (14,000 square feet) average decrease in modeled juvenile rearing habitat in Los Gatos Creek compared with the current baseline, with most decreases apparent during May and November. Decreases would be likely related to decreased wetted area under the Proposed Project. Despite decreases, Los Gatos Creek contains a large amount (331,000 square feet) of juvenile rearing habitat under the current baseline.

There would be a 5 percent (2,550 square feet) average decrease in modeled juvenile rearing habitat in Guadalupe Creek compared with the current baseline, with a 27 percent (18,050 square feet) average increase during Winter Base Flow Operations releases attributable to increased wetted area and a 52 percent (23,142 square feet) average decrease during the Summer Cold Water Program and Fall Flows releases attributable to decreased wetted area and increased water temperature in the reaches below the CWMZ compared with the current baseline. In the Guadalupe Creek CWMZ, modeled juvenile rearing habitat increased by 9 percent (1,200 square feet), with a 52 percent (7,100 square feet) increase observed during Winter Base Flow Operations and a decrease of 34 percent (4,780 square feet) observed during the Summer Cold Water Program. The decreases during the Summer Cold Water Program in the CWMZ are a result of a decrease in wetted area, not temperature, as MWAT in the CWMZ under the Proposed Project remains below 65°F throughout the juvenile rearing period,

There would be a 1 percent (770 square feet) average increase in steelhead modeled juvenile rearing habitat within Alamitos Creek compared with the current baseline.

Based on the results of the FAHCE WEAP Model, there would be a 4 percent (2,390 square feet) decrease in modeled juvenile rearing habitat in Calero Creek compared with the current baseline. A 29 percent (10,030 square feet) average decrease would occur during Winter Base Flow Operations releases attributable to decreased wetted area, and a 6 percent (5,150 square feet) average increase during the Summer Cold Water Program and Fall Flows releases attributable to increased wetted area under the Proposed Project.

Based on the above analysis, the Proposed Project would result in slight decreases to modeled juvenile rearing habitat in most locations (that is, 0.04, 4, 5, and 4 percent in the Guadalupe River, Los Gatos Creek, Guadalupe Creek, and Calero Creek, respectively) in the Guadalupe River watershed portion of the study area. Increases were observed mostly during Winter Base Flow Operations from March to April and decreases in juvenile rearing habitat would be observed at some locations during summer releases, with the exception of Calero Creek, which showed decreases during winter and increases during summer.

Conditions for Migration

The following analysis focuses on adult upstream passage and juvenile downstream passage. Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 3 percent (2 days per year) average increase in adult upstream passage at sites in the Guadalupe River portion of the study area. Adult upstream passage in the upstream part of this reach (GUAD6 and GUAD7) would increase 12 percent (9 days per year) on average.

The Proposed Project would result a 4 percent (2 days per year) average decrease in modeled adult upstream passage in Los Gatos Creek compared with the current baseline. Despite a 2-day-per-year decrease in Los Gatos Creek, Los Gatos Creek would maintain a total of 44 days per year of passage opportunities.

The Proposed Project would result in a 3 percent (1 day per year) average increase in modeled adult upstream passage in Guadalupe Creek compared with the current baseline.

The Proposed Project would result in a 5 percent (3 days per year) average increase in modeled adult upstream passage in Alamitos Creek by an average of 5 percent (3 days per year) compared with the current baseline. Upstream migration would improve by 12 percent (9 days per year) on average at the lowest site (ALM1) in Alamitos Creek.

The Proposed Project would result in 7 percent (2 days per year) average increase in modeled adult upstream passage in in Calero Creek compared with the current baseline.

Based on the above analysis, the Proposed Project would result in slight increases in modeled adult upstream passage in most locations within the Guadalupe River watershed portion of the study area, except Los Gatos Creek, where there would be a slight average decrease (2 days per year on average) in upstream passage opportunities but an average of 36 days per year of passage would be maintained. However, juvenile steelhead have not been detected in Los Gatos Creek during monitoring efforts in 2018 and 2019, indicating poor recruitment or a lack of spawning occurring in the Los Gatos Creek watershed, which may be due to degraded conditions in this watershed (Valley Water 2020e).

The Proposed Project would increase modeled upstream passage opportunities in the mainstem Guadalupe River, which is critically important as all adult steelhead have to traverse the mainstem to get to the other tributaries for spawning, so even a modest increase in upstream passage opportunities in the mainstem is of critical importance to anadromous adult steelhead. The Proposed Project also substantially increased upstream migration opportunities in Alamitos Creek, which has high-quality spawning and rearing habitat in addition to the highest densities of juvenile steelhead in the Guadalupe River watershed portion of the study area during surveys in 2019 (Valley Water 2020e). Additional upstream passage opportunities would provide adults more access to spawning locations and would improve spawning opportunities in the watershed, other than in Los Gatos Creek. Overall, the Proposed Project would result in increased adult upstream passage opportunities compared with the current baseline conditions in the Guadalupe River watershed portion of the study area.

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 2 percent (1 day per year) average increase in juvenile downstream passage in the Guadalupe River compared with the current baseline. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would result in an 11 percent (7 days per year) average increase in juvenile downstream passage in the Guadalupe River compared with the current baseline.

The Proposed Project would result in a 5 percent (2 days per year) average increase in modeled juvenile downstream passage in Los Gatos Creek compared with the current baseline. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would result in a 30 percent (24 days per year) average increase in juvenile downstream passage in Los Gatos Creek compared with the current baseline.

The Proposed Project would result in a 44 percent (7 days per year) average increase in modeled juvenile downstream passage in Guadalupe Creek compared with the current baseline. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would result in a 33 percent (8 days per year) average increase in juvenile downstream passage in Guadalupe Creek compared with the current baseline.

The Proposed Project would result in a 4 percent (1 day per year) average decrease in modeled juvenile downstream passage in Alamitos Creek compared with the current baseline. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would result in a 5 percent (2 days per year) average increase in juvenile downstream passage in Alamitos Creek compared with the current baseline.

The Proposed Project would result in a 3 percent (1 day per year) average decrease in modeled juvenile downstream passage in in Calero Creek compared with the current baseline. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would result in no change to juvenile downstream passage in Calero Creek compared with the current baseline.

Based on the above analysis, although most sites in the Guadalupe River watershed portion of the study area would experience negligible changes in modeled juvenile downstream passage under the Proposed Project, increases were observed at some locations in the watershed. Even though the Guadalupe River only shows a 1-day average increase in juvenile passage, all juveniles must traverse the mainstem Guadalupe River to get to San Francisco Bay and eventually the ocean, so even a modest increase may be biologically meaningful in this reach.

Valley Water regularly observes rearing juveniles in Guadalupe Creek, Alamitos Creek, and Calero Creek. Guadalupe Creek would have a substantial increase in modeled downstream passage opportunities compared with the current baseline, while Alamitos Creek and Calero Creek showed a 1 day decrease on average under the Proposed Project, which is unlikely to be biologically meaningful in these more distant tributaries. The Proposed Project clearly benefits juvenile downstream passage in Guadalupe Creek, which contains a large amount of rearing habitat overall and continually supports steelhead rearing. Passage also increased by 2 days per year on average in Los Gatos Creek, but this likely does not affect steelhead in a biologically meaningful way as Los Gatos Creek does not appear to support as much juvenile rearing as the other reaches, likely because of its degraded condition (Valley Water 2019c, 2020b, 2021b).

Increases in modeled juvenile downstream passage would provide additional opportunities for steelhead to migrate to the ocean and support the anadromous (steelhead) component of the *O. mykiss* population. The Proposed Project would increase juvenile downstream passage opportunities compared with the current baseline conditions in the Guadalupe River watershed portion of the study area, driven mostly by substantial increases in passage opportunities in Guadalupe Creek and a slight increase in passage opportunities in the Guadalupe River. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would increase downstream passage at all locations in the watershed compared with the current baseline.

Summary of Impacts Compared with Current Baseline

When compared with the current baseline, the Proposed Project would result in little change in modeled effective spawning habitat, benefits to fry rearing habitat, and benefits to winter and early spring juvenile rearing habitat with decreases in summer juvenile rearing habitat, and would improve upstream passage opportunities for adult steelhead and downstream passage opportunities for juvenile steelhead.

The Proposed Project prioritizes allocating the available water in the Guadalupe River watershed portion of the study area to increases in flow that support steelhead upstream and downstream migration as well as flows that maintain habitat to support steelhead spawning and incubation, provide more fry rearing habitat, and provide more juvenile rearing habitat from late-fall to spring, compared with the current baseline, to improve conditions for the anadromous steelhead population. However, the available water in the Guadalupe River watershed portion of the study area does not change between the Proposed Project and the current baseline, so allocating more water to increase flow for migration and steelhead habitats in late fall through spring results necessarily in less water available for flow releases during summer and early fall (that is, May through November). As a result, there is lower flow and less juvenile rearing habitat during summer and early fall in the Guadalupe River watershed portion of the study area under the Proposed Project than under the current baseline. Overall, increases in water for flow during late fall and spring support habitat for more steelhead life stages (that is, spawning, incubation, fry rearing, and winter/spring juvenile rearing) than the decrease in water for flow during summer through early fall (that is, summer/fall juvenile rearing), and the decreases in summer/fall juvenile rearing habitat do not occur during the lifestage time period identified as limiting for steelhead in the Guadalupe River.

Spring rearing habitat is critical for juvenile steelhead. It is expected that most growth in a California coastal stream would occur during spring, and this is often sufficient to support juveniles through the typically harsh conditions during summer (Harvey et al. 2006; Stillwater Sciences 2007; Sogard et al. 2009). In addition, late winter and spring rearing habitat is critical to support sufficient growth for steelhead smolts to reach sufficient size (approximately 170 millimeters fork length) to survive in the marine environment (Bond et al. 2008). Thus, the increases in late fall through spring steelhead habitat under the Proposed Project would increase the likelihood that the Stevens Creek watershed would successfully support a year-class of steelhead from egg to smolt, despite a slight decrease in summer to early fall juvenile rearing habitat.

When compared with the current baseline, the Proposed Project would increase upstream and downstream passage opportunities and more so for downstream passage opportunities if temperature thresholds are relaxed.

Therefore, given little change in effective spawning habitat, the increases in fry rearing habitat, and the juvenile rearing habitat impacts that nevertheless provide a net benefit to upstream and downstream passage opportunities, the Proposed Project would have benefits and, in terms of adverse impacts, would result in **no impact** to steelhead, steelhead habitat, and steelhead migration opportunities compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, there would be a 38 percent (2,457 square feet) average increase in effective spawning habitat in the Guadalupe River compared with the future baseline in the Guadalupe River reach; however, compared with the future baseline, increases were observed primarily in the early spawning period (December) with minimal differences observed during the rest of the spawning period (January through May) when most upstream migration occurs (Moyle et al. 2008). The Proposed Project would result in increases in modeled effective spawning habitat and compared with the future baseline conditions in the Guadalupe River.

There would be a 16 percent (195 square feet) average decrease in modeled effective spawning habitat in Los Gatos Creek compared with the future baseline.

There would be a 115 percent (634 square feet) average increase in modeled effective spawning habitat in Guadalupe Creek compared with the future baseline. In the Guadalupe Creek CWMZ, there would be an 82 percent (229 square foot) increase in modeled effective spawning habitat. There is a limited amount of average effective spawning habitat available under the future baseline, so an increase by 634 square feet would result in a high percent increase in effective spawning habitat for this reach.

There would be a 35 percent (28 square feet) average increase in modeled effective spawning habitat in Alamitos Creek compared with the future baseline.

There were no FAHCE WEAP Model predictions for effective spawning habitat in Calero Creek despite known occurrence of spawners. Based on the results of the FAHCE WEAP Model for wetted area, effective spawning habitat would increase across POIs in Calero Creek compared with the future baseline because of increased wetted area during Winter Base Flow Operations.

While there would be a slight decrease in modeled effective spawning habitat for Los Gatos Creek, there would be a net increase in effective spawning habitat throughout the Guadalupe River watershed portion of the study area, including two reaches with very little effective spawning habitat under the future baseline: Guadalupe Creek and Alamitos Creek.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, there would be a 1 percent (17,700) average increase in fry rearing habitat in the Guadalupe River compared with the future baseline. Fry rearing habitat is not limited in the Guadalupe River under the future baseline (there is 121,4500 square feet).

There would be a 1 percent (2,000 square feet) average increase in modeled fry rearing habitat in Los Gatos Creek compared with the future baseline.

The Proposed Project would result in a 3 percent (2,400 square feet) average increase in modeled fry rearing habitat in Guadalupe Creek; a 14 percent increase would be observed from March to April and a 21 percent decrease would be observed during May compared with the future baseline. In the Guadalupe Creek CWMZ, modeled fry rearing habitat would increase by 4 percent (1,000 square feet), with a less than 1 percent (200 square feet) increase during Winter Base Flow Operations and an increase of 10 percent (2,400 square feet) during the Summer Cold Water Program with the Proposed Project.

There would be a 7 percent (4,620 square feet) average increase in modeled fry rearing habitat in Alamitos Creek compared with the future baseline from March to April and it would remain relatively unchanged (0.3 percent difference) during the Summer Release Program. Alamitos Creek has a large amount (66,570 square feet) of fry rearing habitat under the future baseline.

Based on the results of the FAHCE WEAP Model, there would be a 7 percent (4,480 square feet) increase in fry rearing habitat in Calero Creek compared with the future baseline, with increases observed during both Winter Base Flow Operations and the Summer Release Program, likely because of increased wetted area.

Overall, the Proposed Project would result in increases in modeled fry rearing habitat in all reaches of the Guadalupe River watershed portion of the study area compared with the current baseline.

Overall, modeled fry rearing habitat is increased under the Proposed Project compared with the future baseline. More fry rearing habitat would support more steelhead fry, making the population more resilient to threats and stressors at this life history stage.

Juvenile Rearing Habitat

Based on the results of the FAHCE WEAP Model, there would be a 2 percent (28,700 square feet) average increase in juvenile rearing habitat in the Guadalupe River compared with the future baseline, with a 5 percent increase during Winter Base Flow Operations and a 2 percent decrease during the Summer Release Program. The Guadalupe River contains a large amount (1,234,700 square feet) of modeled juvenile rearing habitat under the future baseline.

There would be a 5 percent (17,000 square feet) average decrease in modeled juvenile rearing habitat in Los Gatos Creek compared with the future baseline. Decreases are modeled during both Winter Base Flow Operations and the Summer Release Program, with the largest decreases occurring in May and November. Los Gatos Creek contains a large amount (348,000 square feet) of juvenile rearing habitat under the future baseline.

There would be a 6 percent (4,090 square feet) average decrease in modeled juvenile rearing habitat within Guadalupe Creek compared with the future baseline, with a 35 percent (23,690 square feet) average increase during Winter Base Flow Operations and a 53 percent (31,564 square feet) average decrease during the Summer Cold Water Program. In the Guadalupe Creek CWMZ, modeled juvenile rearing habitat decreased by 11 percent (2,000 square feet), with a 65 percent (8,500 square feet) increase observed during Winter Base Flow Operations and a decrease of 53 percent (12,300 square feet) observed during the Summer Cold Water Program. Decreases in fry rearing habitat in the Guadalupe Creek CWMZ during the Summer Cold Water Program are due to a decrease in wetted area, as MWATs remain below 65°F throughout the juvenile rearing period under the Proposed Project. Guadalupe Creek has a large amount (63,740 square feet) of juvenile rearing habitat under the future baseline.

There would be a 6 percent (4,050 square feet) average increase in modeled juvenile rearing habitat within Alamitos Creek compared with the future baseline, with a 9 percent (6,720 square feet) average increase during Winter Base Flow Operations as well as a 2 percent (1,500 square feet) average increase during the Summer Release Program.

Based on the results of the FAHCE WEAP Model, there would be a 3 percent (1,660 square feet) increase in juvenile rearing habitat in Calero Creek compared with the future baseline. The increase in juvenile rearing habitat is likely an underestimate because there were no model predictions for POI 2 during Winter Base Flow Operations, but there would be increased habitat during this time because of increases in wetted area.

The Proposed Project would result in overall increases in modeled juvenile rearing habitat in the Guadalupe River, Alamitos Creek, and Calero Creek. The Proposed Project would result in overall decreases in Los Gatos Creek and Guadalupe Creek, both of which already have a substantial amount of juvenile rearing habitat under the future baseline. Also, FAHCE provides more water for pulse flows to encourage more juveniles to outmigrate to the ocean versus over-summering in the Guadalupe River watershed.

Conditions for Migration

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 2 percent (3 days per year) average increase in adult upstream passage in the downstream reaches of the Guadalupe River and a 35 percent (23 days per year) average increase in the upstream reaches of the Guadalupe River.

The Proposed Project would result in a 3 percent (1 day per year) average decrease in modeled adult upstream passage in Los Gatos Creek compared with the future baseline; however, there are 38 days of upstream passage provided under the future baseline.

The Proposed Project would result in a 26 percent (4 days per year) average increase in modeled adult upstream passage in Guadalupe Creek compared with the future baseline. There are limited passage opportunities under the future baseline (13 days per year on average).

The Proposed Project would result in a 30 percent (13 days per year) average increase in modeled adult upstream passage in Alamitos Creek compared with the future baseline.

The Proposed Project would result in a 414 percent (9 days per year) average increase in modeled adult upstream passage in in Calero Creek compared with the future baseline.

Based on the above analysis, the Proposed Project would result in additional upstream passage opportunities (an increase from the Proposed Project compared with the future baseline) for steelhead in the Guadalupe River watershed portion of the study area compared with the future baseline. Additional upstream passage opportunities would provide adult steelhead more access to spawning locations and would improve spawning opportunities in the watershed. An increase in effective spawning habitat would support increased abundance of anadromous adult spawners, increase the spatial diversity of available effective spawning habitat, decrease competition among spawners, and increase resiliency of spawning to temporal and spatial changes in habitat conditions.

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 21 percent (7 days per year) average increase in juvenile downstream passage in the Guadalupe River compared with the future baseline. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would result in a 25 percent (16 days per year) average increase in juvenile downstream passage in the Guadalupe River compared with the future baseline.

The Proposed Project would result in an 8 percent (3 days per year) average increase in modeled juvenile downstream passage in Los Gatos Creek compared with the future baseline. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would result in a 13 percent (12 days per year) average increase in juvenile downstream passage in Los Gatos Creek compared with the future baseline.

The Proposed Project would result in a 212 percent (17 days per year) average increase in modeled juvenile downstream passage in Guadalupe Creek compared with the future baseline. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would result in an 87 percent (17 days per year) average increase in juvenile downstream passage in Guadalupe Creek compared with the future baseline.

The Proposed Project would result in a 16 percent (3 days per year) average increase in modeled juvenile downstream passage in Alamitos Creek compared with the future baseline. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would result in a 29 percent (10 days per year) average increase in juvenile downstream passage in Alamitos Creek compared with the future baseline.

The Proposed Project would result in a 252 percent (21 days per year) average increase in modeled juvenile downstream passage in in Calero Creek compared with the future baseline. Evaluating the juvenile downstream passage excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the Proposed Project would result in a 282 percent (38 days per year) average increase in juvenile downstream passage in Calero Creek compared with the future baseline.

The Proposed Project would improve modeled juvenile downstream passage throughout the Guadalupe River watershed portion of the study area compared with the future baseline. The effects of the Proposed Project on steelhead juvenile downstream passage would provide additional opportunities for downstream migrants to reach the ocean and support the anadromous (steelhead) component of the *O. mykiss* population. An increase in downstream migrants would support increased abundance of anadromous adult spawners. An increase in adult and smolt migration opportunities under the Proposed Project increases the potential for anadromous *O. mykiss* life history production in the Guadalupe River watershed portion of the study area compared with the current baseline.

Summary of Impacts Compared with Future Baseline

Overall, throughout the Guadalupe River watershed portion of the study area, the Proposed Project benefits modeled effective spawning habitat, fry rearing habitat, upstream migration, and downstream migration. The Proposed Project benefits juvenile rearing habitat in the winter and early spring, and decreases in the summer habitat are buffered by already abundant juvenile rearing habitat under the future baseline. In terms of adverse impacts, the Proposed Project would have **no impact** to the steelhead population compared with the future baseline.

Chinook Salmon

Flow Measures Compared with Current Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 37 percent (4,478 square feet) average decrease in effective spawning habitat in the Guadalupe River compared with the current baseline. Decreases are associated with increased water temperatures at the end of the incubation period and decreased water depths.

The Proposed Project would result in an 80 percent (5,088 square feet) average decrease in modeled effective spawning habitat Los Gatos Creek compared with the current baseline. Effective spawning habitat under the current baseline has a total area of 6,390 square feet, while the Proposed Project would reduce available effective spawning habitat to 1,302 square feet. Effective spawning habitat was decreased at both POIs, with the largest decrease occurring in November.

There would be a 100 percent (901 square feet) average increase in modeled effective spawning habitat in Guadalupe Creek compared with the current baseline. In the Guadalupe Creek CWMZ, there would be a 60 percent (136 square foot) increase in modeled Chinook salmon effective spawning habitat. Modeled effective spawning habitat in Guadalupe Creek increases to 1,799 square feet under the Proposed Project compared with 898 square feet under the current baseline.

There would be a 16 percent (76 square feet) average decrease in modeled effective spawning habitat in Alamitos Creek compared with the current baseline.

Based on the results of the FAHCE WEAP Model for wetted area, effective spawning habitat would decrease across POIs in Calero Creek compared with the current baseline, resulting in an assumed decrease in effective spawning habitat.

Based on the above analysis, most reaches would experience decreases in the absolute amount of available effective spawning habitat. These decreases are driven mostly by reduced water depth and increased temperatures toward the end of the Chinook salmon incubation period.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 0.02 percent (300 square feet) average increase in fry rearing habitat in the Guadalupe River compared with the current baseline.

There would be a 3 percent (15,000 square feet) average increase in modeled fry rearing habitat in Los Gatos Creek compared with the current baseline.

There would be a 10 percent (9,300 square feet) average increase in modeled fry rearing habitat in Guadalupe Creek compared with the current baseline. In the Guadalupe Creek CWMZ, modeled fry rearing habitat increased by less than 1 percent (200 square feet) when compared with the current baseline.

There would be 1 percent (870 square feet) increase in modeled fry rearing habitat in Alamitos Creek compared with the current baseline.

There would be a 15 percent (4,400 square feet) decrease in modeled fry rearing habitat in Calero Creek compared with the current baseline.

Overall, the Proposed Project would increase modeled fry rearing habitat in the Guadalupe River watershed portion of the study area compared with the current baseline.

Juvenile Rearing Habitat

Based on the results of the FAHCE WEAP Model for POIs GUAD3, GUAD4, GUAD5, GUAD6, and GUAD7,[13] the Proposed Project would result in a 1 percent (10,400 square feet) average decrease compared with the current baseline, with a 1 percent (10,100 square feet) increase during Winter Base Flow Operations and a 5 percent (50,200 square feet) decrease during the Summer Cold Water Program. The Guadalupe River contains a large amount (1,335,500 square feet) of modeled juvenile rearing habitat under the current baseline.

There would be a 2 percent (8,000 square feet) average increase in modeled juvenile rearing habitat in Los Gatos Creek compared with the current baseline, with a 6 percent (22,000 square feet)

[13] POIs GUAD1 and GUAD2 were not analyzed because of a lack of temperature data.

increase during Winter Base Flow Operations and a 5 percent (19,000 square feet) decrease during the Summer Cold Water Program. Los Gatos Creek contains a large amount (392,000 square feet) of modeled juvenile rearing habitat under the current baseline

There would be a 6 percent (4,820 square feet) average increase in modeled juvenile rearing habitat in Guadalupe Creek compared with the current baseline, with a 21 percent (18,000 square feet) increase during Winter Base Flow Operations and a 30 percent (21,390 square feet) decrease during Summer Cold Water Program releases. In the Guadalupe Creek CWMZ, modeled juvenile rearing habitat would increase by 12 percent (2,700 square feet), with a 28 percent (5,800 square feet) increase occurring during Winter Base Flow Operations followed by a 14 percent (3,600 square feet) decrease during the Summer Cold Water Program. Average MWAT under the Proposed Project is modeled to remain below 65°F throughout the Summer Cold Water Program in the Guadalupe Creek CWMZ, so decreases in habitat within the CWMZ are strictly a function of a decrease in wetted area. The decreases in habitat during the Summer Cold Water Program downstream of the CWMZ are the result of a combination of reduced wetted area and elevated water temperatures.

There would be a 1 percent (870 square feet) average increase in modeled juvenile rearing habitat in Alamitos Creek compared with the current baseline. An abrupt decrease in juvenile rearing habitat would occur in June. Most outmigration occurs before June; however, there can still be some juvenile outmigration in June (Table 3.7-2).

Based on the results of the FAHCE WEAP Model, there would be a 6 percent (3,070 square feet) average decrease in juvenile rearing habitat in Calero Creek compared with the current baseline. A 22 percent (6,100 square feet) average decrease would occur during Winter Base Flow Operations releases attributable to decreased wetted area, and a 3 percent (3,070 square feet) average increase during the Summer Cold Water Program releases attributable to increased wetted area under the Proposed Project.

Based on the above analysis, most locations within the Guadalupe River watershed portion of the study area experienced overall increases in Chinook salmon juvenile rearing habitat under the Proposed Project compared with the current baseline, except for the Guadalupe River and Calero Creek, where modeled juvenile rearing habitat would decrease by 1 percent (10,400 square feet) and 6 percent (3,070 square feet), respectively. Increases were observed mostly during Winter Base Flow Operations from March to April and decreases in juvenile rearing habitat would be observed at some locations during summer releases, attributable to reduced wetted area and/or elevated water temperatures. Despite the decreases during the Summer Release Program, most of the juvenile rearing period occurs during Winter Base Flow Operations and the decreases during the Summer Release Program are less likely to affect the Chinook salmon population, as they occur toward the end of their juvenile rearing and outmigration period (Table 3.7-2).

Conditions for Migration

The following analysis focuses on adult upstream passage and juvenile downstream passage. Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 17 percent (3 days per year) average increase in adult upstream passage at the most upstream sites (GUAD6 and GUAD7) and an 8 percent (4 days per year) decrease in the most downstream sites (GUAD3 and GUAD4) of the Guadalupe River compared with the current baseline. The 4-day decrease is a portion of the average total number of upstream days (58 days per year) modeled under the current baseline.

The Proposed Project would result in a 16 percent (2 days per year) average decrease in modeled adult upstream passage in Los Gatos Creek compared with the current baseline.

The Proposed Project would result in a 21 percent (less than 1 day per year) average decrease in modeled adult upstream passage in Guadalupe Creek compared with the current baseline.

The Proposed Project would result in a 19 percent (4 days per year) average increase in modeled adult upstream passage at ALAM1 (the most downstream POI in Alamitos Creek) and a 17 percent (1 day per year) average decrease at the upstream sites compared with the current baseline.

The Proposed Project would result in a 3 percent (less than 1 day per year) average increase in modeled adult upstream passage in Calero Creek compared with the current baseline.

Based on the above analysis, changes in Chinook salmon adult upstream migration opportunities are likely to be negligible to slightly beneficial for the Chinook salmon population. Upstream adult passage days at POIs in the Guadalupe River saw few changes and continued to provide an average of 58 days of passage per year under the Proposed Project. Chinook salmon are able to spawn in the Guadalupe River or hold until passage opportunities present themselves at the upstream tributaries in the Guadalupe watershed (Valley Water et al. 2018; Moyle 2002). Therefore, the Proposed Project is unlikely to affect the Chinook salmon population in a biologically meaningful way that differs from the current baseline.

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 3 percent (2 days per year) average increase in juvenile downstream passage in the Guadalupe River compared with the current baseline.

The Proposed Project would result in a 1 percent (1 day per year) average decrease in modeled juvenile downstream passage in Los Gatos Creek compared with current baseline.

The Proposed Project would result in a 47 percent (15 days per year) average increase in modeled juvenile downstream passage in Guadalupe Creek compared with the current baseline.

The Proposed Project would result in a 7 percent (4 days per year) average increase in modeled juvenile downstream passage in Alamitos Creek compared with the current baseline.

The Proposed Project would result in a 5 percent (3 days per year) average decrease in modeled juvenile downstream passage in Calero Creek compared with the current baseline.

Based on the above analysis, throughout the Guadalupe River watershed portion of the study area, the average number of juvenile downstream passage days across all sites under the Proposed Project is 64 days, compared with 59 days under the current baseline conditions. The increases in juvenile downstream passage days under the Proposed Project would provide additional opportunities for Chinook salmon to migrate to the ocean and would benefit the Guadalupe River watershed population.

Summary of Impacts Compared with Current Baseline

For Chinook salmon, implementing the Proposed Project flow measures would result in overall increases in Chinook salmon fry and juvenile rearing habitat and downstream migration opportunities, variable changes in upstream migration opportunities, and decreases in effective spawning habitat for the species. The decreases of effective spawning habitat may result in increased competition among spawners and decrease redd productivity. The largest decreases of effective spawning habitat occur in the Guadalupe River and Los Gatos Creek. The Guadalupe River is where the majority of Chinook salmon spawning is reported within the watershed (Valley Water 2018e). Even though there are overall decreases throughout the watershed, effective spawning habitat would increase in Guadalupe Creek. Up-migrant trapping conducted by Valley Water from 1998 to 2006 captured a range of 13–104 adult Chinook salmon per year and additional redd surveys conducted from 1995 to 2016 found a range of 3–35 redds across the watershed per year (Valley Water 2018e; Valley Water and Stillwater

Sciences 2017). Although spawning survey data are not population estimates, the annual average number of redds and adult upstream migrants indicate small run sizes of Chinook salmon and, therefore, available effective spawning habitat under the Proposed Project is likely sufficient to support an increase in Chinook salmon spawner abundance within the watershed; therefore, adverse impacts to modeled effective spawning habitat would not be considered substantial.

Upstream adult passage days at POIs in the Guadalupe River portion of the study area would be slightly decreased in the Guadalupe River portion of the study area under the Proposed Project when compared with the current baseline. Upstream migration opportunities would also be reduced in certain reaches (for example, Los Gatos Creek and Guadalupe Creek). Chinook salmon in the Guadalupe River portion of the study area are primarily mainstem spawners (Valley Water 2018e) and Chinook salmon are able to spawn in the Guadalupe River or hold until passage opportunities occur in the upstream tributaries of the Guadalupe River watershed. Under the Proposed Project, the Guadalupe River would maintain relatively high passage opportunities for Chinook salmon, which would allow the species plenty of opportunities to enter the watershed, migrate upstream, and spawn when conditions are suitable, noting that the largest area of effective spawning habitat is in the Guadalupe River. Overall, there would be slight decreases to Chinook salmon adult upstream migration opportunities in the Guadalupe River portion of the study, but there would still be opportunities for upstream migration.

The Proposed Project flow measures would benefit modeled fry and juvenile rearing habitat and downstream migration opportunities and, in terms of adverse impacts, the Proposed Project would result in **less-than-significant** impacts to Chinook salmon, Chinook salmon habitat, and migration opportunities compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 10 percent (1,212 square feet) average decrease in effective spawning habitat in the Guadalupe River compared with the future baseline. Apart from a sharp decline in modeled effective spawning habitat in December, which can be attributed to the 10 percent decrease in available habitat, there is little difference between the Proposed Project and the future baseline during the rest of the spawning period (October through January).

The Proposed Project would result in an 81 percent (5,667 square feet) average decrease in modeled effective spawning habitat in Los Gatos Creek compared with the future baseline. There is a sharp decline in effective spawning habitat observed in November. The decrease in effective spawning habitat is attributable to decreases in flow under the Proposed Project that reduce the suitability of the water depth for spawning.

There would be a 196 percent (1,609 square feet) average increase in modeled effective spawning habitat in Guadalupe Creek compared with the future baseline. In the Guadalupe Creek CWMZ, modeled effective spawning habitat would increase by 155 percent (264 square feet) when compared with the future baseline.

The Proposed Project would result in a 121 percent (669 square feet) average increase in modeled effective spawning habitat in Alamitos Creek compared with the future baseline.

Based on the results of the FAHCE WEAP Model for wetted area, effective spawning habitat would decrease across POIs in Calero Creek compared with the future baseline.

The Proposed Project has variable effects on modeled effective spawning habitat within the Guadalupe River watershed when compared with the future baseline. The Guadalupe River, Los Gatos Creek, and Calero Creek had modeled decreases in effective spawning habitat overall, while Guadalupe and Alamitos Creeks had modeled increases in effective spawning habitat. Similar trends were observed for the effects of the Proposed Project on effective spawning habitat compared with the current and future baselines; however, the overall decrease in the absolute amount of available habitat would be less compared with the current baseline, and the increases in Guadalupe and Alamitos Creeks would be greater.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in an average increase of 2 percent (25,800 square feet) of fry rearing habitat in the Guadalupe River compared with the future baseline.

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 2 percent (12,000 square feet) increase in fry rearing habitat in Los Gatos Creek compared with the future baseline

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 13 percent (11,680 square feet) increase in fry rearing habitat in Guadalupe Creek compared with the future baseline. In the Guadalupe Creek CWMZ, modeled fry rearing habitat increased by 2 percent (400 square feet) when compared with the future baseline.

There would be in an 8 percent (5,810 square feet) average increase in modeled fry rearing habitat in Alamitos Creek compared with the future baseline.

Based on the results of the FAHCE WEAP Model, there would be 2 percent (520 square feet) increase in fry rearing habitat in Calero Creek compared with the current baseline.

The Proposed Project would result in increases in modeled fry rearing habitat throughout the Guadalupe River watershed compared with the future baseline. The Proposed Project would result in a net increase of over 1 acre of additional fry rearing habitat compared with the future baseline.

Juvenile Rearing Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in a 2 percent (22,700 square feet) increase in juvenile rearing habitat compared with the future baseline, with a 4 percent (56,400 square feet) increase during Winter Base Flow Operations and a 4 percent (44,700 square feet) decrease during the Summer Release Program.

There would be a 1 percent (4,000 square feet) average increase in modeled juvenile rearing habitat in Los Gatos Creek compared with the future baseline, with a 4 percent (14,000 square feet) increase during Winter Base Flow Operations and a 4 percent (17,000 square feet) decrease during the Summer Release Program.

There would be a 7 percent (6,030 square feet) average increase in modeled juvenile rearing habitat in Guadalupe Creek compared with the future baseline, with a 27 percent (22,920 square feet) increase during Winter Base Flow Operations and a 33 percent (27,060 square feet) decrease during the Summer Release Program. In the Guadalupe Creek CWMZ, modeled juvenile rearing habitat increased by 15 percent (3,300 square feet), with a 37 percent (7,300 square feet) increase occurring during Winter Base Flow Operations followed by a 16 percent (4,600 square feet) decrease during the Summer Cold Water Program, There would be 7 percent (5,170 square feet) average increase in modeled juvenile rearing habitat in Alamitos Creek compared with the future baseline, with a 9 percent (6,820 square feet) increase during Winter Base Flow Operations and a 3 percent (1,970 square feet) increase during the Summer Release Program.

Based on the results of the FAHCE WEAP Model, there would be a 5 percent (2,960 square feet) increase in modeled juvenile rearing habitat in Calero Creek compared with the future baseline with a 3 percent (850 square feet) increase during the Winter Base Flow Operations and a 6 percent (7,190 square feet) increase during the Summer Release Program.

The Proposed Project would result in increases in modeled juvenile rearing habitat throughout the Guadalupe River watershed compared with the future baseline. The Proposed Project would result in a net increase of over 1 acre of additional juvenile rearing habitat compared with the future baseline. Increases were observed mostly during Winter Base Flow Operations from March to April and decreases in juvenile rearing habitat would be observed at some locations during summer releases, notwithstanding the increases during the Winter Base Flow Operations, but most juvenile rearing and outmigration would have already occurred by that time. Similar trends in habitat availability over both the winter and summer releases were observed under the future baseline and the current baseline.

Conditions for Migration

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in increases by an average of 3 percent in modeled adult upstream fall-run Chinook salmon passage in the Guadalupe River compared with the future baseline. GUAD3 and GUAD4 would see an average decrease (8 days per year), while the upstream POIs would see an increase (5 days per year), with the exception of GUAD5, which saw an increase (1 day per year). Although passage varied across sites, the average number of passage days (61 days per year) remained the same under both the future baseline and the Proposed Project.

The Proposed Project would result in decreases by an average of 39 percent (7 days per year) in modeled adult upstream fall-run Chinook salmon passage at Los Gatos Creek compared with the future baseline.

The Proposed Project would result in decreases (5 percent or less than 1 day per year on average) in modeled adult upstream fall-run Chinook salmon passage at Guadalupe Creek compared with the future baseline.

The Proposed Project would result in increases (25 percent or 5 days per year on average) in modeled adult upstream fall-run Chinook salmon passage at ALAM1, the downstream site in Alamitos Creek, compared with the future baseline. The upstream sites would see an average decrease of 17 percent (less than 1 day per year on average) in adult upstream fall-run Chinook salmon passage as a result of the Proposed Project compared with the future baseline. Despite the variability amongst sites, the average number of upstream passage days (9 days per year) would remain the same under both the future baseline and the Proposed Project.

The Proposed Project would result in a 267 percent increase (8 days per year on average) in modeled adult upstream passage in Calero Creek compared with the future baseline.

Based on the above analysis, the Proposed Project would have variable effects on modeled adult upstream passage opportunities in the Guadalupe River watershed. Upstream passage opportunities would be substantially reduced in Los Gatos Creek and slightly reduced in Guadalupe Creek, while there would be increases in passage opportunities in the Guadalupe River and Alamitos Creek. Adult upstream passage opportunities would remain high in the Guadalupe River under both the Proposed

Project and the future baseline conditions at 61 days per year, which would allow fall-run Chinook salmon sufficient opportunities to enter the watershed, migrate upstream, and spawn.

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in an increase of 30 percent (18 days per year) in juvenile downstream fall-run Chinook salmon passage in the Guadalupe River compared with future baseline.

The Proposed Project would result in an increase of 5 percent (4 days per year) in modeled juvenile downstream fall-run Chinook salmon passage at Los Gatos Creek compared with the future baseline.

The Proposed Project would result in an increase of 152 percent (36 days per year) in modeled juvenile downstream fall-run Chinook salmon passage at Guadalupe Creek compared with future baseline.

The Proposed Project would result in an increase of 46 percent (17 days per year) in modeled juvenile downstream fall-run Chinook salmon passage at Alamitos Creek compared with future baseline.

The Proposed Project would result in a 75 percent increase (30 days per year on average) in modeled juvenile downstream passage in in Calero Creek compared with the current baseline.

Based on the above analysis, the Proposed Project would result in a substantial increase in modeled juvenile downstream passage opportunities in the Guadalupe River watershed. The effects of the Proposed Project on juvenile fall-run Chinook salmon downstream passage would provide additional opportunities for downstream migrants to reach the ocean, which would benefit juvenile downstream passage in the Guadalupe River watershed fall-run Chinook salmon population.

Summary of Impacts Compared with Future Baseline

For Chinook salmon, implementing the Proposed Project flow measures would result in overall increases in Chinook salmon fry and juvenile rearing habitat and downstream migration opportunities, variable changes in upstream migration opportunities, and decreases in effective spawning habitat for the species. The decreases of effective spawning habitat may result in increased competition among spawners and decreased redd productivity. The largest decreases of effective spawning habitat occur in the Guadalupe River and Los Gatos Creek, and the Guadalupe River is where the majority of Chinook salmon spawning is reported within the watershed (Valley Water 2018e). Even though there are overall decreases throughout the watershed, effective spawning habitat would increase in Guadalupe Creek. Up-migrant trapping conducted by Valley Water from 1998 to 2006 captured a range of 13–104 adult Chinook salmon per year, and additional redd surveys conducted from 1995 to 2016 found a range of 3–35 redds across the watershed per year (Valley Water 2018e; Valley Water and Stillwater Sciences 2017). Although spawning survey data are not population estimates, the annual average number of redds and adult upstream migrants indicate small run sizes of Chinook salmon and, therefore, available effective spawning habitat under the Proposed Project is likely sufficient to support an increase in Chinook salmon spawner abundance within the watershed. Adverse impacts to effective spawning habitat would not be substantial.

Upstream migration opportunities would be reduced in certain reaches (for example, Los Gatos Creek and Guadalupe Creek), and there would be minimal changes in upstream migration in Alamitos Creek and the Guadalupe River compared with the future baseline. Chinook salmon in the Guadalupe River portion of the study area are primarily mainstem spawners (Valley Water 2018e), and Chinook salmon are able to spawn in the Guadalupe River or hold until passage opportunities occur in the upstream tributaries of the Guadalupe River watershed. Under the Proposed Project, the Guadalupe River would maintain relatively high passage opportunities for Chinook salmon, which would allow the species plenty of opportunities to enter the watershed, migrate upstream, and spawn when conditions are suitable, noting that the largest area of effective spawning habitat is in the Guadalupe River.

Overall, there would be slight decreases in Chinook salmon adult upstream migration opportunities in the Guadalupe River portion of the study, but there would still be opportunities for upstream migration.

The Proposed Project flow measures would benefit modeled fry and juvenile rearing habitat and downstream migration opportunities and, in terms of adverse impacts, the Proposed Project would result in **less-than-significant** impacts to Chinook salmon, Chinook salmon habitat, and migration opportunities compared to the future baseline.

Pacific Lamprey

Flow Measures Compared with Current Baseline Impact Analysis

The impacts to Pacific lamprey and Pacific lamprey habitat that would result from the Proposed Project within Stevens Creek watershed are provided in the following discussion. As discussed in Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum*, there were no HAI model outputs for habitat or passage for Pacific lamprey. Thus, the effects of the Proposed Project on Pacific lamprey habitat and passage were evaluated based on a combination of modeled data for flow, thalweg depth, wetted area, and temperature, as well as on modeled HAI for steelhead when life cycles and habitat preference overlap between the species (see Appendix K for more details).

Pre-spawning Holding Habitat

The adult freshwater residence period can be divided into three distinct stages: (1) initial migration from the ocean to holding areas, (2) pre-spawning holding, and (3) secondary migration to spawning sites (Clemens et al. 2010; Starcevich et al. 2014). The pre-spawning holding stage begins when individuals cease upstream movement, generally in early summer, and continues until fish begin their secondary migration to spawn the following spring (Robinson and Bayer 2005; Starcevich et al. 2014).

Based on the results of the FAHCE WEAP Model, there would be a decrease in pre-spawning holding habitat in the Guadalupe River and Los Gatos Creek compared with the current baseline. The Proposed Project would result in increased pre-spawning holding habitat during Winter Base Flow Operations and decreased habitat during the Summer Release Program attributable to changes in wetted area in the Guadalupe River and Los Gatos Creek. Decreases in wetted area relative to the current baseline would occur during May and November, which could dry out habitat occupied by pre-spawning holding Pacific lamprey in these reaches and force holding adults to relocate or strand. Increases in winter habitat and decreases during the summer could offset impacts to pre-spawning holding habitat compared with the current baseline in the Guadalupe River and Los Gatos Creek.

Based on the results of the FAHCE WEAP Model, there would be a negligible change in pre-spawning holding habitat in Guadalupe Creek and Alamitos Creek compared with the current baseline. The Proposed Project would result in increased habitat during Winter Base Flow Operations and only minor decreases or no change in habitat during the summer releases.

Based on the results of the FAHCE WEAP Model, there would be a decrease in pre-spawning holding habitat in Calero Creek during November through April but an increase from May to October compared with the current baseline.

Based on the results of the FAHCE WEAP Model, under the Proposed Project there would be a decrease in pre-spawning holding habitat during the summer and an increase during the winter based on changes in wetted area within the Guadalupe River watershed, although the opposite seasonal patterns would be observed in Calero Creek.

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, there would be a negligible change in effective spawning habitat in the Guadalupe River, Los Gatos Creek, Alamitos Creek, and Calero Creek compared with the current baseline. The Proposed Project would result in increased habitat during Winter Base Flow Operations and decreased habitat during the Summer Cold Water Program release. During Summer Cold Water Program releases, there would be unsuitable water temperatures for Pacific lamprey spawning and incubation periods under both the current baseline and the Proposed Project.

Based on the results of the FAHCE WEAP Model, there would be a decrease in modeled effective spawning habitat in Guadalupe Creek compared with the current baseline. The Proposed Project would result in increased habitat during Winter Base Flow Operations and decreased habitat during the summer releases. Unlike conditions in the Guadalupe River, Los Gatos Creek, and Alamitos Creek, under the current baseline, daily average temperatures in Guadalupe Creek would generally remain suitable for spawning and incubation during the summer months (May through August), but under the Proposed Project, daily average temperatures would be increased to above optimal temperatures for spawning and rearing starting in May, except in the CWMZ (GCRK3, GCRK4). While spawning is typically finished by mid-June (Brumo et al. 2009; Gunckel et al. 2009), egg incubation could continue into August, and high temperatures under the Proposed Project would decrease egg incubation success from May through August. There would be negligible changes in Pacific lamprey spawning and incubation habitat during the winter (March through April) and decreases to spawning and incubation habitat during the summer in Guadalupe Creek under the Proposed Project.

Based on the results of the FAHCE WEAP Model, there would be a decrease in effective spawning habitat in Calero Creek from March to April and an increase from May to August compared with the current baseline as a result of changes in wetted area.

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in negligible changes in effective spawning habitat in many locations within the Guadalupe River watershed. However, there would be a decrease in effective spawning habitat in Guadalupe Creek during the summer because of decreased flow and increased water temperature.

Larvae Rearing Habitat

Based on the results of the FAHCE WEAP Model, there would be a decrease in larvae rearing habitat in the Guadalupe River and Los Gatos Creek compared with the current baseline. The Proposed Project would result in increased habitat during Winter Base Flow Operations and decreased habitat during the Summer Release Program attributable to changes in wetted area in the Guadalupe River and Los Gatos Creek. Decreases in wetted area relative to the current baseline would occur during May and November, which could dry out habitat occupied by Pacific lamprey larvae in these reaches and force larvae to relocate or strand. However, Pacific lamprey larvae have been shown to withstand prolonged periods of dewatering if they can burrow deep enough in the hyporheic zone to remain wetted (Rodriguez-Lozano 2019). Increases in winter habitat and decreases during the summer could offset impacts to larvae rearing habitat compared with the current baseline in the Guadalupe River and Los Gatos Creek.

Based on the results of the FAHCE WEAP Model, there would be a negligible change in larvae rearing habitat in Guadalupe Creek and Alamitos Creek compared with the current baseline. The Proposed Project would result in increased habitat during Winter Base Flow Operations and only minor decreases or no change in habitat during the summer releases.

Based on the results of the FAHCE WEAP Model, there would be a decrease in larvae rearing habitat in Calero Creek driven by a decrease during Winter Base Flow Operations resulting from decreased wetted area compared with the current baseline. In contrast to other locations in the Guadalupe River watershed, there would be an increase in larvae rearing habitat in Calero Creek during the Summer Release Program compared with the current baseline.

Based on the results of the FAHCE WEAP Model, under the Proposed Project there would be a decrease in larvae rearing habitat during the summer and an increase during the winter based on changes in wetted area within the Guadalupe River watershed, although the opposite pattern would be observed in Calero Creek.

Conditions for Migration

The following analysis focuses on adult upstream passage and juvenile downstream passage. During the adult Pacific lamprey upstream migration period (January 1 through June 30), the FAHCE WEAP Model results for thalweg water depth indicate no change to adult upstream passage opportunities across the Guadalupe River watershed when compared with the current baseline. Model results for upstream passage for adult steelhead, which overlaps with the timing of upstream passage of adult Pacific lamprey between January and April, indicate that adult upstream passage for Pacific lamprey would increase in the Guadalupe River, Alamitos Creek, Guadalupe Creek, and Calero Creek and there would be a decrease in upstream passage in Los Gatos Creek under the Proposed Project when compared with the current baseline. The decreases in adult Pacific lamprey upstream passage opportunities modeled with the thalweg depth analysis are due to decreases in flow associated with the Summer Release Program, which begins on May 1, and are not reflected in the adult steelhead upstream passage model results because the end of the steelhead migration period occurs before the Summer Release Program begins. During May and June, the Proposed Project would provide fewer passage opportunities compared with the current baseline because of reduced flows. High-flow events are typically restricted to winter and spring months in Central California, and there are likely few high-flow events that would provide upstream passage after May under the current baseline. As a result, there is likely a negligible effect of the Proposed Project on upstream migrations after May.

During the juvenile Pacific lamprey downstream migration period (December 1 through May 31), the FAHCE WEAP Model results for thalweg water depth indicate that the Proposed Project would result in an 8 percent (11 days per year) average increase in Guadalupe Creek, no change in depth to the Guadalupe River and Los Gatos Creek, and a less than 2 percent (3 days per year) average decrease in Alamitos and Calero Creeks in downstream migration compared to the current baseline. Additionally, modeled downstream passage for steelhead (with the water temperature criteria included), which overlaps with the timing of downstream passage of juvenile Pacific lamprey between December and May, was increased from under the Proposed Project in all reaches except for Los Gatos Creek, which resulted in a 4 percent (2 days per year) average decrease. However, downstream movements of Pacific lamprey can occur over the entire year, and reduced flows during the Summer Cold Water Program could reduce downstream passage for Pacific lamprey if critical riffles become dry during low flows in the summer and fall. As described above, high-flow events are typically restricted to winter and spring months in Central California, and there are likely few high flow events that would provide downstream passage after May, even under the current baseline. As a result, there is an average increase of juvenile downstream migration opportunities. Overall, the increases in Guadalupe Creek outweigh the decreases in Alamitos and Calero Creeks, and Pacific lamprey juvenile downstream passage would increase under the Proposed Project compared with the current baseline.

Summary of Impacts Compared with Current Baseline

Although the operations associated with the Proposed Project are management actions that benefit federally listed steelhead and salmon, the actions would provide an overall benefit to Pacific lamprey as well.

For Pacific lamprey, implementing the Proposed Project flow measures would result in increases in pre-spawning holding, spawning, and larvae rearing habitat in the winter and early spring, and overall increases in upstream and downstream passage opportunities, as well as decreases in pre-spawning holding, effective spawning, and larvae rearing habitat in the summer. The only exception is in Calero Creek, where opposite seasonal patterns are expected, with decreased habitat during the winter and decreased habitat during winter. Reduced flows and elevated temperatures in the summer would affect only the late stages of Pacific lamprey spawning and incubation in this watershed. The Guadalupe River and Alamitos Creek are believed to be the most important locations for Pacific lamprey in the watershed (Leidy 2007), and spawning and incubation habitat would not be reduced by the Proposed Project in these locations. Larvae rearing occurs year-round, and decreases in larvae rearing habitat in the summer could result in larvae becoming desiccated or suffocating if they are unable to relocate to wetted reaches. It is expected that spawning would cease by June 1 in the Guadalupe River portion of the study area, and because the length of Pacific lamprey embryo incubation is highly dependent on water temperature, high water temperatures in the region would result in incubation being completed by the end of July at the latest (Meeuwig et al. 2005; Brumo 2006). Thus, decreases in flow and high temperatures during the summer would affect only the late stages of Pacific lamprey spawning and incubation in the Guadalupe River portion of the study area. The exception would be Calero Creek, where there would be decreased winter habitat.

Adult upstream passage would be improved under the Proposed Project, especially once seismic restrictions were lifted (that is, compared with the future baseline).

Downstream passage would only be improved in Guadalupe Creek compared with the current baseline, but once seismic restrictions were lifted, downstream passage would be improved in both the Guadalupe River and Guadalupe Creek. The Guadalupe River is the location where the most Pacific lamprey have been observed (Leidy 2007), and improved downstream and upstream passage in this location would increase opportunities for adult access to spawning areas and juvenile migration to the ocean. Therefore, increases of downstream passage in the Guadalupe River and Guadalupe Creek outweigh decreases in Los Gatos, Alamitos, and Calero Creeks, providing an overall benefit to Pacific lamprey.

On balance, the net benefits of implementing the flow measures outweigh the decreases in pre-spawning holding, spawning, and larvae rearing habitat in the summer for Pacific lamprey. In terms of adverse impacts, the Proposed Project would result in **no impact** to Pacific lamprey, Pacific lamprey habitat, and Pacific lamprey migration opportunities compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Pre-spawning Holding Habitat

Based on the results of the FAHCE WEAP Model, there are negligible differences in the Proposed Project comparisons to the current and future baselines for pre-spawning holding habitat. For the reasons outlined in the current baseline, the Proposed Project would result in offsetting increases in pre-spawning holding habitat during the winter and decreases in the summer. The exception was Calero Creek, where under the Proposed Project there would be additional habitat compared with the future baseline once seismic restrictions were lifted.

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, there are negligible differences in the Proposed Project in analysis between the current and future baselines for effective spawning habitat. For the reasons outlined in the current baseline, the Proposed Project results in reduced habitat for Pacific lamprey. The exception was Calero Creek, where under the Proposed Project there would be additional habitat compared with the future baseline once seismic restrictions were lifted.

Larvae Rearing Habitat

Based on the results of the FAHCE WEAP Model, there are negligible differences in the Proposed Project comparisons to the current and future baselines for larvae rearing habitat. For the reasons outlined in the current baseline, the Proposed Project would result in offsetting increases in larvae rearing habitat during the winter and decreases in the summer. The exception was Calero Creek, where under the Proposed Project there would be additional habitat compared with the future baseline once seismic restrictions were lifted.

Conditions for Migration

During the adult Pacific lamprey upstream migration period (January 1 through June 30), the FAHCE WEAP Model results for thalweg depth indicate variable effects on upstream passage opportunities across the Guadalupe River watershed when compared with the future baseline. Minor increases (1 to 2 percent, 3 days per year on average) were observed in the Guadalupe River and Alamitos and Calero Creeks, while a 2 percent decrease (3 days per year on average) was observed in Guadalupe Creek. The FAHCE-plus Alternative resulted in no change in adult upstream passage opportunities for adult Pacific lamprey in Los Gatos Creek when compared with the future baseline. Modeled results for adult steelhead upstream passage, which overlaps with the timing of upstream passage of adult Pacific lamprey (January through April), indicate increased passage opportunities at all locations within the Guadalupe River portion of the study area, with the exception of Los Gatos Creek, where there would be a decrease to upstream passage under the Proposed Project compared with the future baseline.

Similar to what was described above for comparisons with the current baseline, there would be decreases in upstream passage during summer releases, but it is unlikely that Pacific lamprey would undertake upstream migrations during this time of the year under either the Proposed Project or the future baseline.

During the juvenile Pacific lamprey downstream migration period (December 1 through May 31), the FAHCE WEAP Model results for thalweg water depth indicate an 8 percent (12 day per year) average increase in Guadalupe Creek, no change in depth to the Guadalupe River, and a less than 2 percent (3 days per year) average decrease in Los Gatos, Alamitos, and Calero Creeks in downstream migration compared to the future baseline. Additionally, modeled downstream passage for steelhead (with the water temperature criteria included), which overlap with the timing of downstream passage of juvenile Pacific lamprey between December and May, was increased from under the Proposed Project in all reaches. Overall, the increases in Guadalupe Creek outweigh the decreases in Los Gatos, Alamitos, and Calero Creeks, and Pacific lamprey juvenile downstream passage would increase overall under the Proposed Project compared with the future baseline. Similar to what was described above for comparisons with the current baseline, there would be decreases in downstream passage during summer releases, but it is unlikely that Pacific lamprey would undertake downstream migrations during this time of the year under either the Proposed Project or the future baseline.

Summary of Impacts Compared with Future Baseline

Although the operations associated with the Proposed Project are management actions that benefit federally listed steelhead and salmon, the actions would provide an overall benefit to Pacific lamprey as well.

For Pacific lamprey, implementing the Proposed Project flow measures would result in increases in pre-spawning holding, spawning, and larvae rearing habitat in the winter and early spring, and overall increases in upstream and downstream passage opportunities, as well as decreases in pre-spawning holding, effective spawning, and larvae rearing habitat in the summer. The only exception is in Calero Creek, where opposite seasonal patterns are expected, with decreased habitat during the winter and increased habitat during the summer. Reduced flows and elevated temperatures in the summer would affect only the late stages of Pacific lamprey spawning and incubation in this watershed. The Guadalupe River and Alamitos Creek are believed to be the most important locations for Pacific lamprey in the watershed (Leidy 2007), and spawning and incubation habitat would not be reduced by the Proposed Project in these locations. Larvae rearing occurs year-round, and decreases in larvae rearing habitat in the summer could result in larvae becoming desiccated or suffocating if they are unable to relocate to wetted reaches. It is expected that spawning would cease by June 1 in the Guadalupe River portion of the study area, and because the length of Pacific lamprey embryo incubation is highly dependent on water temperature, high water temperatures in the region would result in incubation being completed by the end of July at the latest (Meeuwig et al. 2005; Brumo 2006). Thus, decreases in flow and high temperatures during the summer would affect only the late stages of Pacific lamprey spawning and incubation in the Guadalupe River portion of the study area. The exception would be Calero Creek, where there would be decreased winter habitat.

Adult upstream passage would be improved under the Proposed Project, especially once seismic restrictions were lifted (that is, compared with the future baseline).

Downstream passage would only be improved in Guadalupe Creek compared with the current baseline, and once seismic restrictions were lifted, downstream passage would be improved in both the Guadalupe River and Guadalupe Creek. The Guadalupe River is the location where the most Pacific lamprey have been observed (Leidy 2007), and improved downstream and upstream passage in this location would increase opportunities for adult access to spawning areas and juvenile migration to the ocean. Therefore, increases of downstream passage in Guadalupe River and Guadalupe Creek outweigh decreases in Los Gatos, Alamitos and Calero Creeks, providing an overall benefit to Pacific lamprey.

On balance, the net benefits of implementing the flow measures outweigh the decreases in pre-spawning holding, spawning, and larvae rearing habitat in the summer for Pacific lamprey. In terms of adverse impacts, the Proposed Project would result in **no impact** to Pacific lamprey, Pacific lamprey habitat, and Pacific lamprey migration opportunities compared with the future baseline.

Sacramento Hitch

Flow Measures Compared with Current Baseline Impact Analysis

Based on Smith (2013), Leidy (2007), and sampling conducted by Valley Water and Stillwater Sciences (Valley Water unpublished data 2004–2017; Valley Water 2019c, 2020b, 2021b; Stillwater Sciences 2018), Sacramento hitch have been detected only in the Guadalupe River (downstream of the Norman Mineta Airport) and Los Gatos Creek over the last 17 years; therefore Sacramento hitch are assessed only in these two sub-watersheds.

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in increased effective spawning habitat during Winter Base Flow Operations and decreased habitat during the Summer Release Program starting in May. Predicted water temperatures in the Guadalupe River and Los Gatos Creek remain similar under the Proposed Project compared to the current baseline.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, the Proposed Project would result in increased habitat during Winter Base Flow Operations and decreased habitat during the Summer Release Program. Decreases in wetted area are predicted to occur during May and November, which could dry out habitat occupied by Sacramento hitch fry and force fry to relocate or strand. The increases in Sacramento hitch rearing habitat in winter and decreases in summer likely offset, and the Proposed Project would have negligible effects on Sacramento hitch rearing.

Summary of Impacts Compared with Current Baseline

Although the flow measures associated with the Proposed Project are management actions that benefit federally listed steelhead and salmon, they would also benefit Sacramento hitch.

For Sacramento hitch, implementing the Proposed Project flow measures would result in overall increases in Sacramento hitch spawning and fry rearing habitat in the winter and early spring and decreases in spawning and fry rearing habitat in the summer and fall. Flow decreases in the summer and fall are similar when compared with the current baseline in the Guadalupe River and Los Gatos Creek, where Sacramento hitch are known to occur. Based on modeled wetted area, decreases in rearing habitat would be most substantial during May and November, resulting from decreases in flow.

On balance, the net benefits of implementing the Proposed Project flow measures outweigh the decreases in spawning and rearing habitat in the summer. In terms of adverse impacts, the Proposed Project would result in **no impact** to Sacramento hitch and Sacramento hitch habitat compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the effects of the Proposed Project compared to the future baseline are similar in analysis between the current and future baseline for effective spawning habitat. For the reasons outlined in the current baseline, the Proposed Project would result in increased effective spawning habitat during the Winter Base Flow Operations and minor decreases during the Summer Release Program.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, the effects of the Proposed Project on fry rearing habitat compared to the future baseline are similar to those described for the current baseline analysis. For the reasons outlined in the current baseline, the Proposed Project would result in variable changes in Sacramento hitch habitat; however, there is a slight decrease in habitat in May and November, which could dry out habitat occupied by Sacramento hitch fry and force fry to find refugia habitat in the form of pools or runs. The increases in Sacramento hitch rearing habitat in winter and decreases in summer likely offset, and the Proposed Project would have negligible effects on Sacramento hitch rearing.

Summary of Impacts Compared with Future Baseline

Although the flow measures associated with the Proposed Project are management actions that benefit federally listed steelhead and salmon, they would also benefit Sacramento hitch.

For Sacramento hitch, implementing the Proposed Project flow measures would result in overall increases in Sacramento hitch spawning and fry rearing habitat in the winter and early spring and decreases in spawning and fry rearing habitat in the summer and fall. Flow decreases in the summer and fall are similar when compared with the future baseline in the Guadalupe River and Los Gatos Creek, where Sacramento hitch are known to occur (Smith 2013; Jarrett 2018; Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum*, Attachment K.2 – Figures K.2.13, K.2.14, K.2.19, K.2.20, K.2.25, K.2.26, K.2.31, and K.2.32). Based on modeled wetted area, decreases in rearing habitat would be most substantial during May and November, resulting from decreases in flow.

On balance, the net benefits of implementing the Proposed Project flow measures outweigh the decreases in spawning and rearing habitat in the summer. In terms of adverse impacts, the Proposed Project would result in **no impact** to Sacramento hitch and Sacramento hitch habitat compared with the future baseline.

Riffle Sculpin

Flow Measures Compared with Current Baseline Impact Analysis

Riffle sculpin have been documented in the Guadalupe River watershed within the past 20 years. Sampling conducted by Valley Water from 2004 to 2020 resulted in detections of riffle sculpin in Guadalupe Creek in all years and one individual detection in the Guadalupe River in 2018 (Valley Water unpublished data 2004–2017; Valley Water 2019c, 2020b, and 2021b). Therefore, riffle sculpin are assessed only in these two sub-watersheds.

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, there would be a minimal change in effective spawning habitat in the Guadalupe River and an overall increase in Guadalupe Creek within the spawning season (that is, February through March) compared with the current baseline. The Proposed Project would result in increased habitat during Winter Base Flow Operations, with the exception of a decrease at the downstream-most POI near the confluence with the Guadalupe River (that is, GCRK1); however, riffle sculpin are found predominantly in the upper reaches of Guadalupe Creek and generally decline downstream of GCRK3 (Smith 2013; Valley Water 2019c, 2020b, 2021b).

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, there would be a slight, overall increase in fry rearing habitat in the Guadalupe River and Guadalupe Creek compared with the current baseline for riffle sculpin. The Proposed Project would result in increased habitat during Winter Base Flow Operations and decreased habitat during the summer releases. Decreases in wetted area could occur during May, which could dry out habitat occupied by riffle sculpin fry and force fry to relocate or strand. The increases in riffle sculpin rearing habitat in winter and decreases in summer likely offset.

Summary of Impacts Compared with Current Baseline

Although the flow measures associated with the Proposed Project are management actions that benefit federally listed steelhead, the actions would also provide some benefits and be neutral overall to riffle sculpin.

For riffle sculpin, implementing the Proposed Project flow measures would result in overall increases to riffle sculpin spawning and fry rearing habitat in the winter and early spring and decreases of spawning and fry rearing habitat in the summer and fall. Flow decreases in the summer are similar when compared with the current baseline in the Guadalupe River and Guadalupe Creek, where riffle sculpin are known to occur (Valley Water unpublished data 2004–2017; Valley Water 2019c, 2020b, 2021b; Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum*, Attachment K.2 – Figures K.2.13, K.2.14, K.2.19, K.2.20, K.2.37, K.2.38, K.2.43, K.2.44). Fry rearing habitat would not decrease substantially in the Guadalupe River, where fry rearing habitat is abundant. Decreases in Guadalupe Creek would occur in May and are more substantial at the downstream POIs (GCRK 1, GCRK 2, and GCRK 3); however, the effect would be reduced because riffle sculpin are predominantly found in the upstream reaches of Guadalupe Creek, and generally decline downstream of GCRK 3 (Smith 2013, Valley Water 2019c, 2020, 2021b).

On balance, the net benefits of implementing the Proposed Project flow measures outweigh the decreases of spawning and fry rearing habitat in the summer. In terms of adverse impacts, the Proposed Project would result in **no impact** to riffle sculpin and riffle sculpin habitat compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, there are minimal differences in the Proposed Project in analysis between the current and future baseline for effective spawning habitat. For the reasons outlined in the current baseline, the Proposed Project would result in minimal changes in effective spawning habitat in the Guadalupe River and an overall increase in Guadalupe Creek within the spawning season (that is, February through March) compared with the future baseline.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, there are minimal differences in the Proposed Project in analysis between the current and future baseline for fry rearing habitat. For the reasons outlined in the current baseline, the Proposed Project would result in minimal changes in fry rearing habitat in the Guadalupe River and an overall increase in Guadalupe Creek compared with the future baseline.

Summary of Impacts Compared with Future Baseline

Although the flow measures associated with the Proposed Project are management actions that benefit federally listed steelhead, the actions would also provide some benefits and be neutral overall to riffle sculpin.

For riffle sculpin, implementing the Proposed Project flow measures would result in overall increases in riffle sculpin spawning and fry rearing habitat in the winter and early spring and decreases of spawning and fry rearing habitat in the summer and fall. Flow decreases in the summer are similar when compared with the current and future baselines in the Guadalupe River and Guadalupe Creek, where riffle sculpin are known to occur (Valley Water unpublished data 2004–2017; Valley Water 2019c, 2020b, 2021b; Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum*, Attachment K.2 – Figures K.2.13, K.2.14, K.2.19, K.2.20, K.2.37, K.2.38, K.2.43, K.2.44). Fry rearing habitat would not decrease substantially in the Guadalupe River, where fry rearing habitat is abundant. Decreases in Guadalupe Creek would occur in May and are more substantial at the downstream POIs (GCRK 1, GCRK 2, and GCRK 3); however, the effect would be reduced because riffle sculpin are found predominantly in the upstream reaches of Guadalupe Creek and generally decline downstream of GCRK 3 (Smith 2013; Valley Water 2019c, 2020, 2021b).

On balance, the net benefits of implementing the Proposed Project flow measures outweigh the decreases in spawning and fry rearing habitat in the summer. In terms of adverse impacts, the Proposed Project would result in **no impact** to riffle sculpin and riffle sculpin habitat compared with the current baseline.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures on steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin in the Guadalupe River watershed. The non-flow measures included in the Proposed Project analyzed in this section are fish passage barrier remediation, spawning and rearing habitat improvements, and the geomorphic functions enhancement specific to the Guadalupe River watershed, as well as implementation of the AMP. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Passage Barrier Remediation

The locations of the barrier remediation projects are known and include the Pheasant Creek Culvert on Guadalupe Creek, Old Dam on Guadalupe Creek, and the Bertram Road Drop Structure on Alamitos Creek. Because the projects occur only in Guadalupe and Alamitos Creeks, and Sacramento hitch do not occur in these areas, Sacramento hitch will not be assessed further in this section.

Implementation of BMPs would reduce the impacts of construction on steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin. Implementation of the fish passage barrier remediation projects could result in short-term impacts to steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin; their habitat; and migration conditions for steelhead, Chinook salmon, and Pacific lamprey within the Guadalupe River watershed during construction. Utilization of heavy equipment and the presence of construction equipment and personnel within the wetted areas could result in harm or mortality to steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin through trampling, heavy equipment strike, or stress from construction noise or vibrations. In addition, utilization of heavy equipment and the presence of construction equipment and personnel within the wetted areas could result in construction noise and/or vibrations that could cause steelhead, Chinook salmon, and Pacific lamprey migrating to avoid the vicinity of the construction footprint, limiting migration. However, the fish passage barrier remediation projects would not impact adult steelhead upstream migration, as the project’s timeline (June 15 through October 15) would occur outside the species’ spawning window (December 1 through April 31). In addition, the project would not impact adult Chinook salmon upstream migration, as the project’s timeline would occur outside the species’ spawning window (October 15 through January 31). Specifically, concrete and asphalt demolition of the barriers may result in harm or mortality through trampling, heavy equipment strike, stress from construction noise or vibrations, or impaired water quality (for example, increased temperature and reduced DO). In addition, steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin habitat would be decreased during the construction implementation period. Riparian vegetation removal within the watershed could reduce cover and shaded habitat for steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin to rest or rear. Dewatering could result in water quality impairment (for example, increased temperature and reduced DO), crowding, stranding of steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin of all life history stages (that is, fry, juvenile, adults, and larvae) and dewatered redds, and could reduce downstream movement for steelhead, Chinook salmon, and Pacific lamprey and upstream migration of Pacific lamprey. Water quality impairments (for example, increased temperature and reduced DO) downstream of the construction area could limit juvenile downstream migration of the species. If the channel bed and bank are altered for construction, this may result in a reduction of beneficial steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin habitat and may decrease water quality within and downstream of the construction zone. The presence of construction personnel may result in increased trash in the vicinity, which may attract predatory species to the area, increasing predation risk. While burrowed in fine substrate, Pacific lamprey larvae have the potential to become desiccated or suffocate during dewatering or may be crushed during construction activities, as they can be difficult to salvage and may not move out of construction areas on their own volition.

The application of the BMPs listed within the fish passage barrier remediation section described in Proposed Project Impact AQUA-1a would be applied to the barrier remediation projects in the Guadalupe Creek watershed and would result in reduced impacts to steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin through direct harm or mortality by minimizing the duration and footprint of habitat affected by construction activities, limiting predator attraction, and training construction personnel to reduce harm to steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin during in-channel construction. In addition, water would be diverted around the work area to avoid steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin presence in the active work area. The application of BMPs would result in reduced construction impacts to steelhead, Chinook salmon, and Pacific lamprey migration by minimizing the duration and footprint of habitat affected by construction activities; enhancing aquatic habitat, which may benefit fish migration; maintaining flow; and improving water quality downstream of the construction site. Steelhead, Chinook salmon, and riffle sculpin individuals and Pacific lamprey juvenile and adults would be rescued and relocated. Potential adverse impacts and/or take as defined in the ESA may occur during the fish rescues and relocations. However, proper fish handling procedures would be implemented as listed in the *Fish Relocation Guidelines* (Valley Water 2010c) to minimize impacts, and incidental take coverage pursuant to the federal ESA would be obtained, as appropriate.

There could be some short-term adverse impacts to steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin; their habitat; and migration opportunities from construction; however, the implementation of the BMPs would substantially decrease any potential impacts. Overall, fish passage barrier remediation projects would provide many benefits to steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin in the long term through increasing the amount of and access to pre-spawning holding, spawning, and rearing habitat, as well as increasing migration conditions, improving species' access to the habitat upstream of the current barriers, and allowing more timely and safer passage downstream. Increased habitat within the Guadalupe River watershed could support increased abundance of steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin in the system; increase access to available effective spawning habitat and cover; decrease competition among individuals; and increase resiliency of individuals to temporal and spatial changes in conditions. Increased abundance would lead to increased population health and greater genetic diversity. In addition, BMP implementation (that is, BI-9 [Restore Riffle/Pool Configuration of Channel Bottom] and REVEG-1 [Seeding]) would enhance the habitat within the construction footprint by promoting native vegetation growth and creating in-channel habitat (for example, riffle and pool configurations) to benefit steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin. These measures would also limit impacts to Pacific lamprey larvae for the reasons stated above. In addition, GEN-15 would result in a fish and native aquatic vertebrate relocation plan to be established if aquatic vertebrates, including Pacific lamprey larvae, are present when cofferdams, water bypass structures, and silt barriers are to be installed to avoid fish stranding. A relocation effort would be conducted by a qualified biologist prior to the installation of water diversion structures and may include netting and/or electrofishing the area. GEN-33 (Dewatering for Non-Tidal Sites) would result in recommendations by a qualified fisheries biologist to be incorporated. As stated prior, the fish passage barrier remediation projects are analyzed here on a programmatic level, and additional CEQA analysis would be conducted prior to project implementation. Jurisdictional waters permits (for example, pursuant to the CWA, the Porter-Cologne Act, and the California Fish and Game Code) would be obtained prior to Project implementation. These permits would include avoidance and mitigation measures to protect sensitive fish species. The methods described in the *Best Management Guidelines for Native Lampreys During In-water Work* (Lamprey Technical Working Group 2020) would be implemented during the construction phase, if feasible. Given the small size of the construction footprint relative to the watershed, water diversion measures to be followed to maintain flow downstream of the working area, water quality measures implemented to maintain water quality downstream of the work area, the relocation of sensitive species prior to dewatering the project reach, future permit measures to limit impacts to sensitive fish species, and the recommendations of a qualified fisheries biologist specific for each project, impacts to sensitive fish species, including Pacific lamprey larvae, would be minimized.

Overall, when short- and long-term impacts of non-flow measures are evaluated together, the Proposed Project would provide many benefits to steelhead, Chinook salmon, Pacific lamprey, their habitat, and migration conditions, as well as to riffle sculpin and their habitat in Guadalupe Creek and Alamitos Creek. Maintenance, monitoring, and habitat enhancement would result in long-term benefits to steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin, notwithstanding the short-term impacts during the construction period.

Spawning and Rearing Habitat Improvements

The exact locations of the spawning and habitat improvement projects are unknown, as the projects are currently described in a programmatic level of detail. However, the general locations of these projects would occur within the Guadalupe River (approximately 1,500 feet downstream of Alamitos Creek and Guadalupe Creek confluence), Guadalupe Creek (downstream of Guadalupe Dam and near the intersection of Hicks and Wagner Roads), and Los Gatos Creek (downstream of Camden Drop Structure and between the Highway 17 bridge and Creekside Way bridge). The exact locations of the spawning and rearing habitat improvement projects would be proposed by Valley Water and reviewed by the AMT in its annual work plan. These habitat improvements are to help meet the overall objectives of the Proposed Project. Habitat restoration and enhancement restoration measures within the program would be implemented at those locations where the benefit to aquatic species is greatest. Specific restoration sites would be selected based on data collected as part of the Draft FHRP monitoring (Appendix A). Site selection and project design would follow the methodologies and techniques of the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al. 2010). The improvements could impact steelhead, Chinook salmon, and Pacific lamprey individuals and their habitat during the construction period. In addition, the projects could result in impacts to migration conditions for steelhead, Chinook salmon, and Pacific lamprey during the construction period. Because spawning and rearing habitat improvement projects are to be constructed in the Guadalupe River, Guadalupe Creek, and Los Gatos Creek, impacts to Sacramento hitch and riffle sculpin individuals and their spawning and fry rearing habitat could also occur during construction.

The short- and long-term impacts for the spawning and rearing habitat improvements projects for steelhead and Pacific lamprey are the same among Stevens Creek and the Guadalupe River, Guadalupe Creek, and Los Gatos Creek. The analysis for impacts to Chinook salmon, Sacramento hitch, and riffle sculpin in the Guadalupe River watershed are similar to impacts to steelhead and Pacific lamprey in the Stevens Creek watershed, with the exception that the projects would not impact upstream Chinook salmon adult migration, as the project's timeline would occur outside the species' spawning window (October 15 through January 31). Utilization of heavy equipment, the presence of construction personnel, removal and placement of habitat improvement components (for example, gravel, LWD, boulders), and dewatering may impact steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin individuals, habitat, and migration conditions for steelhead, Chinook salmon, and Pacific lamprey. However, BMPs would be implemented (refer to Proposed Project Impact AQUA-1a for a detailed list of BMPs that would occur), and the fish spawning and rearing habitat improvement projects would not impact adult upstream steelhead or Chinook salmon migration, as the project's timeline (June 15 through October 15) would occur outside the species' spawning windows (December 1 through April 31 and October 15 through January 31, respectively). Refer to the analysis included in Proposed Project Impact AQUA-1a for a detailed description of impacts to steelhead and Pacific lamprey (which are similar to impacts to Chinook salmon, Sacramento hitch, and riffle sculpin) resulting from spawning and rearing habitat improvements projects and BMPs that would be implemented for these projects in the Guadalupe River watershed.

There could be short-term impacts to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin individuals; their habitat; and migration opportunities for steelhead, Chinook salmon, and Pacific lamprey from construction because of substantial adverse effects; however, the implementation of the BMPs would substantially decrease any potential impacts. Overall, spawning and rearing habitat improvement projects could provide many benefits to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin in the long term through increasing the habitat complexity within the watershed and allowing a more timely and safer passage in the watershed. Spawning and rearing habitat improvements could result in increased cover and effective spawning habitat within the watershed. Increased habitat within the Guadalupe River watershed could support increased abundance of steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin in the system; increase available effective spawning habitat and cover; decrease competition among individuals; and increase resiliency of individuals to temporal and spatial changes in conditions. Increased steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin populations would lead to increased population health and greater genetic diversity. In addition, BMP implementations (that is, BI-9 [Restore Riffle/Pool Configuration of Channel Bottom] and REVEG-1 [Seeding]) would enhance the habitat within the construction footprint by promoting native vegetation growth and creating in-channel habitat (for example, riffle and pool configurations) to benefit steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin.

Overall, when the short- and long-term impacts of spawning and rearing habitat improvement non-flow measures are evaluated together, the Proposed Project would benefit steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin; their habitat; and migration opportunities for steelhead, Chinook salmon, and Pacific lamprey in the Guadalupe River watershed.

Geomorphic Functions Enhancement

Specific to the Guadalupe River watershed, the exact locations of the geomorphic functions enhancement projects are unknown, as the projects are currently described in a programmatic level of detail, and short-term impacts to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin individuals; their habitat; and migration conditions could occur depending on the locations of the future improvements. If the geomorphic functions enhancement projects occur in the Guadalupe River, the enhancements could impact steelhead individuals and habitat (with the exception of fry rearing and effective spawning habitat), Chinook salmon individuals and habitat, and Pacific lamprey individuals and habitat during the construction period. If geomorphic functions enhancement projects occur in the Guadalupe River or Los Gatos Creek, impacts to Sacramento hitch individuals and their spawning and fry rearing habitat could occur during construction. If geomorphic functions enhancement projects occur in the Guadalupe River or Guadalupe Creek, the projects could result in impacts to riffle sculpin individuals and spawning and fry rearing habitat during the construction period. If the enhancement projects occur in Los Gatos, Guadalupe, Alamitos, or Calero Creek, the projects could result in impacts to steelhead, Chinook salmon, and Pacific lamprey individuals or habitats (that is, effective spawning, fry rearing, juvenile rearing, and larvae rearing habitat) during the construction period. If the projects occur in the Guadalupe River, Los Gatos Creek, Guadalupe Creek, Alamitos Creek, or Calero Creek, the projects could result in impacts to migration conditions for steelhead, Chinook salmon, and Pacific lamprey during the construction period.

Implementation of BMPs would reduce the impacts of construction on steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin. Implementation of the geomorphic functions enhancement projects could result in short-term impacts to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin individuals; their habitat; and migration conditions within the Guadalupe Creek watershed during construction. The use of heavy equipment and the presence of construction equipment and personnel within the wetted areas could result in harm or mortality to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin individuals through trampling, heavy equipment strike, or stress from construction noise or vibrations. In addition, utilization of heavy equipment and the presence of construction equipment and personnel within the wetted areas could result in construction noise and/or vibrations that could cause steelhead, Chinook salmon, and Pacific lamprey migrating to avoid the vicinity of the construction footprint, limiting migration. However, the geomorphic functions enhancement projects would not impact adult steelhead upstream migration, as the project's timeline (June 15 through October 15) would occur outside the species' spawning window (December 1 through April 31). In addition, the project would not impact adult Chinook salmon upstream migration, as the project's timeline would occur outside the species' spawning window (October 15 through January 31). Specifically, modifying the channel could result in harm or mortality to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin in the construction footprint; impair water quality downstream; and result in noise and vibration impacts to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin within the vicinity of construction. Dewatering could result in water quality impairment (for example, increased temperature and reduced DO), crowding, and stranding of steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin of all life history stages (that is, fry, juvenile, adults, and larvae) and dewatering of redds, and could reduce downstream movement for steelhead, Chinook salmon, and Pacific lamprey and upstream migration of Pacific lamprey. Water quality impairments (for example, increased temperature and reduced DO) downstream of the construction area could limit juvenile downstream migration of the species. If the channel bed and bank are altered for construction, this may result in a reduction of beneficial fish habitat and decrease water quality within and downstream of the construction zone (for example, increased suspended sediments downstream of the installed gravel). In addition, fish habitat could be decreased during construction implementation. Riparian vegetation removal within the watershed could reduce cover and shaded habitat for steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin to rest or rear. The presence of construction personnel may result in increased trash in the vicinity, which may attract more predatory species to the area, increasing predation risk.

The application of the BMPs listed within the fish passage barrier remediation section in AQUA-1a would be applied to the geomorphic function enhancement projects and would reduce the impacts of construction to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin through direct harm or mortality by minimizing the duration and footprint of habitat affected by construction activities, limiting predator attraction, and training construction personnel to reduce harm to fish species during in-channel construction. In addition, water would be diverted around the work area to avoid fish species presence in the active work area. The application of BMPs would result in reduced construction impacts to steelhead, Chinook salmon, and Pacific lamprey migration by minimizing the duration and footprint of habitat affected by construction activities; enhancing aquatic habitat, which may benefit fish migration; maintaining flow; and improving water quality downstream of the construction site. Steelhead; Chinook salmon; Sacramento hitch; riffle sculpin fry, juvenile, and adult individuals; and Pacific lamprey juveniles and adults would be rescued and relocated. Potential adverse impacts and/or take as defined in the ESA may occur during the fish rescues and relocation. However, proper fish handling procedures would be implemented as listed in the *Fish Relocation Guidelines* (Valley Water 2010c) to minimize impacts, and incidental take coverage pursuant to the federal ESA would be obtained, as appropriate.

There could be some short-term impacts to steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin; their habitat; and migration opportunities from construction because of substantial adverse effects; however, the implementation of the BMPs would substantially decrease any potential impacts. However, the overall long-term results of the fish geomorphic functions enhancement projects would provide many benefits to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin through substantial channel enhancements throughout the watershed. Geomorphic functions enhancement projects would result in increased channel capacity, resulting in reduced natural scour and vegetation removal, altering the shape of channel meanders to benefit channel function, planting native vegetation along the channel, removing potential instream passage barriers, and stabilizing the channel. These enhancements could result in greater habitat complexity for steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin throughout the watershed, reduced sedimentation and erosion during storms, and increased habitat availability throughout low-flow periods, and would allow more timely and safer passage throughout the watershed. Increased habitat within Guadalupe Creek watershed could support increased abundance of steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin in the system, increase the diversity of available effective spawning habitat and cover, decrease competition among individuals, and increase resiliency of individuals to temporal and spatial changes in conditions. Increased abundance would lead to increased population health and greater genetic diversity. In addition, BMP implementation (that is, BI-9 [Restore Riffle/Pool Configuration of Channel Bottom] and REVEG-1 [Seeding]) would enhance the habitat within the construction footprint by promoting native vegetation growth and creating in-channel habitat (for example, riffle and pool configurations) to benefit fish species.

Overall, when the short- and long-term impacts of non-flow measures are evaluated together, the Proposed Project would provide many benefits to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin; their habitat; and migration conditions for steelhead, Chinook salmon, and Pacific lamprey in Guadalupe Creek watershed. Maintenance, monitoring, and habitat enhancement would result in long-term benefits to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin, notwithstanding the short-term impacts during the construction period.

Summary of Short-term Non-flow Measure Impacts

There could be a short-term reduction of steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin habitat and a reduction of migration conditions for steelhead, Chinook salmon, and Pacific lamprey during the construction of the non-flow measures. In addition, the construction period may could result in localized impacts to Pacific lamprey larvae if the Project footprint is located within areas with fine sediment where Pacific lamprey larvae are burrowed. However, BMPs would be implemented, and seasonal timing of the work would reduce impacts to steelhead, Chinook salmon, and Pacific lamprey individuals; their habitat; and migration conditions, as well as Sacramento hitch and riffle sculpin individuals and their habitat. Therefore, non-flow measures would result in **less-than-significant** impacts in the short-term construction period.

Summary of Long-term Non-flow Measure Impacts

There could be increased steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin habitat as well as increased migration conditions as a result of the fully constructed non-flow measures. In the long term, the Proposed Project would, in terms of adverse impacts, result in **no impact** and would benefit steelhead, Chinook salmon, and Pacific lamprey individuals; their habitat; and migration conditions, as well as Sacramento hitch and riffle sculpin individuals and their habitat, resulting from the completed non-flow measures.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect aquatic biological resources. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations.

Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys and would have no impact to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or PIT tag readers using noninvasive technology and would have no impact to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin.

Long-term monitoring would also include electrofishing, capturing, DNA sampling, and PIT tagging, which could cause some adverse impacts to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin. During electrofishing, steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin could be stunned, captured, crowded, and handled, which could cause acute physiological stress and may cause occasional but rare incidental injury and/or mortality. Additionally, juvenile steelhead would be sampled for DNA and PIT tagged, which would cause acute physiological stress and may cause occasional but rare incidental injury and/or mortality. Electrofishing would follow standard NMFS survey protocols, which would minimize injury and mortality during sampling and tagging. Electrofishing and associated sampling would be conducted under a Research and Recovery or incidental take coverage pursuant to the federal ESA and a scientific collecting permit pursuant to the California Fish and Game Code. These permits would provide limits on incidental take during monitoring and would include measures designed to minimize and avoid adverse effects to aquatic resources during electrofishing activities. The monitoring program would provide valuable long-term population information for steelhead that could be used to adjust components of the Proposed Project through the AMP to be more beneficial to steelhead over the long term. Data would also be incidentally collected for Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin providing valuable long-term population information benefitting these species. Therefore, the impacts of monitoring activities implemented under Phase 1 of the AMP would be less than significant to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin.

Maintenance of non-flow measures would involve activities similar to those laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility, and would cause fisheries impacts similar to those of the non-flow measure being maintained.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. Therefore, impacts from implementation of the AMP would be less than significant.

Guadalupe River Impact Overview

When compared with the current and future baseline, implementation of the flow measures would result in overall increases in steelhead spawning and rearing habitat and would provide a net benefit to upstream and downstream passage opportunities for the species. All impacts to steelhead resulting from flow measures (that is, decreases of summer juvenile rearing habitat and a loss of 1 day of upstream passage) nevertheless provide net benefits in spawning and rearing habitat and upstream and downstream passage opportunities for the species, crucial for anadromous steelhead. In addition, the potential short-term impacts of implementing the non-flow measures would be reduced with the implementation of BMPs and offset by the long-term benefits of increased habitat and migration conditions. Maintenance, monitoring, and the Phase 1 AMP adaptive measures would be consistent with those of the Proposed Project and would likewise result in few impacts to steelhead, steelhead habitat, and migration conditions. These benefits would improve conditions for the anadromous steelhead population.

When compared with the current and future baseline, implementation of the flow measures would result in overall increases to Chinook salmon fry and juvenile rearing habitat and downstream migration opportunities, variable changes to upstream migration opportunities, and decreases to effective spawning habitat for the species. Although upstream migration opportunities may be reduced in certain reaches compared with the future baseline (for example, Los Gatos Creek and Guadalupe Creek), there would be minimal changes to Alamitos Creek and the Guadalupe River. Under the Proposed Project, the Guadalupe River would maintain relatively high passage opportunities for Chinook salmon, which would allow the species plenty of opportunities to enter the watershed, migrate upstream, and spawn when conditions are present. However, the decreased effective spawning habitat may result in increased competition among spawners and decreased redd productivity because of reduced availability of effective spawning habitat. The operations associated with the Proposed Project are management actions that optimize benefits for federally listed steelhead, and they would continue to support fall-run Chinook salmon. There are some impacts to habitat suitability for certain life stages of fall-run Chinook salmon (spawning and incubation and upstream migration), but the impacts would not be substantial given the total amount of modeled effective spawning habitat available and the total number of upstream passage days that would be maintained under the Proposed Project.

The potential short-term impacts of implementing the non-flow measures would be reduced with the implementation of BMPs and offset by the long-term benefits of increased habitat and migration conditions, including increased effective spawning habitat and migration opportunities. There would be net benefits of implementing the flow and non-flow measures notwithstanding the adverse impacts of the flow measures (decreased modeled effective spawning habitat and slight decreases in modeled upstream migration days in some areas of the watershed) and the short-term impacts of the non-flow measures. Maintenance, monitoring, and the Phase 1 AMP adaptive measures would be consistent with those of the Proposed Project and would likewise result in few impacts to Chinook salmon, Chinook salmon habitat, and migration conditions. Overall, the Proposed Project would support increased abundance of Chinook salmon in the watershed, which would lead to increased population health and greater genetic diversity.

When compared with the current and future baseline, implementation of the flow measures would result in overall increases in Pacific lamprey upstream and downstream passage opportunities; increases in pre-spawning holding, spawning, and larvae rearing habitat in the winter and early spring; and decreases in pre-spawning holding, spawning, and larvae rearing habitat in the summer. Benefits to pre-spawning holding, spawning, and larvae rearing habitat would occur in winter and early spring, with decreases to habitat during the summer. Decreases in flow and high temperature in the summer would affect only the late stages of Pacific lamprey spawning and incubation in this watershed. There are some decreases in modeled habitat suitability for certain life stages of Pacific lamprey but they are not anticipated to impact the Pacific lamprey population, given the total amount of available habitat in the watershed that would still be available.

The potential short-term impacts of implementing the non-flow measures would be reduced with the implementation of BMPs and offset by the long-term benefits of increased habitat and migration conditions, including increased larvae rearing habitat and migration opportunities. There would be net benefits of implementing the flow and non-flow measures notwithstanding the adverse impacts of the flow measures (decreases in pre-spawning holding, spawning, and larvae rearing habitat in the summer) and the short-term impacts of the non-flow measures. Maintenance, monitoring, and the Phase 1 AMP adaptive measures would be consistent with those of the Proposed Project and would likewise result in few impacts to Pacific lamprey, Pacific lamprey habitat, and migration conditions. Overall, the Proposed Project would support increased abundance of Pacific lamprey in the watershed, which would lead to increased population health and greater genetic diversity.

When compared with the current and future baseline, implementation of the flow measures would result in overall increases in Sacramento hitch spawning and fry rearing habitat in the winter and early spring and decreases in the habitat in the summer. Decreases in flow in the summer are negligible when compared with the current and future baselines in the Guadalupe River and Los Gatos Creek, where Sacramento hitch are known to occur (Smith 2013; Stillwater Sciences 2018). Decreases in wetted rearing habitat would occur only during May and November. There would be some modeled decreases to modeled habitat metrics for Sacramento hitch, but these are not expected to affect the Sacramento hitch population given the large amount of available habitat in the watershed.

The potential short-term impacts of implementing the non-flow measures would be reduced with the implementation of BMPs and offset by the long-term benefits of increased habitat, including increased spawning and fry rearing habitat. There would be net benefits of implementing the flow and non-flow measures, notwithstanding the adverse impacts of the flow measures (decreases in spawning and rearing habitat in the summer) and the short-term impacts of the non-flow measures. Maintenance, monitoring, and the Phase 1 AMP adaptive measures would be consistent with those of the Proposed Project and would likewise result in few impacts to Sacramento hitch and Sacramento hitch habitat. Overall, the Proposed Project is expected to support increased abundance of Sacramento hitch in the watershed, which would lead to increased population health and greater genetic diversity.

When compared with the current and future baseline, implementing the flow measures would result in overall increases in riffle sculpin spawning and fry rearing habitat in the winter and early spring, and decreases in the habitat in the summer. Decreases in flow in the summer are negligible when compared with the current and future baselines in the Guadalupe River and Guadalupe Creek, where riffle sculpin are known to occur (Valley Water unpublished data 2004–2017; Valley Water 2019c, 2020b, 2021b). The reduction in wetted area and increased temperatures during the summer are unlikely to have an effect on riffle sculpin spawning and incubation habitat. Decreases in wetted rearing habitat would be minimal in the Guadalupe River, where fry rearing habitat is abundant. In Guadalupe Creek, fry rearing habitat would increase during winter and decrease in May, likely attributable to reduced wetted area. Given the benefits to habitat during the winter and spring, the impacts in the summer would have negligible effects on the species. There would be some modeled decreases to habitat metrics for riffle sculpin but these are not expected to affect the riffle sculpin population given the large amount of available habitat in the watershed.

The potential short-term impacts of implementing the non-flow measures would be reduced with the implementation of BMPs and offset by the long-term benefits of increased habitat, including increased spawning and fry rearing habitat. There would be net benefits of implementing the flow and non-flow measures, notwithstanding the impacts of the flow measures (decreases in spawning and rearing habitat in the summer) and the short-term impacts of the non-flow measures. Maintenance, monitoring, and the Phase 1 AMP adaptive measures would be consistent with those of the Proposed Project and would likewise result in few impacts to riffle sculpin and riffle sculpin habitat. Overall, the Proposed Project would support increased abundance of riffle sculpin in the watershed, which would lead to increased population health and greater genetic diversity.

When the results of the Proposed Project are analyzed within the Guadalupe River watershed, the effects of the flow and non-flow measures provide an overall benefit to native fish species populations analyzed in this discussion (steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin) within the study area. While there are some decreases in modeled habitat, overall habitat is abundant in the watershed, and non-flow measures would provide more habitat; therefore, the overall population of the species would be increased by the long-term results of the flow and non-flow measures combined, resulting in greater population health and genetic diversity over the long term.

Mitigation

No mitigation would be required for Impact AQUA-1b.

3.7.7.3 Aquatic Biological Resources Impacts Summary

Table 3.7-4 summarizes the aquatic biological resources impacts of the Proposed Project. Specific to the aquatic biological resources section, this summary table specifies the short- and long-term effects of the non-flow measures.

Table 3.7-4. Aquatic Biological Resources Impact Summary

Impact	Common Name Scientific Name	Flow/ Non-flow Measures	Flow Measures Compared With Future/Current Baseline	Level of Significance before Mitigation	Applicable Mitigation	Level of Significance with Mitigation Incorporated	Includes Benefits	Types of Benefits
AQUA-1a (Stevens Creek)	Central California Coast steelhead *Oncorhynchus mykiss*	Flow Measures	Current	NI	N/A	NI	Yes	Effective spawning, fry rearing, and juvenile rearing habitat; upstream passage to lower reaches of watershed; downstream passage throughout Stevens Creek
		Flow Measures	Future	NI	N/A	NI	Yes	Effective spawning, fry rearing, and juvenile rearing habitat; upstream passage to lower reaches of watershed; downstream passage throughout Stevens Creek
		Non-flow Measures	Short-term	LTS	N/A	LTS	No	N/A
		Non-flow Measures	Long-term	NI	N/A	NI	Yes	Effective spawning, fry rearing, and juvenile rearing habitat; upstream and downstream passage

Impact	Common Name Scientific Name	Flow/ Non-flow Measures	Flow Measures Compared With Future/Current Baseline	Level of Significance before Mitigation	Applicable Mitigation	Level of Significance with Mitigation Incorporated	Includes Benefits	Types of Benefits
AQUA-1a (Stevens)	Pacific lamprey *Entosphenus tridentatus*	Flow Measures	Current	NI	N/A	NI	Yes	Winter pre-spawning holding habitat; larvae rearing habitat; upstream and downstream passage
		Flow Measures	Future	NI	N/A	NI	Yes	Winter pre-spawning holding habitat; larvae rearing habitat; upstream and downstream passage
		Non-flow Measures	Short-term	LTS	N/A	LTS	No	N/A
		Non-flow Measures	Long-term	NI	N/A	NI	Yes	Pre-spawning holding, spawning, and larvae rearing habitat; upstream and downstream passage

Impact	Common Name Scientific Name	Flow/ Non-flow Measures	Flow Measures Compared With Future/Current Baseline	Level of Significance before Mitigation	Applicable Mitigation	Level of Significance with Mitigation Incorporated	Includes Benefits	Types of Benefits
AQUA-1b (Guadalupe)	Central California Coast steelhead *Oncorhynchus mykiss*	Flow Measures	Current	NI	N/A	NI	Yes	Upstream passage to lower reaches; downstream passage
		Flow Measures	Future	NI	N/A	NI	Yes	Effective spawning and fry rearing habitat; juvenile rearing habitat in the spring; upstream and downstream passage
		Non-flow Measures	Short-term	LTS	N/A	LTS	No	N/A
		Non-flow Measures	Long-term	NI	N/A	NI	Yes	Effective spawning, fry rearing, and juvenile rearing habitat; upstream and downstream passage

Impact	Common Name Scientific Name	Flow/ Non-flow Measures	Flow Measures Compared With Future/Current Baseline	Level of Significance before Mitigation	Applicable Mitigation	Level of Significance with Mitigation Incorporated	Includes Benefits	Types of Benefits
AQUA-1b (Guadalupe)	Central Valley fall-run Chinook salmon *Oncorhynchus tshawytscha*	Flow Measures	Current	LTS	N/A	LTS	Yes	Fry and juvenile rearing habitat; downstream passage
		Flow Measures	Future	LTS	N/A	LTS	Yes	Fry and juvenile rearing habitat; downstream passage
		Non-flow Measures	Short-term	LTS	N/A	LTS	No	N/A
		Non-flow Measures	Long-term	NI	N/A	NI	Yes	Effective spawning, fry rearing, and juvenile rearing habitat; upstream and downstream passage

Impact	Common Name Scientific Name	Flow/ Non-flow Measures	Flow Measures Compared With Future/Current Baseline	Level of Significance before Mitigation	Applicable Mitigation	Level of Significance with Mitigation Incorporated	Includes Benefits	Types of Benefits
AQUA-1b (Guadalupe)	Pacific lamprey *Entosphenus tridentatus*	Flow Measures	Current	NI	N/A	NI	Yes	Pre-spawning holding, spawning, and larvae rearing habitat in winter and early spring; upstream and downstream passage
		Flow Measures	Future	NI	N/A	NI	Yes	Pre-spawning holding, spawning, and larvae rearing habitat in winter and early spring; upstream and downstream passage
		Non-flow Measures	Short-term	LTS	N/A	LTS	No	N/A
		Non-flow Measures	Long-term	NI	N/A	NI	Yes	Pre-spawning holding, spawning, and larvae rearing habitat; upstream and downstream passage
AQUA-1b (Guadalupe)	Sacramento hitch *Lavinia exilicauda*	Flow Measures	Current	NI	N/A	NI	Yes	Effective spawning and fry rearing habitat in winter and early spring
		Flow Measures	Future	NI	N/A	NI	Yes	Effective spawning and fry rearing habitat in winter and early spring
		Non-flow Measures	Short-term	LTS	N/A	LTS	No	N/A
		Non-flow Measures	Long-term	NI	N/A	NI	Yes	Effective spawning and fry rearing habitat

Impact	Common Name Scientific Name	Flow/ Non-flow Measures	Flow Measures Compared With Future/Current Baseline	Level of Significance before Mitigation	Applicable Mitigation	Level of Significance with Mitigation Incorporated	Includes Benefits	Types of Benefits
AQUA-1b (Guadalupe)	Riffle Sculpin *Cottus gulosus*	Flow Measures	Current	NI	N/A	NI	Yes	Effective spawning and fry rearing habitat in winter and early spring
		Flow Measures	Future	NI	N/A	NI	Yes	Effective spawning and fry rearing habitat in winter and early spring
		Non-flow Measures	Short-term	LTS	N/A	LTS	No	N/A
		Non-flow Measures	Long-term	NI	N/A	NI	Yes	Effective spawning and fry rearing habitat

Notes: LTS = less-than-significant impact, N/A = not applicable, NI = no impact

3.8 Terrestrial Biological Resources

This section describes the terrestrial biological resources of the study area, including vegetation communities, wildlife habitats, common wildlife and plant species, and special-status wildlife and plant species. It also includes non-fish aquatic species and their habitats. In addition, this section discusses the Proposed Project's impacts to plants, wildlife, and habitats in the study area, including special-status species and vegetation communities. These analyses are supported by the information contained in Appendix P, *Terrestrial Biological Resources Technical Memorandum*.

The Project area described in Chapter 2, *Project Description*, includes the two watersheds in northern Santa Clara County, California, where Valley Water holds water rights licenses: Stevens Creek and Guadalupe River. The study area, as it pertains to the terrestrial biological analysis, is limited to the streams and adjacent habitat that occur within these two watersheds that could be affected by implementation of the Proposed Project. Specifically, the study area in the Stevens Creek Watershed would occur within and on terrestrial lands adjacent to Stevens Creek, downstream of the Stevens Creek Dam and upstream of the tidally influenced section of the creek (approximately midway between Highway 101 and the Crittenden Lane pedestrian bridge). The study area for the Guadalupe watershed includes Alamitos Creek, Guadalupe Creek, Los Gatos Creek, and the Guadalupe River and adjacent terrestrial areas. The study area begins below the associated dams and ends upstream of the tidally influenced section of Guadalupe River (approximately located at the pedestrian bridge downstream of the Montague Expressway). Additional detail regarding the extent of the study area on adjacent terrestrial habitat is further explained in Section 3.8.3, *Methodology*.

The analysis of fisheries resources is provided in Section 3.7, *Aquatic Biological Resources*. Chapter 1, *Introduction*, provides a list of the regulatory permits and agency concurrence requirements that would apply to wildlife (terrestrial and aquatic) resources; Section 3.7.5 includes detail on certain regulations and ordinances that apply to both aquatic and terrestrial biological resources.

3.8.1 Environmental Setting

The environmental setting represents the existing conditions of terrestrial biological resources in the study area. Furthermore, portions of the environmental setting are broken out generally into the two watersheds (Stevens Creek and Guadalupe River) within which the study areas are located to make the discussion of resources more streamlined. The current baseline year for the analysis of terrestrial resources is 2020, although some environmental setting information is based on older studies or data that are nevertheless representative of 2020 conditions. This setting forms the basis for comparison of Proposed Project impacts.

The total length of all creeks and rivers in the study area is approximately 90 miles, which comprises the following aquatic features (collectively referred to as "streams" or "creeks") that could be directly or indirectly affected by Proposed Project-related activities:

- Stevens Creek (22.28 miles)
- Guadalupe Creek (9.83 miles)
- Guadalupe River (21.68 miles)
- Calero Creek (3.97 miles)
- Alamitos Creek (7.68 miles)
- Los Gatos Creek (24.83 miles)

In addition to the identified creeks and rivers, the study area for terrestrial species that could be affected by Proposed Project-related activities, specifically non-flow measures, includes the riparian and other lands adjacent to areas where the non-flow measures could be implemented. Additional detail is described in Section 3.8.3.

3.8.1.1 Climate and Soils

Santa Clara County has a Mediterranean climate characterized by mild, wet winters and warm, dry summers. The unique natural communities, soil types, and temperature regimes of the area have resulted in endemic plant species that are adapted to long periods of drought and frequent fire events. Soil types ultimately play a large role in influencing distributions of habitats, endemic plants, and wildlife. Soils in and immediately surrounding San Francisco Bay tend to be fine textured, clayey soils that were deposited by tidal events. Soils in the valley lowlands and farther inland are very deep, medium to fine-textured soils ranging from poorly to excessively drained. Soils higher in the Santa Clara Valley and in the foothills might be derived from sedimentary, basic igneous, or sometimes serpentine rock with clayey, loamy textured soils (CGS 2015).

Serpentine soils and bedrock support a unique assemblage of endemic plant and animal species in California, and Santa Clara County in particular. These soils form from weathered ultramafic rocks that provide relatively inhospitable conditions for plant growth. Plant species found on serpentine soils are adapted to, or are able to tolerate, these harsh, nutrient-poor soil conditions in areas where other plant species cannot grow as easily. Therefore, many special-status plants are endemics that are restricted to outcroppings of serpentine soils in Santa Clara County. A more detailed discussion of the geology and soils of the Project area is included in Section 3.11, *Geology and Soils.*

3.8.1.2 Land Use

The northern half of Santa Clara County is extensively urbanized by 13 of the county's 15 cities and 90 percent of its nearly 1.7 million residents. The southern half of the county is mostly rural within the two-watershed study area with the exception of scattered low-density residential developments. In addition to livestock and poultry, agricultural land uses include field crops (for example, alfalfa, grain, and pasture), bushberries, strawberries, floral crops, forest products, fruits and nuts, vegetable crops, seed crops, and nursery crops (for example, bedding plants, ornamental trees and shrubs, and Christmas trees) (Santa Clara County 2009).

3.8.1.3 Land Cover Types

The Santa Clara Valley, which is dominated by agricultural and developed land uses, runs the length of the study area and is ringed by rolling hills. Land cover types in the Diablo Range to the east include grasslands, chaparral, and oak savannah (Santa Clara County 2018a). Many land cover types in this area are heavily influenced by serpentine soils which make up a large portion of the Diablo Range foothills. Cover types to the west in the Santa Cruz Mountains include rolling grasslands, oak woodlands, and mixed hardwood and evergreen forests (Santa Clara County 2018a). The Baylands occupy the northern portion of the study area and consist mostly of former salt evaporation ponds and remnant and restored marshes and wetlands.

Land Cover Classification and Mapping Overview

Because Valley Water's service area is so vast and contains some terrestrial communities and habitats that might not be subject to the Proposed Project measures, for the purposes of this EIR, only the communities and habitat types that occur within the study area for terrestrial biological resources are discussed in this section. Land cover type, dominant plant species, and stream and canal mapping in the terrestrial biological resources study area was determined using Aerial Information

Systems, Inc., originally developed for Valley Water's SMP in 2011 and 2014 (Valley Water 2011, 2014a).

This information was supplemented by landcover mapping by CALVEG (2021), which was then mapped against the California Wildlife Habitat Relationship System (CWHR) according to the methodology used in the SMP (Valley Water 2011) to determine land cover within portions of the study area that were not within the Aerial Information Systems, Inc.-surveyed areas. Furthermore, these land cover types were cross-walked with those spelled out in the Santa Clara VHP. The extent of the study area and the fine scale of the mapping units make it impractical to include maps depicting vegetation mapping units throughout the entire study area at a scale that allows illustration in the EIR text. Future, project-specific CEQA review would provide more detailed information and analysis once specific non-flow project areas are proposed. However, Table 3.8-1 shows a breakdown of the CWHR land cover types queried in each of the two study areas (Stevens Creek and Guadalupe River watersheds) with estimated acreages of each.

Table 3.8-1. CWHR Land Cover Types Within the Study Area

Stevens Creek Watershed		Guadalupe Watershed	
CWHR Type	**Sum of Acres**	**CWHR Type**	**Sum of Acres**
Annual Grass	47.92	Annual Grass	665.26
Barren	1.23	Barren	6.95
Chamise-Redshank Chaparral	23.72	Blue Oak Woodland	30.70
Coastal Oak Woodland	58.61	Chamise-Redshank Chaparral	45.70
Coastal Scrub	6.37	Coastal Oak Woodland	378.21
Cropland	7.08	Coastal Scrub	6.18
Fresh Emergent Wetland	19.48	Cropland	154.82
Lacustrine	138.50	Fresh Emergent Wetland	77.16
Montane Hardwood-Conifer	0.00	Lacustrine	1,022.24
Saline Emergent Wetland	71.30	Mixed Chaparral	5.09
Urban	1,025.91	Saline Emergent Wetland	189.92
Valley Foothill Riparian	109.83	Urban	3,249.72
Valley Oak Woodland	33.94	Valley Foothill Riparian	531.81
Total	**1,543.87**	Valley Oak Woodland	91.26
		Total	**6,455.01**

Conclusively, the study area (Guadalupe River and Stevens Creek watersheds) includes the following land cover types and wildlife habitats: freshwater emergent wetlands, freshwater marsh, seasonal wetland, riparian forest and woodland, willow riparian forest, mixed riparian forest, central California sycamore alluvial woodland, ruderal grasslands, serpentine bunchgrass, mixed serpentine chaparral, chaparral and coastal sage scrub oak woodland, croplands, montane hardwood conifer, creek and stream channels, canals, barren/disturbed areas, and open water. The dominant and characteristic plant and animal species for each of these communities and land cover types are described below.

In addition to the land cover types discussed below, the study area also includes areas of developed habitat (including roads) and nonnative landscape trees.

Freshwater Wetlands

Freshwater wetlands in the study area can be divided into two distinct sub-communities: freshwater marsh and seasonal wetlands. These wetland habitats are oftentimes protected under state and or federal law (see Section 3.8.2). Water availability and microhabitat conditions, such as shading and soils, can determine the composition of wetland species.

Freshwater Marsh

Freshwater marshes are present primarily where perennial or near-perennial inundation by shallow, fresh water occurs in an open (that is, not wooded) environment. In the study area, freshwater marsh communities tend to occur in relatively long, linear patches, such as those along the lower freshwater reaches of streams that feed into the Bay (for example, the Guadalupe River) and along Guadalupe Creek near the Los Capitancillos Percolation Ponds.

These marshes typically are densely vegetated and dominated by bulrush (*Scirpus* spp.), rushes (*Juncus* spp.), sedges (*Cyperus* spp.), bur reed (*Sparganium* spp.), and cattails (*Typha* spp.). Other common freshwater marsh herbs in Santa Clara County are native and non-native smartweeds (*Polygonum* or *Persicaria* spp.) and primrose (*Ludwigia* spp.; Valley Water 2011).

Freshwater marshes provide habitat for numerous bird species including ducks (*Anas* spp.), gulls (*Larus* spp.), terns (*Anous* spp., *Procelsterna* spp., and *Gygis* spp.), herons and egrets (*Ardea* spp., *Egretta* spp.), and other waterbirds. Soras (*Porzana carolina*) and Virginia rails (*Rallus limicola*) are known to forage in freshwater marshes in the study area during migration and in winter. American coots (*Fulica americana*), common moorhens (*Gallinula chloropus*), pied-billed grebes (*Podilymbus podiceps*), and several species of ducks breed in freshwater wetlands, channels, and ponds in and around emergent vegetation in the study area. Passerine species that are known to breed in freshwater marshes include the marsh wren (*Cistothorus palustris*), song sparrow (*Melospiza melodia*), common yellowthroat (*Geothlypis trichas*), and red-winged blackbird (*Agelaius phoeniceus*) (Valley Water 2011).

Additionally, amphibians such as the native Sierran treefrog (*Pseudacris sierra*) and western toad (*Anaxyrus boreas*), as well as the non-native American bullfrog (*Lithobates catesbeianus*), have the potential to occur in this habitat. However, special-status amphibians such as the California tiger salamander (*Ambystoma californiense*) and the California red-legged frog (*Rana draytonii*) are not known to breed in the small patches that have been mapped as freshwater marsh habitat in the study area, although they have been observed in freshwater marshes in the surrounding mountains (Valley Water 2011).

Seasonal Wetlands

Seasonal wetlands form during the rainy season, typically in topographic low areas with underlying confining soil layers (generally clays and silts) that prevent water from percolating into the ground. Seasonal wetlands can also form in areas with seasonally high groundwater tables. Seasonal wetlands in the study area typically occupy smaller, more discrete areas than freshwater marshes. In many parts of the study area, seasonal wetlands have been disturbed or lost because of urban development or agriculture.

Dominant plant species include those noted above for the freshwater marsh, including rushes and sedges such as tall umbrella sedge (*Cyperus eragrostis*), but they are more commonly dominated by non-native annual hydrophytic species such as rabbitsfoot grass (*Polypogon monspeliensis*), hyssop loosestrife (*Lythrum hyssopifolium*), white sweetclover (*Melilotus albus*), and bristly ox-tongue (*Picris echioides*; Valley Water 2011).

Wildlife use of seasonal wetlands in the study area depends largely on the duration and depth of ponding, the extent of open water, and the structure and type of emergent vegetation. Most of the seasonal wetlands in the study area provide little open water, and they generally do not provide deep water. As a result, they are used primarily for winter and spring foraging by waterbirds such as shorebirds, ducks, and geese (*Anser* spp., *Branta* spp.). Song sparrows and red-winged blackbirds are known to nest in vegetation in those seasonal wetlands that support taller, denser vegetation, and a variety of finches, sparrows, and other birds use this vegetation for cover and foraging habitat.

Seasonal wetlands that provide standing water for at least several months support successful breeding by western toads and Sierran treefrogs, while seasonal wetland swales that do not provide sufficient ponding provide only foraging habitat and moist refugia for these amphibians. In some areas, seasonal wetlands provide suitable breeding conditions for California tiger salamanders, if they hold water through May, and for California red-legged frogs, if they hold water into July. Common garter snakes (*Thamnophis sirtalis*) and western terrestrial garter snakes (*Thamnophis elegans*) forage in these wetlands for amphibian larvae (Valley Water 2011).

Riparian Forests, Woodlands, and Scrub

As a result of the long history of human disturbance, isolation, and other agricultural and urban-associated pressures that began in the late 1700s, many riparian habitats in the study area have undergone a shift in composition. In addition, riparian forests and woodlands in the study area are predominantly restricted to narrow corridors along streams, and many reaches of streams support little or no woody vegetation. In some areas, channels are lined with concrete, riprap, or gabions (for example, the Guadalupe River near Hillsdale Avenue). Although native trees dominate most riparian woodlands (for example, cottonwood [*Populus* spp.], willow [*Salix* spp.], and California box elder [*Acer negundo* var. *californicum*]) and forests (for example, sycamore [*Platanus racemose*]) in the study area, nonnative species are also present, such as eucalyptus (*Eucalyptus* spp.), giant reed (*Arundo donax*), tree-of-heaven (*Ailanthus altissima*), elms (*Ulmus* spp.), and others, occurring frequently along these riparian systems (Valley Water 2011).

In some areas, riparian forests and woodlands have been protected, and in some cases restored (particularly along the larger streams such as the Guadalupe River), by Valley Water and others. Even though riparian land cover is limited, these habitats contribute a disproportionately high amount to landscape-level wildlife species diversity. The presence of water and abundant invertebrate fauna provide foraging opportunities for many species. The diverse habitat structure provides cover, nesting opportunities, and migratory corridors for many wildlife species in the region, supporting the most diverse bird communities in the study area (Valley Water 2011).

Three major types of riparian forest and scrub communities occur in the study area: willow riparian forests, woodlands, and scrub; mixed riparian forests and woodlands; and central California sycamore alluvial woodlands (ICF 2012). While most riparian habitats are considered a sensitive community, central California sycamore alluvial woodland communities are specifically considered a sensitive natural community by CDFW (CDFW 2021b).

Willow Riparian Forests, Woodlands, and Scrub

Willow riparian forests, woodlands, and scrub make up the most common riparian land cover type in the study area. These woodlands occur in the majority of drainages in the Santa Clara Valley. Willow species, such as red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), sandbar willow (*Salix exigua*), and mulefat (*Baccharis salicifolia*), dominate willow riparian forests, woodlands, and scrub habitat in the study area. Most willow riparian habitat in the study area supports invasive trees such as black locust (*Robinia pseudoacacia*), holly oak (*Quercus ilex*), eucalyptus, tree-of-heaven, and elms as well as invasive herbaceous plants such as periwinkle (*Vinca major*) and English ivy (*Hedera helix*) that dominate the understory. Other areas contain native understory species such as California blackberry, poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), and Mexican elderberry (*Sambucus mexicana*; Valley Water 2011).

Willow riparian habitats that include large, mature riparian trees occur along portions of the Guadalupe River, with smaller areas dominated by mature trees present along other SMP-maintained streams as well. Dominant native canopy species in these areas include willows and Fremont cottonwood (*Populus fremontii* spp. *fremontii*) along with native understory species such as elderberry and wild rose (*Rosa californica*). Dense, native willow riparian forests may provide habitat for relatively high densities of native nesting songbirds such as song sparrows, black-headed grosbeaks (*Pheucticus melanocephalus*), and warbling vireos (*Vireo gilvus*). This habitat also is more likely to support native bird and mammal species such as Swainson's thrushes (*Catharus ustulatus*), yellow warblers (*Dendroica petechia*), yellow-breasted chats (*Icteria virens*), and San Francisco dusky-footed woodrats (*Neotoma fuscipes annectens*).

The wider, more mature willow riparian corridors contain suitable foraging and breeding habitat for several functional groups of birds, including insectivores (for example, warblers and flycatchers), seed-eaters (for example, finches), raptors, and cavity-nesters (for example, swallows and woodpeckers). Among the numerous species of birds that use the riparian habitats in the study area for breeding are the Pacific-slope flycatcher (*Empidonax difficilis*), black-headed grosbeak, warbling vireo, yellow warbler, belted kingfisher (*Ceryle alcyon*), and black-chinned hummingbird (*Archilochus alexandri*).

Several species of reptiles and amphibians have the potential to occur in these riparian corridors within the study area. Leaf litter, downed tree branches, and fallen logs can provide cover for species such as the arboreal salamander (*Aneides lugubris*), western toad, and Sierran treefrog. Several lizards can also use this habitat, including western fence lizard (*Sceloporus occidentalis*), western skink (*Eumeces skiltonianus*), and southern alligator lizard (*Elgaria multicarinata*). State SSC Western pond turtles (*Actinemys marmorata*) and the nonnative red-eared sliders (*Trachemys scripta*) are known to use riparian habitat, particularly for breeding and over-wintering (Valley Water 2011).

Bats and small mammals, such as ornate shrew (*Sorex ornatus*), California vole (*Microtus californicus*), and Audubon's cottontail (*Sylvilagus audubonii*), may use these riparian habitats as well. San Francisco dusky-footed woodrats occur, often at high densities, in riparian habitats in less developed areas, but they are often absent from heavily urbanized streams. Medium-sized mammals, such as raccoon (*Procyon lotor*) and striped skunk (*Mephitis mephitis*), also are common in this habitat. Non-natives such as opossum (*Didelphis virginiana*), eastern fox squirrel (*Sciurus niger*), Norway rat (*Rattus norvegicus*), red fox (*Vulpes vulpes*), and feral cat (*Felis catus*) can harass, compete with, or depredate native birds and their eggs, small mammals, amphibians, and reptiles, thereby reducing the quality of this habitat for native riparian wildlife species (Valley Water 2011).

Mixed Riparian Forest and Woodland

Mixed riparian forest and woodland habitat occurs in several drainages and persists in the foothills of the study area along upstream reaches of Alamitos Creek, and Calero Creek. White alder (*Alnus rhombifolia*), bigleaf maple (*Acer macrophyllum*), and western creek dogwood occur in lower densities in the study area.

Mixed riparian forest and woodland habitat is composed of white alder, Fremont cottonwood, California sycamore (*Platanus racemosa*), coast live oak (*Quercus agrifolia*), valley oak (*Quercus lobata*), California bay (*Umbellularia californica*), and box elder (*Acer negundo*). Understory trees and shrubs include willows (*Salix* spp.), California buckeye (*Aesculus californica*), native and introduced blackberry (*Rubus* spp.), and poison oak (*Toxicodendron diversilobum*; Valley Water 2011). Mixed riparian forest and woodland also provides habitat for the special-status, California Rare Plant Rank (CRPR) 1B plant western leatherwood (*Dirca occidentalis*).

The structural diversity of mixed riparian forests in the study area may support high diversities of riparian-breeding species, and many of the same species found in willow riparian forests also are present in mixed riparian habitats, but the lower vegetation volume of mixed riparian forests results in lower bird densities. Additional species that prefer low-density riparian habitats and higher structural diversity are likely to be present throughout this habitat type, species including chestnut-backed chickadees (*Poecile rufescens*), oak titmice (*Baeolophus inornatus*), bushtits (*Psaltriparus minimus*), finches, black phoebes (*Sayornis nigricans*), California scrub-jays (*Aphelocoma californica*), house wrens (*Troglodytes aedon*), American robins (*Turdus migratorius*), and dark-eyed juncos (*Junco hyemalis*). Raptors, such as red-shouldered hawks (*Buteo lineatus*) and Cooper's hawks (*Accipiter cooperii*), nest in these riparian corridors and forage in adjacent habitats. Oak, cottonwood, and sycamore trees also support cavity-nesting bird species such as woodpeckers, American kestrels (*Falco sparverius*), and barn owls (*Tyto alba*) as well as bat colonies (Valley Water 2011).

Central California Sycamore Alluvial Woodland

Central California sycamore alluvial woodland, a CDFW sensitive natural community, occurs primarily in the upper watersheds above the study area, in Alamitos, Guadalupe, and Stevens Creeks. It occurs on broad valley floors along low, braided riparian channels. This land cover type usually forms only where floodplains are broad and hydrology remains unmodified, specifically along low-gradient streams flowing over deep alluvial deposits, and where there are sufficient winter pulse flows and natural summer dry backs of the creek channel, with persistent high subsurface flow. Sycamore alluvial woodland stands have an open canopy dominated by California sycamore, often interspersed with white alder and willows. Other associated species can include valley oak, coast live oak, and California bay. Winter flows typically scour the understory vegetation each season, so herbaceous vegetation is spare and patchy. Riparian species such as willows, coyote brush (*Baccharis pilularis*), mulefat, California buckeye, blackberry, Italian thistle (*Carduus pycnocephalus*), poison oak, common chickweed (*Stellaria media*), and bedstraw (*Galium aparine*) can occur along the outer stream banks (Valley Water 2011).

Sycamore woodlands may provide habitat for many species of bats, including the pallid bat (*Antrozous pallidus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), Yuma myotis (*Myotis yumanensis*), California myotis (*Myotis californicus*), and big brown bat (*Eptesicus fuscus*). Cavity-nesting bird species, such as woodpeckers and American kestrels, are also likely to breed in this habitat. Red-tailed hawks (*Buteo jamaicensis*), red-shouldered hawks, great-horned owls (*Bubo virginianus*), and other raptors are known to nest in the larger trees in this habitat and forage in adjacent habitats. Species that prefer thick understory cover, such as towhees and sparrows, are less abundant in sycamore woodlands compared with other riparian habitats (Valley Water 2011).

Ruderal/Nonnative Grasslands

California annual grassland habitat occurs commonly on undeveloped parcels and constructed levees throughout the study area. Grassland communities are characterized by a dominance of grass and herb species, with less than 10 percent cover by trees and shrubs. Dominant plant species are non-native annual grasses such as ripgut brome (*Bromus diandrus*), Italian ryegrass (*Festuca perennis*), and wild oats (*Avena* spp.). Associated species include many native and nonnative forbs such as California poppy (*Eschscholzia californica*), lupine (*Lupinus* spp.), and filaree (*Erodium* spp.).

Native grassland habitat (non-serpentine) is distributed in small patches throughout portions of the California annual grassland habitat and typically includes a component of native purple needlegrass (*Nassella pulchra*) growing in association with wild oats and ripgut brome.

A small area of rock outcrops consisting of exposed non-serpentine bedrock occurs in the study area in California annual grassland habitat north of Alamitos Creek in the Santa Teresa Hills. These rock outcrops are devoid of soil and typically do not support vascular plants except within crevices that have accumulated soil. One exception is that several species of non-special status dudleya (*Dudleya* spp.) are able to grow in cracks and fractures of the outcrops. In addition, mosses and other epiphytes can grow in some crevices that can retain water for a short duration (Valley Water 2011).

Wildlife use of grasslands in much of the study area is limited by human disturbance, the extent of the habitat in a specific area, the abundance of non-native and invasive species, and the isolation of grassland habitat remnants from more extensive grasslands. As a result, some of the wildlife species associated with extensive grasslands, such as grasshopper sparrows (*Ammodramus savannarum*), breeding Bryant's savannah sparrows (*Passerculus sandwichensis alaudinus*), and western meadowlarks (*Sturnella neglecta*), are thought to be absent from small patches of grassland within the urban matrix that occupies most of the study area. However, much of the grassland around the periphery of the study area is contiguous with larger expanses of grassy open space and thus provides higher-quality habitat for grassland-associated wildlife species.

California ground squirrels (*Spermophilus beecheyi*), where they are present, are an important component of these grassland communities, providing a prey base for diurnal raptors and terrestrial predators. The burrows of California ground squirrels also provide refugia for several special-status wildlife species such as burrowing owl (*Athene cunicularia*) and California tiger salamander. Other rodent species that are likely present in grassland habitats include California vole, valley pocket gopher (*Thomomys bottae*), and deer mouse (*Peromyscus maniculatus*). Diurnal raptors such as red-tailed hawks, northern harriers (*Circus cyaneus*), white-tailed kites (*Elanus leucurus*), and American kestrels are known to forage for these small mammals over grasslands during the day, and, at night, nocturnal raptors such as barn owls forage for nocturnal rodents such as deer mice. Loggerhead shrikes (*Lanius ludovicianus*) forage in grassland habitats for insects and other prey.

Open grassland habitat with bare ground is important foraging habitat for pallid bats. Mammals such as coyotes (*Canis latrans*), American badgers (*Taxidea taxus*), black-tailed jackrabbits (*Lepus californicus*), and striped skunks use grassland habitats in the study area for foraging. Reptiles such as western fence lizards, southern alligator lizards, western skinks, western terrestrial garter snakes, gopher snakes (*Pituophis catenifer*), racers (*Coluber constrictor*), northern Pacific rattlesnakes (*Crotalus oreganus oreganus*), and California kingsnakes (*Lampropeltis californiae*) also frequent these habitats (Valley Water 2011).

Chaparral and Coastal Scrub

In the study area, chaparral and coastal scrub land cover types were mapped primarily between Calero Reservoir and Almaden Quicksilver Park. These communities are characterized by drought-tolerant, shrub-dominated landscapes that are exposed to intense sunlight. These habitat types form dense stands of shrubs with little understory and are prone to intense and regular fire cycles in natural settings. After a fire event, these habitat types recover quickly and support extraordinary blooms of annual forbs adapted to fire during the first few years as the shrub canopy develops. Typical dominant species found in chaparral communities are chamise (*Adenostoma fasciculatum*), bigberry manzanita (*Arctostaphylos glauca*), ceanothus (*Ceanothus* spp.), and scrub oak (*Quercus* spp.). Typical dominant species found in coastal scrub communities are black sage (*Salvia mellifera*), coyote brush, and California sagebrush (*Artemisia californica*). Coastal scrub communities generally occur on exposed sites with shallow, rocky soils. Overall, the shrub species that make up coastal scrub communities are lower in stature than chaparral and appear more open. In contrast, once the manzanita and ceanothus shrubs that dominate chaparral reach maturity, these plants form a dense, impenetrable thicket of broad-leaved sclerophyllous[14] shrubs (Valley Water 2011).

Chaparral and coastal scrub habitats typically are dry and provide relatively low and homogeneous structure. In addition, the areas where these habitats occur in the study area are small and often surrounded by other habitat types, such as annual grassland and oak woodland. Therefore, wildlife use of these areas is largely determined by adjacent habitats. Nevertheless, a number of animal species occur in these habitats.

Amphibians are usually absent or scarce in chaparral habitats because of the habitats' very dry conditions, and many other wildlife species occurring here either derive moisture directly from food or synthesize their water metabolically from seeds (for example, the California pocket mouse [*Chaetodipus californicus*]).

Mammals that use chaparral and coastal scrub habitats for cover include coyote, bobcat (*Lynx rufus*), and brush rabbit (*Sylvilagus bachmani*). Nests of San Francisco dusky-footed woodrats often are present where oaks and/or poison oak are mixed with coyote brush scrub. California mice (*Peromyscus californicus*), which often occupy woodrat nests, also are present. Bird species known to nest in chaparral habitats include California thrasher (*Toxostoma redivivum*), California towhee (*Pipilo crissalis*), spotted towhee (*Pipilo maculatus*), California quail (*Callipepla californica*), wrentit (*Chamaea fasciata*), loggerhead shrike, lesser goldfinch (*Carduelis psaltria*), and Anna's hummingbird (*Calypte anna*). Rufous-crowned sparrows (*Aimophila ruficeps*) often nest where these habitats are dominated by California sagebrush.

Reptiles with the potential to occur in these habitats include gopher snake, western rattlesnake, southern alligator lizard, striped racer (*Masticophis lateralis*), California horned lizard (*Phrynosoma coronatum frontale*), and western fence lizard (Valley Water 2011).

Serpentine

Serpentine bunchgrass, and mixed serpentine chaparral are considered sensitive communities by virtue of their importance to special-status plants and animals and their relatively limited extent (ICF 2012). There is no documented serpentine habitat in the Stevens Creek portion of the study area. Limited serpentine habitat is found in the Guadalupe River portion of the study area, described below.

Serpentine Bunchgrass Grasslands

Serpentine bunchgrass grasslands occur on soils derived from serpentine rock substrates. Most serpentine soils support a diverse grassland assemblage dominated by purple needlegrass, California dwarf plantain (*Plantago erecta*), and spring and summer wildflowers including goldfields (*Lasthenia* spp.), buttercup (*Ranunculus californicus*), purple owl's clover (*Castilleja exserta*), and tidy-tips (*Layia platyglossa* and *L. chrysanthemoides*), among many others. Native grasses, such as onion grass (*Melica* spp.), junegrass (*Koeleria macrantha*), big squirreltail (*Elymus multisetus*), creeping wildrye (*Leymus triticoides*), and other perennial bunchgrasses, are common throughout this community.

Serpentine grasslands are highly infertile because of their extremely high levels of magnesium, chromium, and nickel; low concentrations of nutrients such as calcium and nitrogen; and low water-holding capacity. A unique group of vascular plant species, which can tolerate the relatively high magnesium-to-calcium ratio, has evolved in response to these conditions. As a result, serpentine

[14] Sclerophyll is a type of vegetation that has hard leaves, short internodes, and leaf orientation parallel or oblique to direct sunlight.

grasslands generally support native plant communities, including rare plants such as the federally endangered Santa Clara Valley dudleya (*Dudleya setchellii*) and Metcalf Canyon jewel-flower (*Streptanthus albidus* ssp. *albidus*), as well as the CRPR 1B most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*) and smooth lessingia (*Lessingia micradenia* var. *glabrata*). In turn, several invertebrate species, including the federally threatened Bay checkerspot butterfly (*Euphydryas editha bayensis*), depend on serpentine grasslands because their host food plants are found primarily in these habitats (Valley Water 2011).

The Bay checkerspot butterfly occurs in native serpentine grassland communities that support dense stands of dwarf plantain, its primary larval food plant. Larvae also use secondary larval food plants such as owl's clover (*Orthocarpus* spp.), and adult butterflies use nectar from plants such as goldfields, onion (*Allium* spp.), tidy-tips, cream cups (*Platystemon californicus*), and lomatium (*Lomatium* spp.). This species is associated primarily with large expanses of serpentine grassland that are characterized by a diversity of slope exposures and moderate-to-high grazing intensity.

Bird species that occur most abundantly in serpentine grassland habitats in the study area include grasshopper sparrow, horned lark (*Eremophila alpestris*), rufous-crowned sparrow, and rock wren (*Salpinctes obsoletus*). These species are well adapted to the patchy distribution of bunchgrass vegetation in serpentine habitats (Valley Water 2011).

Within the study area, small areas of serpentine bunchgrass are found on the southside of Calero Dam, the eastside of Alamitos Creek downstream from Almaden Dam, and small areas on the eastside of Guadalupe Creek.

Mixed Serpentine Chaparral

Mixed serpentine chaparral is an uncommon chaparral type that is generally composed of chaparral species tolerant of a broad range of soil conditions as well as species that are limited to serpentine soils, species such as leather oak (*Quercus durata*), chaparral silktassel (*Garrya congdonii*), and big berry manzanita (*Arctostaphylos glauca*). The dominant shrubs in mixed serpentine chaparral are often dwarfed and spaced more widely than is typically seen in non-serpentine stands (Holland and Keil 1995). Grass and herbaceous vegetation may or may not be present in the spaces between the shrubs. This unique community is known to support many special-status plants such as Santa Clara thornmint (*Acanthomintha lanceolata*) and Sharsmith's harebell (*Campanula sharsmithiae*). Wildlife species typical of this community are similar to those described for chaparral and coastal scrub above (Valley Water 2011).

Within the study area, small areas of mixed serpentine chaparral are found on northside of Calero Creek upstream of its confluence with Alamitos Creek, the eastside of Alamitos Creek downstream from Almaden Dam, and small areas on the eastside of Guadalupe Creek.

Oak Woodland

Two oak woodland land cover types occur within the study area: valley oak woodland and blue oak woodland. Oak woodland communities in the study area typically occur at elevations above 300 feet and are characterized by native California oaks (for example, coast live oak, valley oak, and blue oak [*Quercus douglasii*]). Representative understory plants are weedy annual grasses, some native and introduced forbs, and occasional shrubs such as toyon, poison oak, California coffeeberry (*Rhamnus californica*), and common snowberry (*Symphoricarpos albus* var. *laevigatus*). The special-status species big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*) and robust monardella (*Monardella villosa* ssp. *globosa*) occur in oak woodland habitats. In oak and riparian woodland habitat fringing streams, the special status (CRPR 1B) Loma Prieta hoita (*Hoita strobilina*) may also occur.

Many of the oak woodland habitats in the study area have been fragmented by urban and suburban land uses. Nevertheless, they may support a number of the common oak associated wildlife species in the region. The California scrub-jay, acorn woodpecker (*Melanerpes formicivorus*), oak titmouse, Nuttall's woodpecker (*Picoides nuttallii*), chestnut-backed chickadee, spotted towhee, and white-breasted nuthatch (*Sitta carolinensis*) are year-round residents. Dusky-footed woodrats also are frequently found in oak woodlands. The deer mouse, California mouse, and the introduced eastern gray squirrel (*Sciurus carolinensis*) nest and forage in this habitat as well. Reptiles found in adjacent grassland and scrub habitats also occur regularly in oak woodland habitats. Bats, such as pallid bats, might use hollows of larger, older oak trees for roosting in open-canopy oak woodland. The California myotis and long-eared myotis (*Myotis evotis*) might occur in areas of oak woodland with a closed canopy (Valley Water 2011).

Open Water

Aquatic or open-water habitats are permanently or semi-permanently flooded and support minimal vegetation in emergent or submerged states. Isolated ponds, reservoirs, percolation ponds, rivers, streams, canals, and ditches represent the open-water surfaces mapped in the study area. Such areas are described below in terms of the hydrologic regimes and the salinity of the water.

Ponds and Reservoirs

Very few naturally occurring ponds exist in the study area. There are many human-made ponds, including old gravel excavation sites, stock ponds, or ornamental ponds associated with golf courses and parks. Other waterbodies in the study area include the reservoirs and percolation ponds along Los Gatos, Stevens, and Guadalupe Creeks, and the Guadalupe River.

There are six reservoirs in the study area: Calero, Guadalupe, Lexington, Stevens Creek, Vasona, and Almaden were built between 1935 and 1952. These reservoirs were built to provide water supply and storage uses for county residents. Reservoirs have altered downstream hydrology by reducing spring runoff events, dampening flood peaks and frequency, and supplying water to creeks and adjacent habitat areas that would normally be dry during summer months. They also retain sediment, thereby preventing natural sediment dispersal throughout the watershed.

Cormorants, gulls, and pelicans exhibit movements between foraging areas at inland reservoirs and the south bay, and ospreys (*Pandion haliaetus*), Forster's terns (*Sterna forsteri*), and Caspian terns (*Sterna caspia*) forage for fish in a number of ponds and reservoirs in the study area. Since the late 1990s, small heron rookeries have become established near inland reservoirs in the south bay; these herons and egrets forage mainly on fish in these waterbodies (Valley Water 2011).

Amphibian species known to breed in ponds and reservoirs throughout the study area include Sierran treefrog, bullfrog, and western toad. State SSC western pond turtles are known to occur in a number of streams, including Guadalupe River and Alamitos Creek, several Valley Water reservoirs (Almaden, Calero, Stevens Creek, Lexington, etc.), and other small ponds throughout the study area (H. T. Harvey & Associates 1999; CDFW 2021a). This species can occur in creek, pond, and reservoir habitats throughout the study area; though in urban areas, nesting habitat is limited or absent. Several non-native turtle species have been introduced into the study area as well.

State listed foothill yellow-legged frogs (*Rana boylii)* are often found in partially shaded shallow streams and riffles with a rocky substrate. The species occurs in a variety of habitats in coast ranges, and occurrences have been documented along Guadalupe Creek, Rincon Creek, and below Calero Reservoir along Llagas Creek (CDFW 2021a). State and federally protected California tiger salamanders are known to breed in several ponds at the periphery of the study area, where non-instream aestivation habitat is available and nonnative aquatic predators, such as bullfrogs, green sunfish (*Lepomis cyanellus*), mosquitofish (*Gambusia affinis*), and Louisiana red crayfish (*Procambarus clarkii*), are absent. Federally protected California red-legged frogs are known from ponds and streams in a few areas at the periphery of the study area; however, this species is largely absent from the portions of the study area on the Santa Clara Valley floor that have been heavily affected by urban development and agricultural activities (CDFW 2021a).

Common resident birds that occur in ponds, lakes, and reservoirs throughout the study area include pied-billed grebe (*Podilymbus podiceps*), double-crested cormorant (*Phalacrocorax auritus*), great egret, snowy egret (*Egretta thula*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), common merganser (*Mergus merganser*), American coot, and killdeer (*Charadrius vociferus*). Numerous species of wintering ducks, such as northern shoveler (*Anas clypeata*), lesser scaup (*Aythya affinis*), and bufflehead (*Bucephala clangula*), occur in these habitats during fall and winter. Shorebirds, such as the greater yellowlegs (*Tringa melanoleuca*) and spotted sandpiper (*Actitis macularius*), forage and roost at the edges of these habitats during migration and winter. Additionally, a variety of mammals come to ponds and reservoirs to drink (Valley Water 2011).

Creek and Stream Channels

Creek and stream channels have been divided into three types for the purposes of the existing SMP: natural, mixed, and concrete. Natural channels are streams that have an unmodified bed and banks. Mixed channels have modified channels but have earthen stream-bottoms. The banks of mixed channels are often lined with excavated earth, rock riprap, gabions, concrete, or flood walls. Concrete-type channels are defined by concrete lining in the channel bed. Natural and mixed creek and stream channels can be vegetated with wetland vegetation, riparian vegetation, or open water, depending on the extent and type of modification applied (Valley Water 2011).

Amphibians, such as foothill yellow-legged frogs, western toads, Sierran treefrogs, and non-native bullfrogs, may occur in creeks and stream channels in the study area. The native western pond turtle is present in low numbers in some reaches of these streams, as are several species of non-native turtles that have been released locally from captivity, such as red-eared sliders and painted turtles (*Chrysemys picta*). Waterbirds such as mallards, green herons (*Butorides virescens*), great egrets (*Ardea alba*), and belted kingfishers forage in these waters. Bats, including Yuma myotis and big brown bats, forage aerially on insects over these streams.

Canals

Valley Water-maintained canals (such as Almaden, Calero, and Vasona Canals) are used to divert water between streams or around certain stream reaches, or from one reservoir to another; canals also provide a flood protection benefit by intercepting hillside runoff. Some canals, such as Almaden Calero Canal are concrete-lined and as a result support little riparian or wetland vegetation other than vegetation that establishes on sediment that accumulates in the canals in areas where perennial seeps flow into the canal. As a result, dominant vegetation along these canals is determined primarily by the type of adjacent habitat (for example, grassland or woodland) in which the canals have been constructed. Amphibians such as Sierran treefrogs and western toads use perennially wet sections of the canals for refuge and as breeding habitat. Ducks such as mallards forage in canals in low numbers, and use of these facilities by waterbirds is generally low (Valley Water 2011).

Urban/Developed

Urban development has occurred within or adjacent to most other habitats in California, with the highest density at lower elevations. Urban/developed areas, which are dominated by structures and pavement, make up more than 40 percent of the study area. Within the study area boundaries, urban/developed areas generally consist of disturbed areas that are dominated by pavement and built structures. The urban/developed category also includes vegetated corridors along highways and patches of ornamental vegetation such as tree groves, street strips, shade trees, lawns, shrubs, and other ornamental vegetation typically supported by irrigation.

Urban areas generally support only a few common wildlife species rather than a diverse wildlife community. Common species using the urban/developed habitat in the study area include the American crow (*Corvus brachyrhynchos*), Anna's hummingbird (*Calypte anna*), red-shouldered hawk (*Buteo lineatus*), northern mockingbird (*Mimus polyglottos*), black phoebe (*Sayornis nigricans*), Say's phoebe (*Sayornis saya*), California towhee (*Melozone crissalis*), house finch (*Haemorhous mexicanus*), American goldfinch (*Spinus tristis*), lesser goldfinch (*Spinus psaltria*), bushtit (*Psaltriparus minimus*), and, in winter, white-crowned sparrow (*Zonotrichia leucophrys*) and golden-crowned sparrow (*Zonotrichia atricapilla*). Common mammal species that occur in urban/developed habitat include the native raccoon, coyote, striped skunk, and the nonnative Norway rat.

3.8.1.4 Special-status Plant and Wildlife Species

For the purposes of this EIR, special-status plant and wildlife species are those species that meet one or more of the following criteria:

- Species that are listed as threatened or endangered under the federal ESA (50 CFR 17.12 for listed plants, 50 CFR 17.11 for listed animals)
- Species that are candidates for possible future listing as threatened or endangered under the ESA (76 Federal Register 66370)
- Species that are listed or proposed for listing by the State of California as threatened or endangered under CESA (14 California Code of Regulations Section 670.5)
- Plants listed as rare under the Native Plant Protection Act (NPPA; Fish and Game Code Section 1900 et seq.)
- Plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California"
- CRPR List 1A and 1B
- Species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines Section 15380)
- Wildlife fully protected in California (Fish and Game Code Sections 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians])
- Covered species under the VHP (Section 1.2.4, *Covered Species*)

Special-status Plants

All special-status plants with the potential to occur in the study area were carried forward for detailed analysis in this EIR, except that CRPR List 3 and 4 species (see Section 3.8.2 for a description) were carried forward only if:

- The only known populations occur in Santa Clara County;
- The species has been recorded by CNPS (2018) as occurring in no more than two counties in California, including Santa Clara County (that is, very limited distribution);
- Populations in the study area are at the periphery of the species' range or in areas where the taxon is especially uncommon or has sustained heavy losses; or
- The type locality occurs in the study area.

Based on the literature review discussed in Section 3.8.1.1, a list of 65 special-status plants was compiled and listed in Appendix P, *Terrestrial Biological Resources Technical Memorandum*, in Table P-1. This table also lists the species' regulatory status, its known habitat associations, its analysis status for this EIR, and the rationale for its inclusion or exclusion from further analysis in this EIR. Of the 66 special-status plant species pulled forth from the literature review, 26 were determined to not have the potential for occurrence, leaving 40special-status plant species for consideration. The special-status plant species carried forward for analysis are:

- Anderson's manzanita (*Arctostaphylos andersonii*) – CRPR 1B.2
- Arcuate bush-mallow (*Malacothamnus arcuatus*) – CRPR 1B.2
- Ben Lomond buckwheat (*Eriogonum nudum* var. *decurrens*) – CRPR 1B.1
- Bent-flowered fiddleneck (*Amsinckia lunaris*) – CRPR 1B.2
- Big-scale balsamroot (*Balsamorhiza macrolepis*) – CRPR 1B.2
- Bristly sedge (*Carex comosa*) – CRPR 2B.1
- California alkali grass (*Puccinellia simplex*) – CRPR 1B.2
- Chaparral ragwort (*Senecio aphanactis*) – CRPR 2B.2
- Choris' popcornflower (*Plagiobothrys chorisianus* var. *chorisianus*) – CRPR 1B.2
- Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) – CRPR 1B.1
- Contra Costa goldfields (*Lasthenia conjugens*) – FE, CRPR 1B.1
- Coyote ceanothus (*Ceanothus ferrisae*) – FE, CRPR 1B.1, VHP
- Davidson's bush-mallow (*Malacothamus davidsonii*) – CRPR 1B.2
- Deceiving sedge (*Carex saliniformis*) – CRPR 1B.2
- Fragrant fritillary (*Fritillaria liliacea*) – CRPR 1B.2
- Hall's bush-mallow (*Malacothamnus hallii*) – CRPR 1B.2
- Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*) – CRPR 1B.1
- Lesser saltscale (*Atriplex minuscula*) – CRPR 1B.1
- Loma Prieta hoita (*Hoita strobilina*) – CRPR 1B.1, VHP
- Metcalf Canyon jewelflower (*Streptanthus albidus* ssp. *albidus*) – FE, CRPR 1B.1, VHP
- Minute pocket moss (*Fissidens pauperculus*) – CRPR 1B.2
- Most beautiful jewelflower (*Streptanthus albidus* ssp. *peramoenus*) – CRPR 1B.2, VHP
- Mt. Hamilton fountain thistle (*Cirsium fontinale* var. *campylon*) – CRPR 1B.2, VHP
- Northern curly-leaved monardella (*Monardella sinuate* spp. *nigrescens*) – CRPR 1B.2
- Pacific Grove clover (*Trifolium polyodont*) – CRPR 1B.1
- Pink creamsacs (*Castilleja rubicundula* var. *rubicundula*) – CRPR 1B.2
- Prostrate vernal pool navarretia (*Navarretia prostrata*) – CRPR 1B.1
- Saline clover (*Trifolium hydrophilum*) – CRPR 1B.2
- San Francisco collinsia (*Collinsia multicolor*) – CRPR 1B.2
- San Joaquin spearscale (*Extriplex joaquinana*) – CRPR 1B.2
- San Mateo woolly sunflower (*Eriophyllum latilobum*) – FE, CE, CRPR 1B.1
- Santa Clara Valley dudleya (*Dudleya abramsii* ssp. *setchellii*) – FE, CRPR 1B.1, VHP
- Santa Cruz clover (*Trifolium buckwestiorum*) – CRPR 1B.1
- Slender-leaved pondweed (*Stuckeniafiliformis* ssp. *alpina*) – CRPR 2B.2

- Smooth lessingia (*Lessingia micradenia* var. *glabrata*) – CRPR 1B.2, VHP
- Tiburon paintbrush (*Castilleja affinis* var. *neglecta*) – FE, state threatened (ST), 1B.2, VHP
- Western leatherwood (*Dirca occidentalis*) – CRPR 1B.2
- White-flowered rein orchid (*Piperia candida*) – CRPR 1B.2
- White-rayed Pentachaeta (*Pentachaeta bellidiflora*) – FE, CE, CRPR 1B.1
- Woodland woolythreads (*Monolopia gracilens*) – CRPR 1B.2

Those species listed in Appendix P, *Terrestrial Biological Resources Technical Memorandum*, but not carried forward in the analysis were removed from the analysis for one or more of the following reasons:

- There is a lack of suitable habitat for the species;
- The elevation range of the species is outside the range in the study area;
- The study area is outside of the known species range; or
- The species is thought to have been extirpated from the region.

Special-status Wildlife Species

Based on review of those materials discussed in Section 3.8.3.1, a list of 53 special-status wildlife species potentially occurring in the study area was compiled and is listed in Appendix P. Appendix P, Table P-2, also lists each species' regulatory status, its preferred habitat, its analysis status for this EIR, and the rationale for its inclusion or exclusion from further analysis in this EIR. Of the 53 special-status wildlife species identified in the literature review, 25 were determined to not have the potential for occurrence, leaving 28 special-status wildlife species for consideration. The special-status wildlife species carried forward for analysis are:

- Bay checkerspot butterfly (*Euphydryas editha bayensis*) – FE, VHP
- American badger (*Taxidea taxus*) – SSC
- Pallid bat (*Antrozous pallidus*) – SSC
- San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) – SSC
- Foothill yellow-legged frog (*Rana boylii*) – state endangered (SE), VHP
- Western pond turtle (*Actinemys marmorata*) – SSC, VHP
- California giant salamander (*Dicamptodon ensatus*) – SSC
- California tiger salamander (*Ambystoma californiense*) – FT, ST, VHP
- California red-legged frog (*Rana draytonii*) – FT, SSC, VHP
- Santa Cruz black salamander (*Aneides niger*) – SSC
- Coast horned lizard (*Phrynosoma blainvillii*) – SSC
- American peregrine falcon (*Falco peregrinus anatum*) – fully protected (FP)
- Bald eagle (*Haliaeetus leucocephalus*) – SE, FP
- Burrowing owl (*Athene cunicularia*) – SSC, VHP
- California least tern (*Sternula antillarum browni*) – FE, SE, FP
- Grasshopper sparrow (*Ammodramus savannarum*) – SSC
- Golden eagle (*Aquila chrysaetos*) – FP
- LBV (*Vireo bellii pusillus*) – FE, SE, VHP
- Loggerhead shrike (*Lanius ludovicianus*) – SSC

- Long-eared owl (*Asio otus*) – SSC
- Northern harrier (*Circus cyaneus*) – SSC
- Purple martin (*Progne subis*) – SSC
- Southwestern willow flycatcher (*Empidonax traillii extimus*) – FE, SE
- Swainson's hawk (*Buteo swainsoni*) – ST
- Tricolored blackbird (*Agelaius tricolor*) – ST, VHP
- White-tailed kite (*Elanus leucurus*) – FP
- Yellow rail (*Coturnicops noveboracensis*) – SSC
- Yellow-breasted chat (*Icteria virens*) – SSC

Those species listed in Appendix P, *Terrestrial Biological Resources Technical Memorandum*, but not carried forward in the analysis were determined to be absent from the study area for one or more of the following reasons:

- Do not have extant populations or occurrences and are not known to breed or would not potentially breed in the study area;
- Do not occur fairly commonly as nonbreeders in the study area (and thus would not be substantially affected by activities that occur under the Proposed Project);
- Are not described in the VHP as potentially occurring in the study area; and/or
- Are not species about which the resource agencies and/or the VHP have expressed particular concern such that an expanded discussion is required.

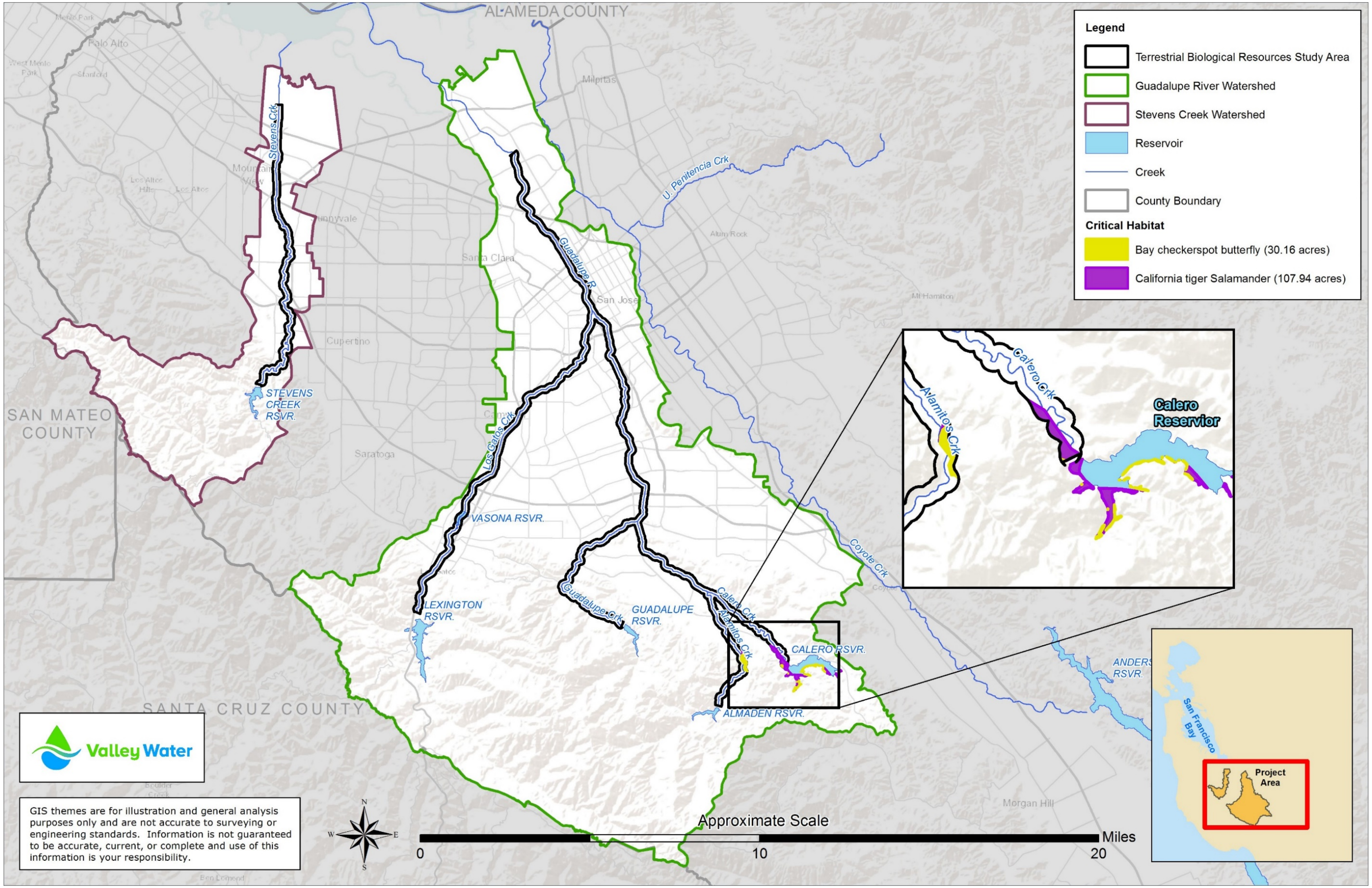
Critical Habitat

Critical habitat, as defined in the federal ESA (see Section 3.8.2), has been designated wholly or partly within the study area or adjacent areas for the following species:

- Bay checkerspot butterfly
- California tiger salamander

The critical habitat is shown in Figure 3.8-1.

Figure 3.8-1. Critical Habitat



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Other Regulated and Sensitive Natural Communities

Waters, Streams, Lakes, and Other Waters of the U.S./Waters of the State

These habitats are extremely important in supporting numerous plant and wildlife species in the study area. Throughout California, the quality and quantity of aquatic and wetland habitat types has dramatically declined because of the construction of dams, dikes, and levees as well as water diversions, the filling of aquatic and wetland habitat for development, and the overall degradation of general water quality caused by inputs of runoff from agricultural and urban development and other sources. As a result of their importance and the declines in these habitats that have occurred, aquatic and wetland habitat types are considered sensitive.

As described in in detail in Section 3.8.2, many streams, lakes, and wetlands in the study area are regulated by USACE as “waters of the U.S.” and/or by the SWRCB and/or the San Francisco Bay RWQCB as “waters of the state.” In addition, the state finds that the protection and conservation of fish and wildlife resources are of the “utmost public interest” (Fish and Game Code Section 1600), and CDFW regulates effects on the bed, channel, or bank of any river, stream, or lake.

Riparian Habitats

As described in in detail in Section 3.8.2, CDFW considers streams and riparian habitat as sensitive. Therefore, along the creeks within the study area, CDFW may consider areas below the top of bank as sensitive and also subject to Fish and Game Code Section 1600. In areas where the tree canopy in riparian woodland extends above the top of bank, the CDFW regularly identifies the landward canopy edge as the demarcation of the lateral limit of CDFW jurisdictional sensitive riparian habitat.

Oak Woodlands

Oak woodlands are considered one of California’s most productive and important natural communities. They support a rich plant and wildlife community. As a result, numerous state and local agencies have established guidelines, regulations, and ordinances regarding the conservation of oak woodlands (for example, Oak Woodlands Conservation Act [Fish and Game Code Sections 1360 to 1372], SB 1334, and the Santa Clara County Oak Woodlands Management Plan [2005]). Consequently, this community is considered sensitive.

Sensitive Natural Communities

CDFW assigns global (G) and state (S) ranks based on rarity of and threats to vegetation communities in California. Natural communities with ranks of S1–S3 are considered Sensitive Natural Communities by CDFW. Many of the riparian forests, serpentine, oak woodland, and central California sycamore alluvial woodland communities in the study area are listed as sensitive natural communities (CDFW 2021b) and are described in Section 3.8.1.3.

3.8.1.5 Invasive Species

For over two centuries, people have brought non-native plants and animals into the study area, either accidentally (for example, as stowaways in cargo shipments) or intentionally (for example, imported for food, ornament, sport, or as pets), and many of these species have now been introduced into the wild. Such species that cause harm and, once established, spread quickly from their point of introduction are often called “invasive” species. Invasive species can threaten the diversity and abundance of native species through predation, competition for resources, transmission of disease, parasitism, and physical or chemical alteration of the habitat. Their effects on natural communities can also lead to direct effects on human activities, effects such as clogging waterways and water delivery systems, weakening flood-protection structures, damaging crops, and diminishing sport fish populations (CDFW 2013).

Invasive plant species, such as perennial pepperweed (*Lepidium* spp.) and giant reed, are common in the study area. Introduced animal species are also common in the study area. A few of the more common introduced and/or invasive wildlife and fish species present, or with a high potential to be introduced, are discussed in this section.

Mosquito fish (*Gambusia affinis*) have been introduced throughout the world, including Santa Clara County, to control mosquito populations. Such introductions have been shown to have negative effects on amphibians in experimental studies, including decreased survival of larval Sierran treefrogs and California newts (*Taricha torosa*), as well as tail injury, reduced metamorph size, and altered activity patterns of larval California red-legged frogs (CDFW 2013).

New Zealand mud snails (*Potamopyrgus antipodarum*) reproduce rapidly and can crowd out the native insects that aquatic wildlife depend on for survival. The species was first discovered in California in 2000 in the Owens River in Mono County (CDFW 2013). In relation to the study area, they have since been identified in Guadalupe River, Guadalupe Creek, Alamitos Creek, and Stevens Creek (U.S. Geological Survey 2021).

The American bullfrog has been accidentally and intentionally introduced (for example, for food in the 1920s by commercial frog farmers) throughout the world and is now established throughout most of the western United States, including the study area (CDFW 2013). Their large size, mobility, generalized eating habits (their prey includes native amphibians as well as other aquatic and riparian vertebrates), and aggressive behavior have made bullfrogs extremely successful invaders and a threat to biodiversity (CDFW 2013).

Additional nonnative species such as feral house cats, red foxes, and Norway rats are also known to occur in the study area, some of which are significant predators of native birds.

3.8.2 Regulatory Setting

This section summarizes the federal and state laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to terrestrial biological resources as well as wetlands.

3.8.2.1 Federal

Endangered Species Act

The ESA provides protective measures for federally listed threatened and endangered species, including their habitats, from unlawful take (16 USC 1531–1544). The ESA defines take to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Part 222 of 50 CFR further defined harm to include an act that actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including feeding, spawning, rearing, migrating, feeding, or sheltering.

ESA Section 7(a)(1) requires federal agencies to use their authority to further the conservation of listed species. ESA Section 7(a)(2) requires consultation with USFWS or NMFS if a federal agency undertakes, funds, permits, or authorizes (termed the federal nexus) any action that may impact endangered or threatened species or designated critical habitat.

For projects that may result in the incidental take of threatened or endangered species, or critical habitat, and that lack a federal nexus, a Section 10(a)(1)(b) incidental take permit can be obtained from USFWS and/or NMFS. To receive a permit, the applicant must develop an HCP for approval by

USFWS or NMFS. The issuance of an incidental take permit requires the USWFS or NMFS to go through internal Section 7(a)(2) consultation. The Santa Clara VHP, described in Section 3.8.2.3, is an approved HCP covering ESA-listed terrestrial species (see Appendix E, *General Conditions of the Valley Habitat Plan Applicable to FAHCE FHRP*). The VHP does not cover aquatic species.

For further discussion of the ESA, see Section 3.7, *Aquatic Biological Resources*.

Clean Water Act Sections 404 and 401

CWA Section 404 (33 USC 1344) established the program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Under this regulation, discharges of dredged or fill material into waters of the U.S. require obtaining a permit prior to initiation.

The primary objective of this program is to ensure that the significant adverse impacts associated with discharge of dredged or fill material are, sequentially, first avoided, then minimized, then fully mitigated, and that such discharges are not permitted if a practicable alternative to the proposed activities exists, resulting in the implementation of the least environmentally damaging practicable alternative and any necessary compensatory mitigation. To comply with these objectives, a permittee must document the measures taken to avoid and minimize impacts to waters of the U.S. and provide compensatory mitigation for any unavoidable impacts, as well as other alternatives to the proposed activities considered and rejected.

Under Section 401 of the CWA, a federal agency like USACE cannot issue a license or permit to conduct any activity that may result in a discharge of dredge or fill material into waters of the U.S. until the state agency with jurisdiction over water quality in the state where the discharge would originate has granted or waived a Section 401 Water Quality Certification that any such discharge will not violate state water quality standards.

Any work that involves potential discharges of dredged or fill material within waters of the U.S. (that is, wetlands and other waters), including relatively large waterways, certain small drainages, and wetlands may require a Section 404 permit from USACE and a Section 401 Water Quality Certification from the San Francisco Bay RWQCB. Most freshwater wetlands and open-water habitats are generally considered waters of the U.S. subject to the CWA. Isolated wetlands and seeps that are not connected to jurisdictional waters of the United States generally would not be considered waters of the U.S. subject to the CWA but would be addressed by other state resource protection laws discussed below.

Migratory Bird Treaty Act

Migratory birds are protected under the Migratory Bird Treaty Act of 1918 (MBTA) (16 USC 703–711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21).

Fish and Wildlife Coordination Act of 1958 (16 U.S. Code 661 et seq.)

The Fish and Wildlife Coordination Act requires that whenever any body of water is proposed or authorized to be impounded, diverted, or otherwise controlled or modified, the lead federal agency must consult with USFWS, the state agency responsible for fish and wildlife management, and NMFS. Section 662(b) of the Act requires the lead federal agency to consider the recommendations of USFWS and other agencies. The recommendations may include proposed measures to mitigate or compensate for potential damages to wildlife and fisheries associated with a modification of a waterway.

Executive Order 13112 – Invasive Species

Executive Order (EO) 13112 directs all federal agencies to refrain from authorizing, funding, or carrying out actions or projects that may spread invasive species. The order further directs federal agencies to prevent the introduction of invasive species, control and monitor existing invasive species populations, restore native species to invaded ecosystems, research and develop prevention and control methods for invasive species, and promote public education on invasive species. As part of the proposed action, USFWS and USACE would issue permits and, therefore, would be responsible for ensuring that the proposed action complies with EO 13112 and does not contribute to the spread of invasive species.

National Invasive Species Act

The National Invasive Species Act of 1996 reauthorized and amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 with a number of findings that highlighted a need for an additional management measure to prevent further introduction and infestation of destructive species. This Act reauthorized the ballast water management program to demonstrate efficacy of technologies and practices for preventing the introduction of nonnative species.

Executive Order 11990 – Protection of Wetlands

EO 11990 (42 Federal Register 26961) requires federal agencies to provide leadership and take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural qualities of these lands. Federal agencies are required to avoid undertaking or providing support for new construction located in wetlands unless (1) no practicable alternative exists and (2) all practical measures have been taken to minimize harm to wetlands.

3.8.2.2 State

California Endangered Species Act

CESA establishes various requirements and protections regarding species listed as threatened or endangered under state law (Fish and Game Code Sections 2050 to 2089). California's Fish and Wildlife Commission is responsible for maintaining lists of threatened and endangered species under CESA. CESA prohibits the "take" of listed and candidate (petitioned to be listed) species (Fish and Game Code Section 2080). "Take" under California law means to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch capture, or kill" (Fish and Game Code Section 86). The state definition does not include "harm" or "harass" as the federal definition does. As a result, the threshold for take under CESA is typically higher than that under the federal ESA.

Fish and Game Code Section 2081 allows for take incidental to otherwise lawful development projects. A Section 2081 permit is not available to authorize take of fully protected species.

CDFW would provide CESA coverage for incidental take of covered species under the VHP. For areas that are not covered by the VHP, such as Stevens Creek, or for noncovered species, a CESA Incidental Take Permit would be required for take of any state listed species.

Natural Community Conservation Planning Act

The Natural Community Conservation Planning Act (NCCP Act) identified a need for "broad-based planning to provide for effective protection and conservation of the state's wildlife heritage while continuing to allow appropriate development and growth" [California Fish and Game Code Section 2801(b)]. The Act describes the use of natural community conservation planning as a tool to protect species diversity and reduce conflict. An NCCP is the state conservation plan that focuses on the conservation of natural communities at a landscape level. It provides a means of complying with the NCCP Act (California Fish and Game Code Section 2835) and securing CESA take authorization at the state level in exchange for conservation of natural communities. The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale and contribute to species' recovery, while accommodating compatible and lawfully adopted land uses and authorizing incidental take associated with those land uses. To be approved by CDFW, an NCCP must provide for the conservation of species and protection and management of natural communities, as well as listed species associated with those communities, in perpetuity within the area covered by permits.

The NCCP Act requires that conservation actions improve the overall condition of a species and must be applied at the regional scale to promote the long-term recovery of species, protection of habitat and natural communities, and diversity of species at the landscape level.

CDFW would provide CESA coverage for incidental take of covered species under the VHP, which is an NCCP.

California Fish and Game Code Section 1600 to 1616

Section 1600 of the Fish and Game Code states that "the protection and conservation of the fish and wildlife resources of this state are of utmost public interest. Fish and wildlife are the property of the people and provide a major contribution to the economy of the state, as well as providing a significant part of the people's food supply; therefore their conservation is a proper responsibility of the state" (2004). Fish and Game Code Section 1602 lays out the process for state regulation of activities that may "substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, …"

Section 1602 of the Fish and Game Code requires that CDFW be notified of lake or streambed alteration activities. Valley Water would apply for Section 1602 Streambed Alteration Agreements for the Proposed Project for those activities that would occur within the jurisdiction of CDFW and would require a Streambed Alteration Agreement.

California Fish and Game Code – Fully Protected Species

California statutes afford fully protected status to a number of specifically identified birds, mammals, reptiles, and amphibians. These species cannot be taken, even with an incidental take permit. Fish and Game Code Section 3505 makes it unlawful to take "any aigrette or egret, osprey, bird of paradise, goura, numidi, or any part of such a bird."

Fish and Game Code Section 3511 protects from take the following fully protected birds: (1) American peregrine falcon (*Falco peregrinus anatum*), (2) brown pelican (*Pelecanus occidentalis*), (3) California black rail (*Laterallus jamaicensis coturniculus*), (4) California clapper rail (*Rallus longirostris obsoletus*), (5) California condor (*Gymnogyps californianus*), (6) California least tern (*Sterna albifrons browni*), (7) golden eagle (*Aquila chrysaetos*), (8) greater sandhill crane (*Grus canadensis tabida*), (9) light-footed clapper rail (*Rallus longirostris levipes*), (10) southern bald eagle (*Haliaeetus leucocephalus leucocephalus*), (11) trumpeter swan (*Cygnus buccinator*), (12) white-tailed kite (*Elanus leucurus*), and (13) Yuma clapper rail (*Rallus longirostris yumanensis*).

Fish and Game Code Section 4700 identifies the following fully protected mammals that cannot be taken: (1) Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*); (2) bighorn sheep (*Ovis canadensis*), except Nelson bighorn sheep (subspecies *Ovis canadensis nelsoni*); (3) northern elephant seal (*Mirounga angustirostris*); (4) Guadalupe fur seal (*Arctocephalus townsendi*); (4) ring-tailed cat (*genus Bassariscus*); (5) Pacific right whale (*Eubalaena sieboldi*); (6) salt-marsh harvest mouse (*Reithrodontomys raviventris*); (7) southern sea otter (*Enhydra lutris nereis*); and (8) wolverine (*Gulo gulo*).

Fish and Game Code Section 5050 protects from take the following fully protected reptiles and amphibians: (1) blunt-nosed leopard lizard (*Crotaphytus wislizenii silus*), (2) San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), (3) Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*), (4) limestone salamander (*Hydromantes brunus*), and (5) black toad (*Bufo boreas exsul*).

Fish and Game Code Section 5515 identifies certain fully protected fish that cannot lawfully be taken, even with an incidental take permit. The following species are protected in this fashion: (1) Colorado River squawfish (*Ptychocheilus lucius*), (2) thicktail chub (*Gila crassicauda*), (3) Mohave chub (*Gila mohavensis*), (4) Lost River sucker (*Catostomus luxatus*), (5) Modoc sucker (*Catostomus microps*), (6) shortnose sucker (*Chasmistes brevirostris*), (7) humpback sucker (*Xyrauchen texanus*), (8) Owens River pupfish (*Cyprinoden radiosus*), (9) unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*), and (10) rough sculpin (*Cottus asperrimus*).

California Fish and Game Code Sections 3503, 3513, and 3800

Fish and Game Code Sections 3503, 3513, and 3800 protect raptors and native and migratory birds, including their active or inactive nests and eggs, from all forms of take. In addition, species that are “fully protected” from all forms of take are listed in Section 3511 (birds), Section 5515 (fish), Section 4700 (mammals), and Section 5050 (amphibians). No permit is available to take these species.

California Fish and Game Code – Native Plant Protection Act

NPPA authorizes the Fish and Game Commission to designate plants as endangered or rare and prohibits take of any such plants, except as authorized under limited circumstances. CNPS has developed a set of lists of native plants in California according to rarity: the CRPR system. Plants on List 1A, List 1B, and List 2 meet the definitions of Section 1901, Chapter 10 (NPPA) or Sections 2060 and 2067 (CESA) of the Fish and Game Code (Sections 1900–1913) as rare or endangered species. These species have been considered during CEQA review of the Proposed Project in this EIR.

The NPPA also prohibits the taking, possessing, or sale within the state of any plants with a state designation of rare, threatened, or endangered (as defined by CDFW). An exception in the act allows landowners, under specified circumstances, to take listed plant species, if the owners first notify CDFW and give that state agency at least 10 days to retrieve the plants before they are plowed under or otherwise destroyed (Fish and Game Code Section 1913). Project impacts to these species are not considered significant unless the species are known to have a high potential to occur within the area of disturbance associated with construction of the proposed project.

State Definition of Covered Waters

Under California state law, waters of the state means “any surface water or groundwater, including saline waters, within the boundaries of the state” [California Water Code Section 13050(e)]. Therefore, water quality laws apply to both surface water and groundwater. After the U.S. Supreme Court decision in Solid Waste Agency of Northern Cook County v. US Army Corps of Engineers, 531 U.S. 159 (2001), the Office of Chief Counsel of the SWRCB released a legal memorandum confirming the state’s jurisdiction over isolated wetlands. The memorandum stated that under the Porter-Cologne, discharges to wetlands and other waters of the state are subject to state regulation, and this includes isolated wetlands. In general, SWRCB regulates discharges to isolated waters in much the same way as they do for waters of the U.S., using Porter-Cologne rather than CWA authority.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne) of 1966 (California Water Code Section 13000 et seq.; 23 California Code of Regulations Chapter 3, Subchapter 15) is the primary state regulation that addresses water quality. The requirements of the Act are implemented by SWRCB at the state level and at the local level by RWQCB. The RWQCB carries out planning, permitting, and enforcement activities related to water quality in California. The Act provides for waste discharge requirements and a permitting system for discharges to land or water. Certification is required by the RWQCB for activities that can affect water quality.

In 2019, SWRCB adopted a statewide wetland definition and state procedures for authorizing discharges of dredged or fill materials to wetlands and other waters of the state (SWRCB 2019). On April 6, 2021, SWRCB adopted a resolution to confirm that the “State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State” is in effect as state policy for water quality control.

The regulatory program includes the following components: a wetland definition; a framework for determining whether a feature that meets the wetland definition is a water of the state; wetland delineation procedures; procedures for application submittal; and the review and approval of Water Quality Certifications, Waste Discharge Requirements, and waivers of Waste Discharge Requirements for the discharge of dredge or fill material to both wetland waters of the state, which are defined in the regulations, as well as to non-wetland waters of the state, which are not defined in the regulations.

Under this program, individual Waste Discharge Requirements are required for some discharges to wetlands and other waters of the state that fall outside the definition of waters of the U.S. and are not included within the scope of a Section 401 certification. USACE can assert jurisdiction of waters that do not meet the definition of waters of the United States by requiring a preliminary jurisdictional determination and include them in a Section 401 certification, in which case waters of the state could be addressed by a Section 401 certification and not Waste Discharge Requirements.

Delegated Permit Authority

California has been delegated permit authority for the National Pollutant Discharge Elimination System (NPDES) permit program, including stormwater permits for all areas except tribal lands. Issuance of CWA Section 404 dredge and fill permits remains the responsibility of USACE; however, the state actively uses its CWA Section 401 certification authority to provide that CWA Section 404 permits are in compliance with state water quality standards.

3.8.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies the other regional and local regulations relevant to terrestrial biological resources.

County of Santa Clara General Plan

The following goals and policies of the Habitat and Biodiversity Element of the 2010 County of Santa Clara General Plan (Santa Clara County 1994) are applicable to the terrestrial biological resources that could be affected by the Project:

Strategies, Policies, and Implementation

Strategy #1 Improve Current Knowledge and Awareness of Habitats and Natural Areas

Strategy#2 Protect the Biological Integrity of Critical Habitat Areas

Strategy #3 Encourage Habitat Restoration Wherever Possible

Strategy #4 Evaluate the Effectiveness of Project Mitigations as Required Under CEQA

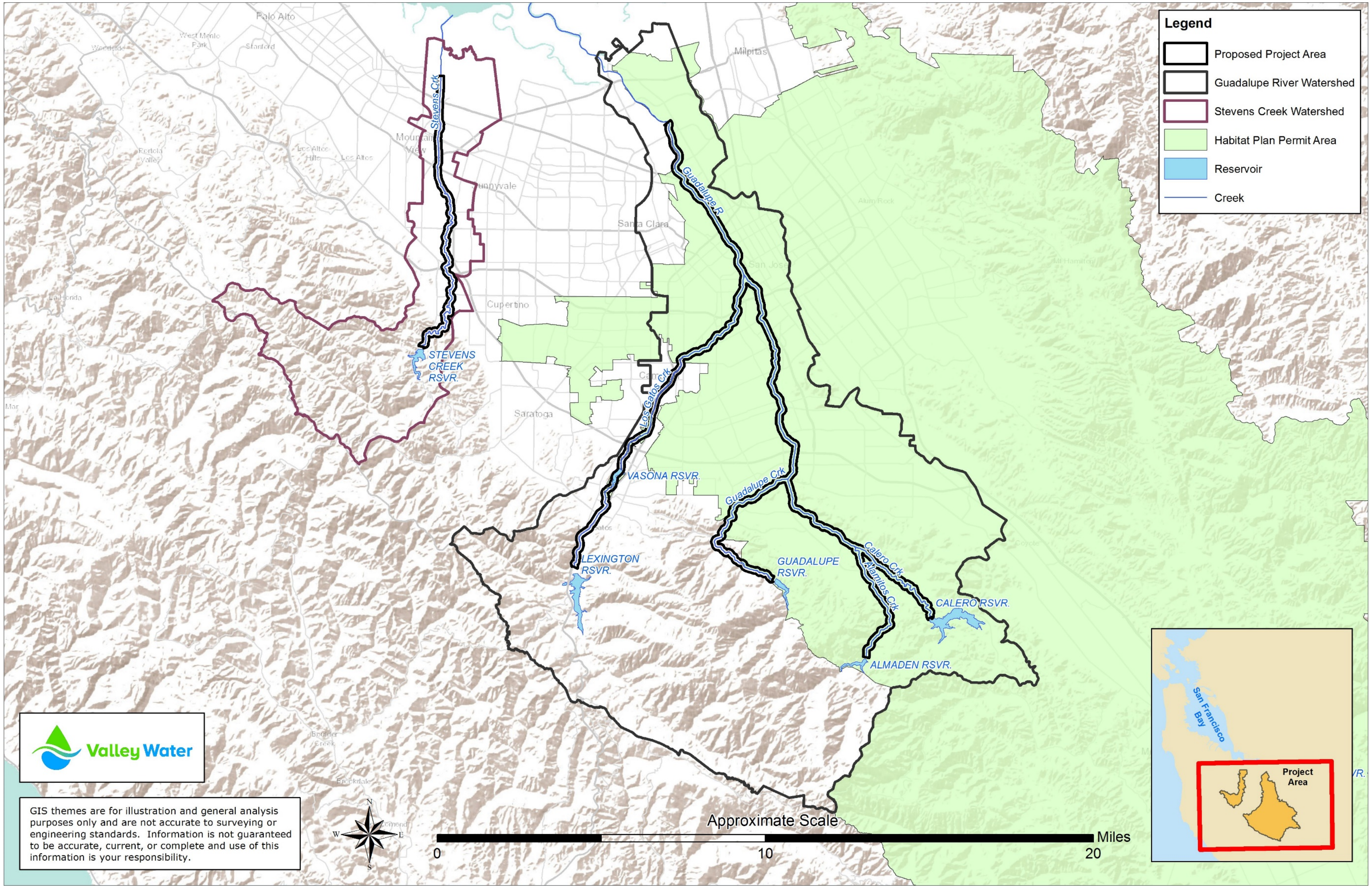
Resource conservation actions R-RC 1 to R-RC 56 lay out requirements for resource conservation with regard to new actions within the county of Santa Clara.

Santa Clara Valley Habitat Plan

Santa Clara County, Santa Clara Valley Transportation Authority, Valley Water, and the Cities of San José, Morgan Hill, and Gilroy (collectively, the Local Partners) have prepared the VHP, an HCP—pursuant to the federal ESA—and an NCCP—pursuant to the NCCP Act—for 519,506 acres in Santa Clara County (Figure 3.8-2). The Santa Clara VHP area includes a large portion of the Guadalupe River watershed. The upper portions of the Guadalupe River watershed and all of the Stevens Creek watershed are outside the VHP area.

The VHP provides for conservation of multiple covered endangered, threatened, or rare species, thereby contributing to their recovery while allowing for compatible and appropriate development (ICF 2012), and providing for authorization of incidental take of covered species listed as endangered or threatened under CESA and/or ESA when such take is associated with otherwise lawful activities and development and occurs within the VHP area. In 2013, the VHP was adopted by all local participating agencies, and incidental take permits were issued by USFWS and CDFW under Section 10(a)(1)(b) of the ESA and Section 2080.1 of the California Fish and Game Code.

Figure 3.8-2. Santa Clara Valley Habitat Plan Coverage Area within the FAHCE Project Location



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A primary component of the VHP is the identification of comprehensive avoidance and minimization measures that the Local Partners must implement to help ensure that impacts from covered activities to listed species, critical habitats, and sensitive habitats are avoided and minimized. In support of this component, the VHP has developed broad principles for regional avoidance and minimization as well as specific conditions on covered activities. Valley Water BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. Conditions on covered activities are those that:

- Minimize impacts to sensitive natural communities and covered species;
- Minimize impacts to select ground dwelling wildlife species during Project construction;
- Ensure compliance with related state and federal wildlife laws;
- Establish a comprehensive stream and riparian setback requirement; and
- Protect water quality in wetlands and streams.

VHP covered activities that are encompassed within the Proposed Project are identified as instream operations and maintenance activities that include the following activities that may impact covered species:

- Natural resource protection such as small bank stabilization projects and removal of debris deposited during flooding.
- Operations and maintenance of flood protection facilities (for example, dams, armored creeks, detention ponds, and streams). Activities may include vegetation management, minor sediment removal, or bank stabilization.
- Operations and maintenance of water supply facilities (for example, flashboard dams, inflatable dams, stream gages, pipelines, and diversions).
- Non-routine stream maintenance activities conducted by Valley Water (that is, those activities not covered by Valley Water's SMP).
- Removal of debris blockages, except in emergency situations.
- Mitigation and/or monitoring in creeks or adjacent riparian corridors.
- Vegetation management for exotic species removal, such as removal of giant reed, and native vegetation plantings.
- Reservoir dewatering events.
- Reservoir filling.

The VHP's conservation strategy identifies land to be preserved in a reserve system that provides important habitat for 18 endangered, threatened, or otherwise rare covered species. The land preservation is intended both to mitigate the environmental impacts of planned development and of public infrastructure operations and maintenance activities within the VHP area, and to enhance the long-term viability of covered species. The covered species are:

- Invertebrates
  - Bay checkerspot butterfly (*Euphydryas editha bayensis*)
- Amphibians and Reptiles
  - California red-legged frog (*Rana draytonii*)
  - California tiger salamander (*Ambystoma californiense*)
  - Foothill yellow-legged frog (*Rana boylii*)
  - Western pond turtle (*Actinemys marmorata*)

- Birds
  - Western burrowing owl (*Athene cunicularia)*
  - LBV (*Vireo bellii pusillus*)
  - Tricolored blackbird (*Agelaius tricolor*)
- Mammals
  - San Joaquin kit fox (*Vulpes macrotis mutica*)
- Plants
  - Coyote ceanothus (*Ceanothus ferrisae)*
  - Fragrant fritillary (*Fritillaria liliacea)*
  - Loma Prieta hoita (*Hoita strobilina)*
  - Metcalf Canyon jewelflower (S*treptanthus albidus* ssp. *Albidus*)
  - Most beautiful jewelflower (*Streptanthus albidus* var. *peramoenus*)
  - Mt. Hamilton thistle (*Cirsium fontinale* var. *campylon)*
  - Santa Clara Valley dudleya (*Dudleya abramsii* ssp. *Setchellii*)
  - Smooth lessingia (*Lessingia micradenia* var. *glabrata*)
  - Tiburon paintbrush (*Castilleja affinis* var. *neglecta*)

The VHP provides a means for Valley Water and other Local Partners to achieve compliance with the federal and state ESAs for incidental take of covered species. Local Partners are authorized to permit their own projects under the VHP, but must document compliance via a VHP application and payment of project-specific fees, as well as other permitting requirements such as General Construction Storm Water NPDES permits and SCVURRP Municipal Separate Storm Sewer System permit, compliance with which minimizes construction and long-term effects of non-flow measures on terrestrial habitats and species.

Local Policies and Ordinances

Santa Clara County and cities within the Stevens Creek and Guadalupe River watersheds have General Plan policies and regulatory programs that encourage protection of terrestrial biological resources such as trees and open space. Some local ordinances call for riparian area setbacks for development. Implementation of Proposed Project measures would comply with applicable local tree and other ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as the Santa Clara County Tree Preservation and Removal Ordinance.

3.8.3 Methodology

To assess impacts from implementation of the flow measures, a 500-foot area of potential impact on either side of centerline of the study area streams was applied. This area captures potential impacts to terrestrial species using the streams within the bank and adjacent riparian areas. To assess impacts from implementation of the non-flow measures where the location of the proposed work is unknown, an area of potential impact equivalent to 500 feet on either side of stream centerline was applied to the CWMZ reaches, while an area of potential impact of 1,000 feet was added to the outer perimeter of the fish barrier remediation locations. These areas of potential impact are used because they conservatively estimate the areas that could accommodate any potential staging areas or construction access needs for the proposed non-flow Project activities and the areas provide sufficient area to evaluate indirect impacts to terrestrial biological resources at the programmatic level. It should be noted that additional efforts to avoid or minimize impacts to sensitive habitats and special-status species would be considered during project-specific planning, compliance, and implementation for all Project activities evaluated at the program level in this EIR (see Section 3.8.3.5).

3.8.3.1 Flow Measures Impact Analysis Methodology

Extreme changes in flow conditions and their timing can adversely impact those terrestrial biological resources that use the streams as habitat, such as amphibians, reptiles, mammals, and waterfowl. Although these changes occur naturally from storm events, the changes of the Proposed Project are examined to determine whether, and to what extent, terrestrial species and habitat within the study area would be affected.

The approach taken to evaluate the impacts of flow measures on terrestrial biological resources in this analysis is summarized as follows:

- Assess timing and changes of stream flows and impacts to species and habitat
  - Proposed winter base flow releases between January 1 and April 30 in the Stevens Creek study area
  - Proposed winter base flow releases between November 1 and April 30 in the Guadalupe River study area
  - Proposed spring pulse flows of 50 cfs for a period of 5 consecutive days made between February 1 and April 30
  - Proposed summer base flow releases between May 1 and October 31
  - Flow ramping would occur whenever Valley Water-controlled flows from reservoirs would be increased or decreased by 50 percent or more from the existing flow condition
- Assess impacts of monitoring as described in Section 2.6, *Adaptive Management Program*, of this EIR.

3.8.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure as introduced in Section 3.1.4.2 was considered in this analysis pertaining to terrestrial biological resources. The approach taken to evaluate the impacts of non-flow measures (Section 3.1.4.2) on terrestrial biological resources in this analysis is summarized as follows:

- Assess qualitatively the types of construction-related impacts and long-term effects on terrestrial biological resources that could occur as a result of the non-flow measures
- Estimate the locations and magnitude of construction-related impacts and long-term effects on terrestrial biological resources from non-flow measures.
- Assess impacts of monitoring as described in Section 2.6, *Adaptive Management Program*, of this EIR.

Baseline information on terrestrial biological resources in the study area, including special-status species and their habitats, was compiled from the VHP and other existing published and unpublished literature describing biological resources in the region, environmental database searches, consultation with local wildlife professionals, and information provided by staff from CDFW, the USFWS Pacific Southwest Region, Valley Water, and USACE. Appendix O, *Use of Habitat Data in Support of CEQA Analysis for FAHCE Fish Habitat Restoration Plan*, provides a detailed list of data sources and reference materials.

3.8.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed flow measures. The monitoring program indicators that could then trigger adaptive management actions would relate to the effects of seasonal flow regimes or pulse flows on fish habitat.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed non-flow measures for the purpose of complying with the measures and validating that habitat conditions are improved for fish passage, spawning, and rearing after implementation of proposed Phase 1 measures.

Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended.

The impacts analysis of monitoring, maintenance, and adaptive management focuses on potential disturbance to species and habitat as a result of presence and monitoring techniques. Impacts from maintenance and adaptive management would be similar to those described in the flow and non-flow measures analyses.

3.8.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to terrestrial biological resources (including non-fish aquatic species) if it would:

- **TERR-1:** Have a substantial adverse effect, either directly or through habitat modifications, on an identified candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS
- **TERR-2:** Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS
- **TERR-3:** Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means
- **TERR-4:** Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites
- **TERR-5:** Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance
- **TERR-6:** Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan

3.8.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs to avoid and minimize undesired adverse effects on the environment that could result from the Proposed Project, and particularly from construction-related activities associated with the Proposed Project. Valley Water BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs, including applicable

VHP conditions, are incorporated into the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions.

At facilities not owned by Valley Water, these same practices are incorporated, as necessary, and would be enforced by Valley Water through contractual requirements for partial funding of measures to improve the facilities.

Terrestrial biological resources could be affected not only by implementation of Proposed Project measures but also by the corresponding BMPs and mitigation measures. The net effect of the BMPs and mitigation measures would be primarily beneficial to terrestrial resources; however, in a few cases, adverse effects could occur during implementation. For example, although relocating non-fish, native aquatic species from dewatered work areas might be necessary to avoid deaths of those individuals, some stress on these individuals could occur during relocation. As a result, any minor adverse effects of the BMPs and the mitigation measures are also discussed where appropriate.

BMPs relevant to this analysis of terrestrial biological resources (along with a brief discussion of their effects on Project activities) include the following:

- Water Quality BMPs
  - **WQ-1:** Conduct Work from Top of Bank – Would reduce the effect of machinery on streambed and water quality
  - **WQ-4:** Limit Impacts from Staging and Stockpiling Materials – Would reduce runoff and erosion and reduce impacts on instream biota and water quality
  - **WQ-5:** Stabilize Construction Entrances and Exits – Would reduce runoff and erosion and reduce impacts on instream biota and water quality
  - **WQ-6:** Limit Impact of Concrete near Waterways – Would reduce water quality impacts from concrete chemistry
  - **WQ-10:** Prevent Scour Downstream of Sediment Removal – Would decrease scour downstream of sediment removal by grading the channel transitions and ensuring that there are no rapid changes in the slope
  - **WQ-12:** Manage Well or Exploratory Boring Materials – Would reduce runoff and erosion and reduce impacts on instream biota and water quality
  - **WQ-15:** Prevent Water Pollution – Would reduce impacts on instream biota and water quality
- Pre-project Planning and General BMPs[15]
  - **GEN-1:** In-Channel Work Window – Would reduce water quality impacts and impacts on anadromous special-status fish and other aquatic species
  - **GEN-2:** Instream Herbicide Application Work Window – Would reduce herbicide impacts on aquatic species
  - **GEN-3:** Avoid Exposing Soils with High Mercury Levels – Would reduce water quality impacts and mercury impacts on biota
  - **GEN-4:** Minimize the Area of Disturbance – Would reduce impacts on terrestrial and aquatic habitats and species
  - **GEN-6:** Minimize Impacts to Nesting Birds via Site Assessments and Avoidance Measures – Would reduce impacts on nesting birds
  - **GEN-6.5:** Protection of Nesting Least Bell's Vireos (LBV) – Would reduce impacts on nesting LBV

[15] *Stream Maintenance Program Update* (Valley Water 2011)

  - **GEN-8:** Protection of Sensitive Fauna Species from Herbicide Use – Would reduce impacts on special-status of wildlife
  - **GEN-9:** Avoid Impacts to Special-status Plant Species and Sensitive Natural Vegetation Communities – Would reduce impacts on special-status plant species and sensitive natural vegetation communities
  - **GEN-10:** Avoid Impacts to Bay Checkerspot Butterfly (*Euphydryas editha bayensis*) and Associated Critical Habitat – Would reduce impacts on Bay checkerspot butterfly and its designated critical habitat
  - **GEN-12:** Protection of Special-status Amphibian and Reptile Species – Would reduce impacts on special-status amphibians and reptiles
  - **GEN-13:** Protection of Bat Colonies – Would reduce impacts on maternity and roosting bat colonies
  - **GEN-14:** Protection of San Francisco Dusky-footed Woodrat – Would reduce impacts on this species
  - **GEN-15:** Salvage Native Aquatic Vertebrates from Dewatered Channels – Would reduce the impacts on native aquatic vertebrates
  - **GEN-19:** Work Site Housekeeping – Would reduce impacts on terrestrial resources by ensuring that work sites are clean and maintained
  - **GEN-20:** Erosion and Sediment Control Measures – Would reduce impacts on terrestrial resources by ensuring that erosion and sediment discharge into waterways and riparian vegetation is minimized
  - **GEN-21:** Staging and Stockpiling of Materials – Would reduce impacts on terrestrial resources by ensuring that construction material is properly stored
  - **GEN-22:** Sediment Transport – Would reduce impacts on terrestrial resources by preventing sediment-laden water from being released back into waterways
  - **GEN-23:** Stream Access – Would reduce impacts on terrestrial resources by using existing access to streams where possible
  - **GEN-30:** Vehicle and Equipment Maintenance – Would reduce impacts on terrestrial resources by maintaining vehicles in authorized areas
  - **GEN-31:** Vehicle Cleaning – Would reduce impacts on terrestrial resources by cleaning vehicles in authorized areas
  - **GEN-32:** Vehicle and Equipment Fueling – Would reduce impacts on terrestrial resources by preventing accidental spills
  - **GEN-33:** Dewatering for Non-Tidal Sites – Would reduce impacts on terrestrial resources by implementing multiple actions to limit the effects of dewatering on native plants and wildlife
- Sediment Removal BMPs
  - **SED-2:** Prevent Scour Downstream of Sediment Removal – Would reduce potential erosion and water quality impacts
- Vegetation Management BMPs
  - **VEG-1:** Minimize Local Erosion Increase from In-channel Vegetation Removal – Would minimize the potential effect of localized erosion and degradation of water quality
  - **VEG-2:** Non-native Invasive Plant Removal – Would reduce occurrences of invasive plant species
  - **VEG-3:** Use Appropriate Equipment for Instream Removal – Would reduce the effect of machinery on streambeds and riparian vegetation

- Post-project Restoration BMPs
  - **REVEG-1:** Seeding – Would reduce erosion and water quality impacts and promote native species
  - **REVEG-2:** Planting Material – Would reduce the potential for nonnative vegetation species to occur and reduce impacts on native vegetation

In addition, avoidance and minimization measures from the Santa Clara VHP conditions would also be applied to the Project, as applicable. These measures are summarized below. Full descriptions of each measure are provided in Appendix E, *General Conditions of the Valley Habitat Plan Applicable to FAHCE Draft FHRP*.

- **Condition 1.** Avoid Direct Impacts on Legally Protected Plant and Wildlife Species – Would avoid impacts to fully protected or no take species
- **Condition 2.** Incorporate Urban-reserve System Interface Design Requirements – Would reduce the effects of urbanization on biota
- **Condition 3.** Maintain Hydrologic Conditions and Protect Water Quality – Would maintain hydrologic conditions in an effort to protect water quality
- **Condition 4.** Avoidance and Minimization for Instream Projects – Would avoid and reduce impacts on instream biota and water quality
- **Condition 5.** Avoidance and Minimization Measures for Instream Operations and Maintenance – Would avoid and reduce impacts on instream biota and water quality
- **Condition 8.** Avoidance and Minimization Measures for Rural Road Maintenance – Would minimize potential impacts on covered species and sensitive land cover types
- **Condition 10.** Fuel Buffer – Would reduce the potential for fire damage to covered biota
- **Condition 11.** Stream and Riparian Setbacks – Would minimize and avoid impacts on aquatic and riparian land cover types, covered species, and wildlife corridors
- **Condition 12.** Wetland and Pond Avoidance and Minimization – Would minimize potential impacts on these habitats and associated species
- **Condition 13.** Serpentine and Associated Covered Species Avoidance and Minimization – Would minimize potential impacts on serpentine habitats and associated species, including Bay checkerspot butterfly
- **Condition 14.** Valley Oak and Blue Oak Woodland Avoidance and Minimization – Would minimize potential impacts on oak woodlands
- **Condition 15.** Western Burrowing Owl – Would minimize potential impacts on this species
- **Condition 16.** Least Bell's Vireo – Would minimize potential impacts on this species
- **Condition 17.** Tricolored Blackbird – Would minimize potential impacts on this species
- **Condition 19.** Plant Salvage When Impacts Are Unavoidable – Requires take notification to the Valley Habitat Agency with a salvage option
- **Condition 20.** Avoid and Minimize Impacts on Covered Plant Occurrences – Would minimize potential impacts on covered plant species

3.8.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur during implementation. This section evaluates the effects of Proposed Project measures on terrestrial biological resources, as compared to current baseline conditions.

3.8.4.1 Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modifications, on an identified candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (less than significant with mitigation)[16]

To better understand the potential for significant impacts, the following analysis of terrestrial biological resources under TERR-1 is broken into the following subtopics:

- Serpentine-associated Special-Status Plant Species
- Other Special-Status Plant Species, and
- Candidate, Sensitive, or Special-Status Wildlife Species, including Special-Status Avian Species

Serpentine-associated Special-status Plant Species

As listed in Section 3.8.1.4 and detailed in Appendix P, *Terrestrial Biological Resources Technical Memorandum,* the following nine serpentine-associated special-status species have a potential for occurrence in serpentine communities in the study area:

1. Tiburon paintbrush (*Castilleja affinis* var. *neglecta*, federally endangered, state threatened, CRPR 1B.1, VHP-covered species)
2. Coyote ceanothus (*Ceanothus ferrisae*, federally endangered, CRPR 1B.1, VHP-covered species)
3. Santa Clara Valley dudleya (*Dudleya abramsii* ssp. *setchellii*, federally endangered, CRPR 1B.1, VHP-covered species)
4. Metcalf Canyon jewelflower (*Streptanthus albidus* ssp. *albidus*, federally endangered, CRPR 1B.1, VHP-covered species)
5. Most beautiful jewelflower (*Streptanthus albidus* ssp. *peramoenus*, CRPR 1B.2, VHP-covered species)
6. Mt. Hamilton thistle (*Cirsium fontinale* var. *campylon*, CRPR 1B.2, VHP-covered species)
7. Smooth lessingia (*Lessingia micradenia* var. *glabrata*, CRPR 1B.2, VHP-covered species)
8. Fragrant fritillary (*Fritillaria liliacea*, CRPR 1B.2, VHP-covered species)
9. Loma Prieta hoita (*Hoita strobilina*, CRPR 1B.2, VHP-covered species)

Flow Measures Impact Analysis

As described in Section 3.2, *Hydrology,* the proposed flow measures in Stevens Creek would not approach, and were projected to be significantly below, the 5,000 cfs capacity. In fact, over the 20-year modeled period, daily peak flows were only found to exceed baseline daily peak flows in 2 days. In the Guadalupe River portion of the study area, maximum daily peak flows for Los Gatos Creek, Guadalupe Creek, and Alamitos Creek would also be significantly under the estimated channel capacity. Calero Creek flows under the 2015 Proposed Project would exceed the channel capacity on 4 additional days compared with the current baseline condition. However, since there is no increase in the peak flows, the peak flow on the 4 days in question only exceeds the channel capacity by 31 cfs, a and would not be considered substantial. While the future baseline and 2035 Proposed Project daily peak flows exceed the channel capacity of Calero Creek, there would be no impact since the modeled 2035 Proposed Project scenario does not increase the daily peak flows by more than 30 cfs relative to

[16] Impact conclusion provided after consideration of mitigation.

the future baseline scenario, and there would be 3 fewer days of Calero Creek flows exceeding the channel capacity under the 2035 Proposed Project scenario, relative to the future baseline condition.

Based on this analysis of the hydrology, serpentine habitats would not be affected by proposed flow measures. Calero Creek primarily flows through mixed riparian forest and woodland habitat and there is only one documented area of mixed serpentine chaparral habitat along Calero Creek. However, it is well away from the creek and separated by mixed riparian forest and woodland habitat and residential development. Given its separation from creek, even rare events of flows exceeding channel capacity would not impact this sensitive habitat type or any associated special-status plant species.

Since there are no serpentine habitat types in Stevens Creek, and the limited habitat in the Guadalupe River portion of the study area is separated from the creek by residential development, the proposed flow measures would have no impact to serpentine habitat types or any associated special-status plant species.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the Proposed Project analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation could affect riparian vegetation needed to access the work area. The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. However, as stated above, there are no serpentine habitat types in Stevens Creek; therefore, there would be no impacts to any serpentine-associated special-status plant species.

The other proposed barrier remediation projects are located in Guadalupe Creek and Alamitos Creek—also lacking serpentine habitat types. There is one small area of serpentine bunchgrass habitat near the Old Dam barrier remediation site on Guadalupe Creek; however, it would be avoided. Therefore, there would be no impact to any serpentine-associated special-status plant species.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. General locations identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. One of the proposed general locations on Guadalupe Creek is near a small area of serpentine bunchgrass habitat, which would be avoided during habitat construction activities. Therefore, there would be no impact to any serpentine-associated special-status plant species.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact, as serpentine habitat is absent from Stevens Creek. Therefore, there would be no impact to any serpentine-associated special-status plant species.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, the little serpentine habitat in the Guadalupe River study area would be avoided and not affected by geomorphic restoration projects. Therefore, there would be no impact to any serpentine-associated special-status plant species.

Other Special-status Plant Species

Special-status plants not strongly associated with serpentine communities are also known to occur in the study area (Section 3.8.1.3). Thus, the Proposed Project could affect the following special-status plant species:

- *Arctostaphylos andersonii*
- *Malacothamnus arcuatus*
- *Amsinckia lunaris*
- *Balsamorhiza macrolepis*
- *Puccinellia simplex*
- *Senecio aphanactis*
- *Centromadia parryi* ssp. *congdonii*
- *Lasthenia conjugens*
- *Malacothamnus hallii*
- *Eryngium aristulatum* var. *hooveri*
- *Atriplex minuscula*
- *Castilleja rubicundula* var. *rubicundula*
- *Navarretia prostrata*
- *Trifolium hydrophilum*
- *Collinsia multicolor*
- *Extriplex joaquinana*
- *Trifolium buckwestiorum*
- *Isocoma menziesii* var. *diabolica*
- *Dirca occidentalis*
- *Piperia candida*
- *Monolopia gracilens*
- *Piperia candida*

Flow Measures Impact Analysis

As described above, the proposed flow measures in Stevens Creek would not approach, and were projected to be significantly below, the 5,000 cfs capacity. In fact, over the 20-year modeled period, daily peak flows were only found to exceed baseline daily peak flows in 2 days.

In the Guadalupe River portion of the study area, maximum daily peak flows for Los Gatos Creek, Guadalupe Creek, and Alamitos Creek would also be significantly under the estimated channel capacity. Calero Creek flows under the 2015 Proposed Project would exceed the channel capacity on 4 additional days compared with the current baseline condition. However, since there is no increase in the peak flows, the peak flow on the 4 days in question only exceeds the channel capacity by 31 cfs, a and would not be considered substantial. While the future baseline and 2035 Proposed Project daily peak flows exceed the channel capacity of Calero Creek, there would be no impact since the modeled 2035 Proposed Project scenario does not increase the daily peak flows by more than 30 cfs relative to the future baseline scenario, and there would be 3 fewer days of Calero Creek flows exceeding the channel capacity under the 2035 Proposed Project scenario, relative to the future baseline condition. Calero Creek primarily flows through mixed riparian forest and woodland habitat. A special-status plant species that could be found in this habitat type is *Dirca occidentalis*—a deciduous shrub.

Increases in flows would be ramped up and down at rates primarily to reduce impacts to aquatic species. These ramping rates would also avoid eroding stream banks and washing out species. If special-status plant species were present in areas of Calero Creek where waters exceeded channel capacity, given the ramping rates, amount of flow, and duration of exceedances over a 20-year period (4 days), it is unlikely they would be adversely affected.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the Proposed Project analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality.

The impacts from each of these non-flow measures are discussed in the sections below. Any impacts would be from construction and access to the area.

Because of the programmatic consideration of the non-flow measure analysis provided in this EIR, a precise, project-level analysis of the specific impacts of individual non-flow measures on special-status plant species and their habitat is not possible at this time, as only general locations and project concepts are known. As non-flow measures identified in the Proposed Project are further planned and designed, project-specific environmental review would be conducted by Valley Water or other agencies responsible for implementing such projects.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land covers types. The Fremont Fish Ladder area is located in urban-suburban land covers types with some areas of Valley foothill riparian habitat up and down stream. Given the developed nature of the two areas, the likely presence of special-status plant species is low. However, species such as *Dirca occidentalis* are found in riparian habitat and could occur.

The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe Creek in annual grasslands, blue oak woodlands, and coastal oak and coastal live oak forest and woodlands. On Alamitos Creek the project would likely occur in mixed riparian forest and woodland and coastal live oak forest and woodland. Special-status plant species such as *Balsamorhiza macrolepis* var. *macrolepis*, *Hoita strobilina*, and *Dirca occidentalis* could occur in these habitat types.

Undocumented plant species could be affected by construction equipment and workers necessary for the project. These activities could result in death, altered growth, or reduced seed set through physically breaking, crushing, wilting, or uprooting plants, and the compaction of soil by heavy equipment could damage plant roots. In addition, the creation of access routes and staging areas could result in the mechanical or physical removal of vegetation and modification of the seed bank as a result of grading, although these areas would be sited outside sensitive resource areas to the extent possible. Furthermore, minor fuel and oil spills could occur during equipment or vehicle operation or refueling, in addition to the risk of larger accidental releases. Without rapid containment and cleanup, these materials could kill or impair the health of special-status plants.

All attempts would be made to avoid protected species. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Proposed Project's effects on plants and vegetation by ensuring that, prior to Project activities and during the appropriate bloom period to detect plants, a qualified botanist would perform a survey of the Project area(s), identify special-status plant species and sensitive natural vegetation communities, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Proposed Project's effects on plants and vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory. Implementation of Valley Water BMPs would also reduce impacts to plants and vegetation by using local ecotypes of native plants for revegetation and erosion control and using appropriate equipment when working in streams. Lastly, implementation of BMPs GEN-30, GEN-31, and GEN-32 would reduce impacts to terrestrial biological resources by implementing multiple actions to limit the effects of dewatering, refueling, and equipment maintenance on native plants.

In addition to these BMPs, adherence to VHP conditions 3, 4, 5, 7, 8, 11, and 14, where applicable, would minimize and reduce the Proposed Project's effects from non-flow-measures on non-serpentine special-status plants by avoiding direct impacts to special-status plants and their habitats. Valley Water also would add measures similar to the applied Valley Water BMPs as conditions of funding agreements for those projects owned by others. Although impacts could be minimized using BMPs and VHP conditions, there is a potential for disturbance and other adverse impacts that could be significant as they could be substantial to the species.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. General locations identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. The proposed Stevens Creek site is located within oak woodland and valley foothill riparian habitat. The Guadalupe Creek sites are located within annual grasslands and oak woodlands. The Guadalupe River site includes a small riparian habitat area surrounded by development. Finally, the Los Gatos Creek sites include valley foothill riparian and scrub, as well as urban development.

Impacts to special-status plant species would be the same as described above for fish barrier remediation projects. All attempts would be made to avoid protected species. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Proposed Project's effects on plants and vegetation by ensuring that, prior to Project activities and during the appropriate bloom period to detect plants, a qualified botanist would perform a survey of the Project area(s), identify special-status plant species and sensitive natural vegetation communities, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Proposed Project's effects on plants and vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory. Implementation of Valley Water BMPs would also reduce impacts to plants and vegetation by using local ecotypes of native plants for revegetation and erosion control, and using appropriate equipment when working in streams. Lastly, implementation of BMPs GEN-30, GEN-31, and GEN-32 would reduce impacts to terrestrial biological resources by implementing multiple actions to limit the effects of dewatering, refueling, and equipment maintenance on native plants.

In addition to these BMPs, adherence to VHP conditions 3, 4, 5, 7, 8, 11, and 14, where applicable, would minimize and reduce the Proposed Project's effects from non-flow-measures on non-serpentine special-status plants by avoiding direct impacts to special-status plants and their habitats. Valley Water also would add measures similar to the applied Valley Water BMPs as conditions of funding agreements for those projects owned by others. Although impacts could be minimized using BMPs and VHP conditions, there is a potential for disturbance and other adverse impacts that could be significant as they could be substantial to the species.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact to special-status species, as the project would take place in disturbed areas related to the dam.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts to special-status plants could occur if they are within the restoration areas. All attempts would be made to avoid protected species as described for other non-flow measures. Although impacts could be minimized using BMPs and VHP conditions, there is a potential for disturbance and other adverse impacts that could be significant as they could be substantial to the species.

Candidate, Sensitive, or Special-Status Wildlife Species, including Special-Status Avian Species

The special-status wildlife species listed in Section 3.8.1.4 that have the potential to occur in the study area and were brought forward to be analyzed include avian, terrestrial, and aquatic (non-fish) species.

The special-status wildlife species carried forward for analysis are:

- Bay checkerspot butterfly (*Euphydryas editha bayensis*) – FE, VHP
- American badger (*Taxidea taxus*) – SSC
- Pallid bat (*Antrozous pallidus*) – SSC
- San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) – SSC
- Foothill yellow-legged frog (*Rana boylii*) – SE, VHP
- Western pond turtle (*Actinemys marmorata*) – SSC, VHP
- California giant salamander (*Dicamptodon ensatus*) – SSC
- California tiger salamander (*Ambystoma californiense*) – FT, ST, VHP
- California red-legged frog (*Rana draytonii*) – FT, SSC, VHP
- Santa Cruz black salamander (*Aneides niger*) – SSC
- Coast horned lizard (*Phrynosoma blainvillii*) – SSC
- American peregrine falcon (*Falco peregrinus anatum*) – FP
- Bald eagle (*Haliaeetus leucocephalus*) – SE, FP
- Burrowing owl (*Athene cunicularia*) – SSC, VHP
- California least tern (*Sternula antillarum browni*) – FE, SE, FP
- Grasshopper sparrow (*Ammodramus savannarum*) – SSC
- Golden eagle (*Aquila chrysaetos*) – FP
- LBV (*Vireo bellii pusillus*) – FE, SE, VHP
- Loggerhead shrike (*Lanius ludovicianus*) – SSC
- Long-eared owl (*Asio otus*) – SSC
- Northern harrier (*Circus cyaneus*) – SSC
- Purple martin (*Progne subis*) – SSC
- Southwestern willow flycatcher (*Empidonax traillii extimus*) – FE, SE

- Swainson's hawk (*Buteo swainsoni*) – ST
- Tricolored blackbird (*Agelaius tricolor*) – ST, VHP
- White-tailed kite (*Elanus leucurus*) – FP
- Yellow rail (*Coturnicops noveboracensis*) – SSC
- Yellow-breasted chat (*Icteria virens*) – SSC

Flow Measures Impact Analysis

As described above, the proposed flow measures in Stevens Creek would not approach, and were projected to be significantly below, the 5,000 cfs capacity. In fact, over the 20-year modeled period, daily peak flows were only found to exceed baseline daily peak flows in 2 days. In the Guadalupe River portion of the study area, maximum daily peak flows for Los Gatos Creek, Guadalupe Creek, and Alamitos Creek would also be significantly under the estimated channel capacity. Calero Creek flows under the 2015 Proposed Project would exceed the channel capacity on 4 additional days compared with the current baseline condition. However, since there is no increase in the peak flows, the peak flow on the 4 days in question only exceeds the channel capacity by 31 cfs, a and would not be considered substantial. While the future baseline and 2035 Proposed Project daily peak flows exceed the channel capacity of Calero Creek, there would be no impact since the modeled 2035 Proposed Project scenario does not increase the daily peak flows by more than 30 cfs relative to the future baseline scenario, and there would be 3 fewer days of Calero Creek flows exceeding the channel capacity under the 2035 Proposed Project scenario, relative to the future baseline condition.

Increases in flows would be ramped up and down at rates primarily to reduce impacts to aquatic species. These ramping rates would also avoid eroding stream banks and washing out or stranding aquatic species. These ramping rates would be slower than what would be experienced naturally in a storm event. The proposed flows would also not reduce water availability, but could increase water sources during dry times.

Species most likely to be affected by changes in flow include the foothill yellow-legged frog, western pond turtle, California giant salamander, California tiger salamander, California red-legged frog, and Santa Cruz black salamander. All of these species rely on water for breeding, and most could be found in study area streams. Although these species are potentially present, it is unlikely that the changes in flows would have substantial adverse effects on them given the timing and ramping rates implemented. Impacts that could occur would be less than significant.

Other special-status species could avoid proposed flows if necessary and would not be adversely affected. They could experience benefits from increased flows, especially during dry periods. There would also be no change in groundwater, so species sensitive to groundwater levels would be unaffected.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the Proposed Project analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The impacts from each of these non-flow measures are discussed in the sections below. The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and properly maintaining key facilities to improve functionality. The benefits of the non-flow measures would provide long-term habitat improvements. Any adverse impacts would be from construction and access to the area, and temporary in nature.

Because of the programmatic consideration of the non-flow measure analysis provided in this EIR, a precise, project-level analysis of the specific impacts of individual non-flow measures on special-status wildlife species and their habitat is not possible at this time, as only general locations and project concepts are known. As non-flow measures identified in the Proposed Project are further planned and designed, project-specific environmental review would be conducted by Valley Water or other agencies responsible for implementing such projects.

Because the non-flow measures would be located primarily within and adjacent to waterways and would be restoration-focused and limited in size and scope, they are unlikely to result in the permanent loss of significant areas of designated critical habitat or habitat for special-status wildlife species. The majority of any Project-related impacts to critical habitat would be temporary, occurring only during non-flow measure project construction. After construction is completed (construction such as bank stabilization, invasive plant removal, or fish migration barrier removal), areas with soil not permanently affected would be revegetated with native plantings to restore their pre-project functions and values.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land covers types. The Fremont Fish Ladder area is located in urban-suburban land covers types with some areas of valley foothill riparian habitat up and down stream. Given the developed nature of the two areas, the likely presence of special-status wildlife species is low. However, species such as LBV could use the small riparian areas.

The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe Creek in annual grasslands, blue oak woodlands, and coastal oak and coastal live oak forest and woodlands. On Alamitos Creek the project would likely occur in mixed riparian forest and woodland and coastal live oak forest and woodland.

Species most likely to be affected by fish barrier remediation projects include the foothill yellow-legged frog, western pond turtle, California giant salamander, California red-legged frog, and Santa Cruz black salamander. All of these species rely on water for breeding, and most could be found in study area streams at the proposed locations. Species such as the LBV that use dense riparian shrubs and small trees could also occur at all the proposed locations. Grassland species such as Bay checkerspot butterflies, badgers, burrowing owls, grasshopper sparrows, California tiger salamander, and northern harrier could occur near the projects on Guadalupe Creek. Two species of special-status bats may be affected by proposed projects if they occur near bridges or similar roosting structures, or in native habitat.

Special-status wildlife species could be affected by construction equipment and workers necessary for the project. These activities could result in avoidance of the area, injury, or death. They could also interrupt feeding or resting periods or breeding and rearing. Interruption to normal behavioral patterns could make certain species more susceptible to predation. In addition, the creation of access routes and staging areas could result in the mechanical or physical removal of vegetation and modification, although these areas would be sited outside sensitive resource areas to the extent possible. Furthermore, minor fuel and oil spills could occur during equipment or vehicle operation or refueling, in addition to the risk of larger accidental releases. Without rapid containment and cleanup, these materials could affect special-status wildlife species' habitat.

Indirect impacts could be caused by construction noise and light, the spread of invasive nonnative species, and human concentration and activity in the vicinity of suitable habitat. This could result in an increase in native and nonnative predators that would be attracted to trash left at the work site. For example, raccoons, American crows (*Corvus brachyrhynchos*), and ravens (*Corvus corax*) would be attracted to trash and would prey opportunistically on some of these species.

The removal of fish barriers would also benefit species by opening or improving access to up and downstream habitat. Improved access for mobility-limited species could result in increased food availability and species genetic diversity.

All attempts would be made to avoid protected species. Valley Water would implement BMPs and VHP conditions in all areas it owns to avoid, minimize, and reduce impacts to special-status wildlife species. Some of these measures are specific to a species or a group of species, while others are more general and could be applied to multiple species and their habitats.

Implementation of BMPs GEN-12, GEN-13, and GEN-14 would protect special-status amphibian and reptile species, bat colonies, and San Francisco dusky-footed woodrats by requiring a Valley Water-qualified biologist to conduct a desk audit to determine whether suitable habitat for any of these species is present in or adjacent to a Project activity. If it is determined that a special-status species could occur in the activity area, a qualified biologist would conduct species-specific surveys prior to the onset of construction and maintenance activities. If one of these species, or the eggs or larvae of a special-status amphibian or reptile, are found in the activity area, the qualified biologist would implement a series of work-specific activities to reduce impacts to the species. These minimization and avoidance actions are specific to each species but generally include, but are not limited to, establishing a buffer, implementing exclusion barriers, capturing and removing the individual to a safe location if allowable, and rescheduling work activities to avoid the species.

Implementation of Valley Water BMPs GEN-4, GEN-9, GEN-10, and GEN-21 would minimize the Proposed Project's effects on the Bay checkerspot butterfly and similar species and critical habitat by minimizing the area of disturbance and ensuring that, prior to implementation of non-flow measures, a qualified botanist would perform a survey of the Project area(s) and identify larval host plants. These host plants would be protected from disturbance to the extent feasible by establishing buffer zones around individual plants or populations and restricting herbicides and maintenance personnel and equipment. Implementation of Valley Water BMP GEN-7 would apply a 250-foot-radius no-work buffer zone around occupied burrowing owl burrows.

Implementation of Valley Water's BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Proposed Project's effects on Bay checkerspot butterfly and similar species by avoiding or minimizing impacts to host plants and associated vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory.

Valley Water would also implement Valley Water BMPs to avoid, minimize, and reduce impacts to special-status wildlife species, including BMPs GEN-2, GEN-4, GEN-8, GEN-15, GEN-20, GEN-23, GEN-26, GEN-30, GEN-32, GEN-33, GEN-35, SED-2, VEG-1, VEG-3. These BMPs would reduce impacts to special-status wildlife species by limiting and restricting herbicide application via the establishment of buffer areas; minimizing the area of disturbance; protecting sensitive fauna species from herbicide use; salvaging native aquatic vertebrates from dewatered channels; implementing erosion and sediment control measures; accessing streams via existing access ramps; avoiding large, mature trees, native vegetation, or other significant habitat features during stream access; minimizing impacts from temporary access points; preventing the accidental release of chemicals, fuels, lubricants, and non-storm-drainage water; preventing vehicle and equipment maintenance and fueling from occurring in sensitive habitats, buffer zones, and waterways; diverting streamflow around the work area by construction of a temporary dam and/or bypass while implementing additional measures to avoid and minimize impacts to water quality and aquatic wildlife; maintaining and operating pumps and generators in a manner that minimizes impacts to water quality and aquatic species; preventing scour downstream of sediment removal areas; minimizing local erosion from in-channel vegetation removal; using appropriate equipment for instream removal to minimize ground disturbance and water quality impacts; using bank stabilization design to prevent erosion downstream; restricting concrete use near waterways to prevent water quality impacts; and restricting fumigants, bait traps, and live traps in sensitive amphibian habitat to minimize impacts to these species from their use.

The Bay checkerspot butterfly, California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle, western burrowing owl, LBV, and tricolored blackbird are covered species under the VHP. The VHP does not provide species level avoidance and minimization measures for all special-status species (for example, tiger salamander and red-legged frog) that could be affected by the Proposed Project. However, goal 17 of the VHP is to conserve existing populations of California red-legged frog, California tiger salamander, and western pond turtle where possible, and to increase the number of individuals and expand the overall distribution of populations of these species in biologically appropriate locations in the study area to maintain viable populations and contribute to the regional recovery of these species.

VHP conditions 3 through 5, 7, 8, 10, 12, and 14 through 17 would benefit all species in the Project area by including management actions and requirements to avoid and/or minimize adverse impacts to covered species and their habitats. These include measures to maintain hydrologic conditions and protect water quality, avoid and minimize disturbance during instream projects, avoid and minimize disturbance during operations and maintenance, increase rural development design and construction requirements, avoid and minimize disturbance during rural road operations and maintenance, establish stream and riparian setbacks, avoid and minimize impacts during activities within or adjacent to wetlands and ponds, and provide specific minimization measures for covered species.

For example, VHP condition 4 requires implementation of over 100 avoidance and minimization measures described in Table 6-2 of the VHP, which requires that all instream projects avoid and/or minimize adverse impacts to stream morphology, aquatic and riparian habitat, and flow conditions. In addition, the VHP requires all instream projects, including projects in dewatered reservoirs, to adopt design requirement and construction avoidance and minimization measures to minimize impacts to covered species, natural communities, and wildlife movement; to ramp increases and decreases in flows during dewatering to avoid washing covered species downstream or drying back the channel faster than covered species can adapt and move to new locations; and to develop an aquatic vertebrate relocation plan for use when cofferdams and water bypass structures are employed. A qualified biologist would determine whether relocation of native species is appropriate during dewatering and implementation of the Proposed Project, and USFWS and CDFW, as applicable, would review the relocation plan to determine whether relocation of VHP-covered species is appropriate.

The VHP provides species-level avoidance and minimization measures for some species, including Bay checkerspot butterfly, western burrowing owls, LBV, and tricolored blackbird. The conditions, although specific for each species, all require habitat surveys, preconstruction surveys, implementation of species-specific avoidance and minimization measures, and construction monitoring to avoid and reduce impacts.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts that could substantially affect special-status wildlife species, and be significant.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. General locations identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. The proposed Stevens Creek site is located within oak woodland and valley foothill riparian habitat. The Guadalupe Creek sites are located within annual grasslands and oak woodlands. The Guadalupe River site includes a small riparian habitat area surrounded by development. Finally, the Los Gatos Creek sites include valley foothill riparian and scrub, as well as urban development.

Impacts from these non-flow measures would be temporary, related to restoration construction activities as described above for fish barrier remediation. These projects would also benefit species by enhancing stream habitat, adding additional cover and complexity. Wildlife species that feed on aquatic species may experience an increase in prey availability over time.

Valley Water would implement BMPs and VHP conditions in all areas it owns to avoid, minimize, and reduce impacts to special-status wildlife species. Some of these measures are specific to a species or a group of species, while others are more general and could be applied to multiple species and their habitats.

Implementation of BMPs GEN-12, GEN-13, and GEN-14 would protect special-status amphibian and reptile species, bat colonies, and San Francisco dusky-footed woodrats by requiring a Valley Water-qualified biologist to conduct a desk audit to determine whether suitable habitat for any of these species is present in or adjacent to a Project activity. If it is determined that a special-status species could occur in the activity area, a qualified biologist would conduct species-specific surveys prior to the onset of construction and maintenance activities. If one of these species, or the eggs or larvae of a special-status amphibian or reptile, are found in the activity area, the qualified biologist would implement a series of work-specific activities to reduce impacts to the species. These minimization and avoidance actions are specific to each species but generally include, but are not limited to, establishing a buffer, implementing exclusion barriers, capturing and removing the individual to a safe location if allowable, and rescheduling work activities to avoid the species.

Implementation of Valley Water BMPs GEN-4, GEN-9, GEN-10, and GEN-21 would minimize the Proposed Project's effects on the Bay checkerspot butterfly and similar species and critical habitat by minimizing the area of disturbance and ensuring that, prior to implementation of non-flow measures, a qualified botanist would perform a survey of the Project area(s) and identify larval host plants. These host plants would be protected from disturbance to the extent feasible by establishing buffer zones around individual plants or populations and restricting herbicides and maintenance personnel and equipment. Implementation of Valley Water BMP GEN-7 would apply a 250-foot-radius no-work buffer zone around occupied burrowing owl burrows.

Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Proposed Project's effects on Bay checkerspot butterfly and similar species by avoiding or minimizing impacts to host plants and associated vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory.

Valley Water would also implement Valley Water BMPs to avoid, minimize, and reduce impacts to special-status wildlife species, including BMPs GEN-2, GEN-4, GEN-8, GEN-15, GEN-20, GEN-23, GEN-26, GEN-30, GEN-32, GEN-33, GEN-35, SED-2, VEG-1, VEG-3. These BMPs would reduce impacts to special-status wildlife species by limiting and restricting herbicide application via the establishment of buffer areas; minimizing the area of disturbance; protecting sensitive fauna species from herbicide use; salvaging native aquatic vertebrates from dewatered channels; implementing erosion and sediment control measures; accessing streams via existing access ramps; avoiding large, mature trees, native vegetation, or other significant habitat features during stream access; minimizing impacts from temporary access points; preventing the accidental release of chemicals, fuels, lubricants, and non-storm-drainage water; preventing vehicle and equipment maintenance and fueling from occurring in sensitive habitats, buffer zones, and waterways; diverting streamflow around the work area by construction of a temporary dam and/or bypass while implementing additional measures to avoid and minimize impacts to water quality and aquatic wildlife; maintaining and operating pumps and generators in a manner that minimizes impacts to water quality and aquatic species; preventing scour downstream of sediment removal areas; minimizing local erosion from in-channel vegetation removal; using appropriate equipment for instream removal to minimize ground disturbance and water quality impacts; using bank stabilization design to prevent erosion downstream; restricting concrete use near waterways to prevent water quality impacts; and restricting fumigants, bait traps, and live traps in sensitive amphibian habitat to minimize impacts to these species from their use.

The Bay checkerspot butterfly, California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle, western burrowing owl, LBV, and tricolored blackbird are covered species under the VHP. The VHP does not provide species level avoidance and minimization measures for all special-status species (for example, tiger salamander and red-legged frog) that could be affected by the Proposed Project. However, goal 17 of the VHP is to conserve existing populations of California red-legged frog, California tiger salamander, and western pond turtle where possible, and to increase the number of individuals and expand the overall distribution of populations of these species in biologically appropriate locations in the study area to maintain viable populations and contribute to the regional recovery of these species.

VHP conditions 3 through 5, 7, 8, 10, 12, and 14 through 17 would benefit all species in the Project area by including management actions and requirements to avoid and/or minimize adverse impacts to covered species and their habitats. These include measures to maintain hydrologic conditions and protect water quality, avoid and minimize disturbance during instream projects, avoid and minimize disturbance during operations and maintenance, increase rural development design and construction requirements, avoid and minimize disturbance during rural road operations and maintenance, establish stream and riparian setbacks, avoid and minimize impacts during activities within or adjacent to wetlands and ponds, and provide specific minimization measures for covered species.

For example, VHP condition 4 requires implementation of over 100 avoidance and minimization measures described in Table 6-2 of the VHP, which requires that all instream projects avoid and/or minimize adverse impacts to stream morphology, aquatic and riparian habitat, and flow conditions. In addition, the VHP requires all instream projects, including projects in dewatered reservoirs, to adopt design requirement and construction avoidance and minimization measures to minimize impacts to covered species, natural communities, and wildlife movement; to ramp increases and decreases in flows during dewatering to avoid washing covered species downstream or drying back the channel faster than covered species can adapt and move to new locations; and to develop an aquatic vertebrate relocation plan for use when cofferdams and water bypass structures are employed. A qualified biologist would determine whether relocation of native species is appropriate during dewatering and implementation of the Proposed Project, and USFWS and CDFW, as applicable, would review the relocation plan to determine whether relocation of VHP-covered species is appropriate.

The VHP provides species-level avoidance and minimization measures for some species, including Bay checkerspot butterfly, western burrowing owls, LBV, and tricolored blackbird. The conditions, although specific for each species, all require habitat surveys, preconstruction surveys, implementation of species-specific avoidance and minimization measures, and construction monitoring to avoid and reduce impacts.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts that could substantially affect special-status wildlife species and be significant.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact to special-status wildlife species, as the project would take place in disturbed areas related to the dam. Any species in an adjacent area may be aware of increased human presence and construction-related noise; however, it is unlikely to alter their behavior.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts and benefits to special-status wildlife could occur if they are within the restoration areas. All attempts would be made to avoid protected species as described for other non-flow measures. Although impacts could be minimized, there is a potential for disturbance and other adverse impacts.

Valley Water would implement BMPs and VHP conditions in all areas it owns to avoid, minimize, and reduce impacts to special-status wildlife species. Some of these measures are specific to a species or a group of species, while others are more general and could be applied to multiple species and their habitats.

Implementation of BMPs GEN-12, GEN-13, and GEN-14 would protect special-status amphibian and reptile species, bat colonies, and San Francisco dusky-footed woodrats by requiring a Valley Water-qualified biologist to conduct a desk audit to determine whether suitable habitat for any of these species is present in or adjacent to a Project activity. If it is determined that a special-status species could occur in the activity area, a qualified biologist would conduct species-specific surveys prior to the onset of construction and maintenance activities. If one of these species, or the eggs or larvae of a special-status amphibian or reptile, are found in the activity area, the qualified biologist would implement a series of work-specific activities to reduce impacts to the species. These minimization and avoidance actions are specific to each species but generally include, but are not limited to, establishing a buffer, implementing exclusion barriers, capturing and removing the individual to a safe location if allowable, and rescheduling work activities to avoid the species.

Implementation of Valley Water BMPs GEN-4, GEN-9, GEN-10, and GEN-21 would minimize the Proposed Project's effects on the Bay checkerspot butterfly and similar species and critical habitat by minimizing the area of disturbance and ensuring that, prior to implementation of non-flow measures, a qualified botanist would perform a survey of the Project area(s) and identify larval host plants. These host plants would be protected from disturbance to the extent feasible by establishing buffer zones around individual plants or populations and restricting herbicides and maintenance personnel and equipment. Implementation of Valley Water BMP GEN-7 would apply a 250-foot-radius no-work buffer zone around occupied burrowing owl burrows.

Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Proposed Project's effects on Bay checkerspot butterfly and similar species by avoiding or minimizing impacts to host plants and associated vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory.

Valley Water would also implement Valley Water BMPs to avoid, minimize, and reduce impacts to special-status wildlife species, including BMPs GEN-2, GEN-4, GEN-8, GEN-15, GEN-20, GEN-23,

GEN-26, GEN-30, GEN-32, GEN-33, GEN-35, SED-2, VEG-1, VEG-3. These BMPs would reduce impacts to special-status wildlife species by limiting and restricting herbicide application via the establishment of buffer areas; minimizing the area of disturbance; protecting sensitive fauna species from herbicide use; salvaging native aquatic vertebrates from dewatered channels; implementing erosion and sediment control measures; accessing streams via existing access ramps; avoiding large, mature trees, native vegetation, or other significant habitat features during stream access; minimizing impacts from temporary access points; preventing the accidental release of chemicals, fuels, lubricants, and non-storm-drainage water; preventing vehicle and equipment maintenance and fueling from occurring in sensitive habitats, buffer zones, and waterways; diverting streamflow around the work area by construction of a temporary dam and/or bypass while implementing additional measures to avoid and minimize impacts to water quality and aquatic wildlife; maintaining and operating pumps and generators in a manner that minimizes impacts to water quality and aquatic species; preventing scour downstream of sediment removal areas; minimizing local erosion from in-channel vegetation removal; using appropriate equipment for instream removal to minimize ground disturbance and water quality impacts; using bank stabilization design to prevent erosion downstream; restricting concrete use near waterways to prevent water quality impacts; and restricting fumigants, bait traps, and live traps in sensitive amphibian habitat to minimize impacts to these species from their use.

The Bay checkerspot butterfly, California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle, western burrowing owl, LBV, and tricolored blackbird are covered species under the VHP. The VHP does not provide species level avoidance and minimization measures for all special-status species (for example, tiger salamander and red-legged frog) that could be affected by the Proposed Project. However, goal 17 of the VHP is to conserve existing populations of California red-legged frog, California tiger salamander, and western pond turtle where possible, and to increase the number of individuals and expand the overall distribution of populations of these species in biologically appropriate locations in the study area to maintain viable populations and contribute to the regional recovery of these species.

VHP conditions 3 through 5, 7, 8, 10, 12, and 14 through 17 would benefit all species in the Project area by including management actions and requirements to avoid and/or minimize adverse impacts to covered species and their habitats. These include measures to maintain hydrologic conditions and protect water quality, avoid and minimize disturbance during instream projects, avoid and minimize disturbance during operations and maintenance, increase rural development design and construction requirements, avoid and minimize disturbance during rural road operations and maintenance, establish stream and riparian setbacks, avoid and minimize impacts during activities within or adjacent to wetlands and ponds, and provide specific minimization measures for covered species.

For example, VHP condition 4 requires implementation of over 100 avoidance and minimization measures described in Table 6-2 of the VHP, which requires that all instream projects avoid and/or minimize adverse impacts to stream morphology, aquatic and riparian habitat, and flow conditions. In addition, the VHP requires all instream projects, including projects in dewatered reservoirs, to adopt design requirement and construction avoidance and minimization measures to minimize impacts to covered species, natural communities, and wildlife movement; to ramp increases and decreases in flows during dewatering to avoid washing covered species downstream or drying back the channel faster than covered species can adapt and move to new locations; and to develop an aquatic vertebrate relocation plan for use when cofferdams and water bypass structures are employed. A qualified biologist would determine whether relocation of native species is appropriate during dewatering and implementation of the Proposed Project, and USFWS and CDFW, as applicable, would review the relocation plan to determine whether relocation of VHP-covered species is appropriate.

The VHP provides species-level avoidance and minimization measures for some species, including Bay checkerspot butterfly, western burrowing owls, LBV, and tricolored blackbird. The conditions, although specific for each species, all require habitat surveys, preconstruction surveys, implementation of species-specific avoidance and minimization measures, and construction monitoring to avoid and reduce impacts.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts that could substantially affect special-status wildlife species and be significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect terrestrial biological resources. Likewise, the Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations.

Monitoring would have no impact to serpentine-associated special-status plant species, as project sites would be outside serpentine habitat. Similarly, since the maintenance and AMP measures would be similar in nature to the proposed flow and non-flow measures, there would be no impact to any serpentine-associated special-status plant species.

Monitoring activities would likely only require foot access to areas and all special-status plant or wildlife species would be avoided. Those species present would likely move to adjacent habitat temporarily while monitors are in the area. Therefore, no adverse impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed flow and non-flow measures; therefore, impacts could occur but would likely be less than significant given any initial impacts from construction. Valley Water would apply the same BMPs and VHP conditions, applied during measure construction, as appropriate.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

Significance Conclusion Summary

There would be no impacts to serpentine-associated special-status plants from the proposed flow measures, as flows would all remain within their banks with the exception of Calero Creek. Calero Creek primarily flows through mixed riparian forest and woodland habitat and there is only one documented area of mixed serpentine chaparral habitat along Calero Creek. However, it is well away from the creek and separated by mixed riparian forest and woodland habitat and residential development.

Impacts of the proposed flow measures on non-serpentine-associated special-status plants would be limited both temporally and spatially. Calero Creek primarily flows through mixed riparian forest and woodland habitat. A special-status plant species that could be found in this habitat type is *Dirca occidentalis*—a deciduous shrub. Increases in flows would be ramped up and down at rates primarily to reduce impacts to aquatic species. These ramping rates would also avoid eroding stream banks and washing out species. If special-status plant species were present in areas of Calero Creek where waters exceeded channel capacity, given the ramping rates, amount of flow, and duration of exceedances over a 20-year period (4 days), it is unlikely they would be adversely affected.

Although species are potentially present it is unlikely that the changes in flows would have substantial adverse effects on special-status wildlife species, given the timing and ramping rates implemented. Aquatic special-status wildlife could be affected, but impacts would be less than significant. Overall, flow measures would result in at most in **less-than-significant** impacts to special-status plants and wildlife.

Non-flow measures would have no impact to serpentine habitats, as they would be avoided. Special-status plants and wildlife could be affected from construction activities if present in the project area. Numerous BMPs and VHP conditions would be implemented to minimize potential impacts. However, there is a potential for disturbance and other adverse impacts that could substantially affect special-status wildlife species and be **significant**.

Mitigation

No mitigation is required for flow measures. Valley Water will implement MM TERR-1a through TERR-1e for construction impacts from non-flow measures on non-serpentine special-status plant and wildlife species. These mitigation measures are described for Impact TERR-1. These mitigation measures may be adjusted in the future to better address project-specific environmental resources.

Mitigation Measure TERR-1a: Biological Resources Screening and Assessment

On a project-by-project basis for each non-flow measure, Valley Water will perform a preliminary biological resource screening as part of the environmental review process to determine whether the project has any potential to affect biological resources, including special-status species. If Valley Water determines that the project has no potential to impact biological resources, no further action is required. If the project would have the potential to affect biological resources, prior to construction, a qualified biologist will conduct a biological resources assessment to document the existing biological resources within the project footprint plus a buffer and to determine the potential impacts to those resources. The biological resources assessment will evaluate the potential for impacts to biological resources including, but not limited to, special-status species, nesting birds, wildlife movement, sensitive plant communities, critical habitat, EFH, and other resources judged to be sensitive by local, state, and/or federal agencies. Pending the results of the biological resources assessment, design alterations, further technical studies (that is, protocol surveys), and/or consultations with USFWS, CDFW, and/or other local, state, and federal agencies may be required.

If the project cannot be designed without complete avoidance, Valley Water will coordinate with the appropriate regulatory agency (that is, USFWS, NMFS, CDFW, or USACE) to obtain regulatory permits and implement project-specific mitigation that could be refined during the permitting process prior to any construction activities. The following mitigation measures (MM TERR-1b through TERR-1e) would be incorporated only as applicable into the biological resources assessment for non-flow measures projects where specific resources are present or may be present and affected by the project. Note that specific surveys described in the mitigation measures below may be completed as part of the biological resources assessment.

Mitigation Measure TERR-1b: Endangered/Threatened Species Habitat Assessment and Protocol Surveys

Specific habitat assessment and survey protocol surveys are established for several federal and/or state endangered or threatened species (for example, California red-legged frog). If the results of the biological resources assessment determine that suitable habitat may be present for any such species in an area that could be affected by construction of a non-flow measure, Valley Water will complete protocol habitat assessments/surveys in areas with suitable habitat for such species that could be affected by construction of the non-flow measures in accordance with CDFW or USFWS, and/or VHP established protocols prior to issuance of any construction permits and/or project approvals.

Alternatively, in lieu of conducting protocol surveys, Valley Water may choose to assume the presence of a special-status species within the project footprint and proceed with development of appropriate avoidance measures, consultation, and payment of VHP fees or permitting, as applicable.

If the special-status species are detected during protocol surveys, or protocol surveys are not conducted and presence assumed based on suitable habitat, MM TERR-1d or MM TERR-1e would apply.

Mitigation Measure TERR-1c: Nesting Avian Species Avoidance and Minimization

Valley Water will retain a qualified biologist to conduct preconstruction surveys for nesting birds. Surveys will be conducted no more than 7 days prior to the initiation of construction activities during the nesting bird season (February 1 through August 15) in any given area. The survey will cover the portions of the Project work area where construction activities will occur as well as a 250-foot buffer for raptors and a 50-foot buffer for non-raptors. During each survey, the biologist will inspect all trees and other potential nesting habitats (for example, shrubs, ruderal grasslands, wetlands, and buildings) in and immediately adjacent to the impact areas for nests. If a lapse in Project-related work of 1 week or longer occurs, another focused survey will be conducted before Project work can be reinitiated.

If an active nest is found sufficiently close to the Project work area (that is, within 250 feet for raptors or 50 feet for non-raptors), a qualified biologist will determine the extent of a disturbance-free buffer zone to be established around the nest (typically 50 feet for non-raptors and 250 feet for raptors). No construction activities will be performed within the buffer until the young have fledged or the nest has been determined to be inactive by a qualified biologist.

If the qualified biologist determines that a reduced buffer size is appropriate given conditions in the vicinity of the nest, the type of construction activity that would occur near the nest, and the species of the nesting bird, the biologist will monitor bird behavior in relation to work activities. If the birds do not indicate that they are habituated to Project activities during the initial 2 days of attempting work within a reduced buffer, the standard buffer will be implemented. Project activities within the reduced buffers will not resume until Valley Water has consulted with CDFW and both the qualified biologist and CDFW confirm that the birds' behavior has normalized, or until the nest is no longer active.

Mitigation Measure TERR-1d: Payment of VHP Impact Fees

Valley Water and other co-permittees implementing non-flow measures will mitigate temporary and permanent impacts to VHP-covered species and sensitive habitats in the geographic area defined by the VHP through payment of VHP impact fees to the Santa Clara Valley Habitat Agency. For each applicable non-flow measure, this fee to the VHP conservation program will pay for the cost of mitigating Project effects on covered species and their habitats, including mitigation for impacts to sensitive habitats such as wetlands and aquatic habitats.

The VHP's conservation program includes conserving existing populations of covered species, where possible; increasing the number of individuals; and expanding the distribution of the species within the VHP Reserve System through the acquisition, restoration, and creation of habitat. Furthermore, the VHP Reserve System would be designed to maintain and improve connectivity between these habitats, to reduce habitat fragmentation, and to link species' habitat within the VHP Reserve System to important habitat outside the VHP Reserve System. The objective of the VHP's conservation strategy is not only the conservation of the species but contribution to the species' recovery as well.

As a result, the payment of fees in compliance with the VHP would contribute to this important conservation and recovery program.

VHP impact fees will be based on the estimated temporary impacts to VHP landcover types, as well as fees specific to impacts to wetlands habitats, resulting from the Proposed Project. As defined by the VHP, temporary impacts are "direct impacts that alter land cover for less than one year and that allow the disturbed area to recover to pre-project or ecologically improved conditions within one year of completing construction" (ICF 2012).

Mitigation Measure TERR-1e: Implement Compensatory Mitigation for Special-status Plant and Wildlife Species for Areas Outside or Activities Not Covered by the VHP

For areas outside the VHP or activities not covered by the VHP, Valley Water will implement project-specific mitigation to avoid or minimize impacts during construction activities.

Compensation for unavoidable impacts to populations of special-status plants will be provided by a combination of preservation and enhancement of those species' populations outside potential impact areas. For impacts to populations (including partial populations) of a specific plant species, compensatory mitigation would include the preparation of a Habitat Mitigation and Monitoring Plan (HMMP) that would describe the preservation, enhancement, and management of lands that (1) already support equal or greater numbers (and health) of individuals of that species and (2) contain sufficient unoccupied suitable habitat to allow for an increase in populations, the increase being at least equivalent to the number affected. For determining the number of individuals affected (if applicable), the greatest number of individuals known to be present within the impact area (if the impact area has undergone multiple surveys) would be used to determine the magnitude of the impact.

Significance after Mitigation

With the implementation of MM TERR-1a, MM TERR-1b, MM TERR-1c, MM TERR-1d, and MM TERR-1e, actions would be taken to substantially avoid or minimize impacts to special-status species during implementation of non-flow measures. Impact TERR-1 would be reduced to a **less-than-significant** level with mitigation because substantial adverse effects on these species would be prevented.

3.8.4.2 Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS (less than significant with mitigation)[17]

To better understand the potential for significant impacts, the following analysis of terrestrial biological resources under TERR-2 evaluates the Proposed Project effects to riparian and other sensitive natural communities. This analysis includes the potential for the introduction or spread of invasive species.

Riparian, woodland, forest, and scrub habitats are found along the perennial and intermittent streams in the study area and many are considered sensitive natural communities. Riparian habitats border stream corridors and serve as a habitat interface between terrestrial and aquatic communities throughout the study area. This habitat includes a variety of riparian shrubs and trees including arroyo willow, Western sycamore, bigleaf maple, white alder, California blackberry, and poison oak. Coast live oak often co-occurs in riparian habitats which sometime intergrade with coast live oak woodland and forest. Serpentine habitat is also highly sensitive and only found in limited areas of the study area.

[17] Impact conclusion provided after consideration of mitigation.

Flow Measures Impact Analysis

As described in Section 3.2, *Hydrology,* the proposed flow measures in Stevens Creek would not approach, and were projected to be significantly below, the 5,000 cfs capacity. In fact, over the 20-year modeled period, daily peak flows were only found to exceed baseline daily peak flows in 2 days. In the Guadalupe River portion of the study area, maximum daily peak flows for Los Gatos Creek, Guadalupe Creek, and Alamitos Creek would also be significantly under the estimated channel capacity. Calero Creek flows under the 2015 Proposed Project would exceed the channel capacity on 4 additional days compared with the current baseline condition. However, since there is no increase in the peak flows, the peak flow on the 4 days in question only exceeds the channel capacity by 31 cfs, and would not be considered substantial. While the future baseline and 2035 Proposed Project daily peak flows exceed the channel capacity of Calero Creek, there would be no impact since the modeled 2035 Proposed Project scenario does not increase the daily peak flows by more than 30 cfs relative to the future baseline scenario, and there would be 3 fewer days of Calero Creek flows exceeding the channel capacity under the 2035 Proposed Project scenario, relative to the future baseline condition.

Calero Creek primarily flows through mixed riparian forest and woodland habitat and there is only one documented area of mixed serpentine chaparral habitat along Calero Creek. However, it is well away from the creek and separated by mixed riparian forest and woodland habitat and residential development. Based on this analysis of the hydrology, serpentine habitats would not be affected by proposed flow measures.

The potential for invasive species from upstream creeks and reservoirs to relocate to the study area with the flow measures would not differ from current conditions given that the source populations currently have the ability to move through the study area during high flows. Therefore, it is unlikely that flow measures associated with the Project would result in an increase in invasive species.

The effects of the flow measures on riparian natural communities would be limited to those rare occasions when flows exceed the channel capacity. The use of ramping rates to increase and decrease flows would limit the level of potential impacts as changes in the hydrology would be gradual. Riparian communities are adapted to flood events, and some plant species need high water events to germinate or spread seeds and could benefit from these flows. Also, summer base flows would help to keep water in streams during drier periods, maintaining associated groundwater. This availability will help certain species during periods of environmental stress, providing long-term benefits.

Overall, there would therefore be no adverse impact to riparian habitat and other sensitive natural communities as a result of the proposed flow measures.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the Proposed Project analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality. The impacts from each of these non-flow measures are discussed in the sections below. Any adverse impacts would be from construction and access to the area.

Because of the programmatic consideration of the non-flow measure analysis provided in this EIR, a precise, project-level analysis of the specific impacts is not possible at this time, as only general locations and project concepts are known. As non-flow measures identified in the Proposed Project are further planned and designed, project-specific environmental review would be conducted by Valley Water or other agencies responsible for implementing such projects.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land covers types. The Fremont Fish Ladder area is located in urban-suburban land covers types with some areas of valley foothill riparian habitat up and down stream.

The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe Creek in annual grasslands, blue oak woodlands, and coastal oak and coastal live oak forest and woodlands. On Alamitos Creek the project would likely occur in mixed riparian forest and woodland and coastal live oak forest and woodland.

Sensitive natural communities would be temporarily affected by construction equipment for the project. Access would be developed to move equipment to the specific area requiring work. Access development and construction activities could result in vegetation clearing; tree removal for access and construction; pruning; trampling of vegetation by equipment; and fill, dust, and alteration of microhabitat conditions during restoration and enhancement activities. In addition, the creation of staging areas could result in the mechanical or physical removal of vegetation and modification of the seed bank as a result of grading, although these areas would be sited outside sensitive resource areas to the extent possible. Furthermore, minor fuel and oil spills could occur during equipment or vehicle operation or refueling, in addition to the risk of larger accidental releases. Without rapid containment and cleanup, these materials could kill or impair the health of plants in these sensitive communities.

The use of vehicles could transport invasive plants or their seed to the location, which could spread in the disturbed area. Because many invasive plants are able to easily colonize recently disturbed areas and/or tolerate repeated disturbance better than many native plants, construction activities associated with non-flow measures, such as clearing and grading, might create conditions suitable for additional spreading of invasive plant species. In addition, bare upland soils left after construction of temporary staging areas might encourage growth of weedy species and mulching or erosion-control mixes might include and thus introduce invasive, nonnative plant species. Further, nonnative plant species could temporarily benefit from any dewatering associated with the measures.

All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Proposed Project’s effects on plants and vegetation by ensuring that, prior to Project activities and during the appropriate bloom period to detect plants, a qualified botanist would perform a survey of the Project area(s), identify sensitive natural vegetation communities, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Proposed Project’s effects on plants and vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory. Implementation of Valley Water BMPs would also reduce impacts to plants and vegetation by using local ecotypes of native plants for revegetation and erosion control and using appropriate equipment when working in streams. Lastly, implementation of BMPs GEN-30, GEN-31, and GEN-32 would reduce impacts to terrestrial biological resources by implementing multiple actions to limit the effects of dewatering, refueling, and equipment maintenance on native plants.

In addition to these BMPs, adherence to VHP conditions 3, 4, 5, 7, 8, 11, and 14, where applicable, would minimize and reduce the Proposed Project's effects from non-flow-measures on non-serpentine special-status plants by avoiding direct impacts to special-status plants and their habitats. Valley Water also would add measures similar to the applied Valley Water BMPs as conditions of funding agreements for those projects owned by others.

Implementation of Valley Water BMPs VEG-1, VEG-2, VEG-3, VEG-6, WQ-9, and HM-1 would reduce the potential for invasive species to spread or become established. BMP BIO-9 requires Valley Water to consult with a qualified biologist or vegetation specialist to determine what planting seed options are ecologically appropriate and effective whenever native species are prescribed for installation. This measure would minimize the introduction of ecologically inappropriate seed mixes (for example, ones that could include nonnative invasive plant seeds) into areas of the Project site(s) that are revegetated following completion of construction activities (for example, work related to development of construction laydown areas, construction staging areas, and access roads). BMPs VEG-1, VEG-2, VEG-3, and VEG-6 would reduce areas where exotic species could become established though proper use of equipment, removal of invasive plant species, and prevention of unwanted grazing in stream areas. BMP HM-1 requires vehicles (for example, construction vehicles and equipment) to be washed only at approved areas and not at work areas. This measure would minimize the spread of nonnative invasive plants (for example, via seeds and flowers) or wildlife (for example, nonnative mussel species) into the Project site.

In applicable areas, the Proposed Project would adhere to VHP condition 7, which would "minimize the potential direct and indirect impacts of rural development in areas that would remain primarily rural on covered species and natural communities most likely to be affected by rural development" (ICF 2012). However, a secondary goal of this VHP condition is to minimize construction-related impacts of VHP-covered projects, including minimizing the introduction of nonnative, invasive species. This condition requires that all temporarily disturbed soils in the areas of VHP-covered projects, including most of the Proposed Project, be revegetated with native plants and/or grasses or sterile nonnative species suitable for the altered soil conditions upon completion of construction. Local watershed native plants would be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixes must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. All disturbed areas that have been compacted would be decompacted prior to planting or seeding (ICF 2012).

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be significant as they could be substantial.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Representative sites identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. The proposed Stevens Creek site is located within oak woodland and valley foothill riparian habitat. The Guadalupe Creek sites are located within annual grasslands and oak woodlands. The Guadalupe River site includes a small riparian habitat area surrounded by development. Finally, the Los Gatos Creek sites include valley foothill riparian and scrub, as well as urban development.

Impacts to sensitive natural communities would be the same as described above for fish barrier remediation projects. All attempts would be made to limit impacts to sensitive areas. However, temporary impacts to riparian and other habitats will be unavoidable as they are the only way to access the project areas. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Proposed Project's effects on sensitive natural communities by ensuring that, prior to Project activities and during the appropriate bloom period to detect plants, a qualified botanist would perform a survey of the Project area(s), identify sensitive natural vegetation communities, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Proposed Project's effects on plants and vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory. Implementation of Valley Water BMPs would also reduce impacts to plants and vegetation by using local ecotypes of native plants for revegetation and erosion control and using appropriate equipment when working in streams. Lastly, implementation of BMPs GEN-30, GEN-31, and GEN-32 would reduce impacts to terrestrial biological resources by implementing multiple actions to limit the effects of dewatering, refueling, and equipment maintenance on native plants.

In addition to these BMPs, adherence to VHP conditions 3, 4, 5, 7, 8, 11, and 14, where applicable, would minimize and reduce the Proposed Project's effects from non-flow-measures on non-serpentine special-status plants by avoiding direct impacts to special-status plants and their associated sensitive natural communities. Valley Water also would add measures similar to the applied Valley Water BMPs as conditions of funding agreements for those projects owned by others. Although impacts could be minimized, there is a potential for disturbance and other adverse impacts, though they would be less than significant as they would not likely be substantial to the sensitive natural communities.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be significant as they could be substantial.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact to special-status species, as the project would take place in disturbed areas related to the dam.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts to special-status plants could occur if they are within the restoration areas. All attempts would be made to avoid sensitive natural communities as described for other non-flow measures. Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be significant as they could be substantial.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect terrestrial biological resources. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. Monitoring activities would likely only require foot access to areas and impacts to sensitive natural communities would be avoided.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. Therefore, no impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed flow and non-flow measures; therefore, impacts could occur but would likely be less than significant given any initial impacts from construction.

Significance Conclusion Summary

The proposed flow measures would not cause substantial loss or disturbance of riparian or other sensitive natural communities. Impacts would be limited both temporally and spatially and thus there would be no impact in context of the magnitude and timing of the fluctuations of the flows. Riparian species could benefit from water being available during the summer dry season and other restoration activities, reducing environmental stress. No mitigation for flow measures is required.

Non-flow measures could result in limited temporary impacts to riparian and other sensitive natural communities, where complete avoidance could not be accomplished, as well as temporal loss of riparian functions and values in the areas disturbed. However, after construction is completed, the areas would be replanted and restored. Implementation of Valley Water’s BMPs and VHP conditions listed above would further reduce these impacts. However, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be significant as they could be substantial.

Overall, the Proposed Project’s impacts to riparian and other sensitive natural communities could be **significant** in the short term. However, in the long term, affected sensitive natural communities would likely be replaced with higher-value habitat through site restoration.

Mitigation

No mitigation is required for flow measures. Valley Water will implement MM TERR-1a and MM TERR-1b, and TERR-1d and TERR-1e (if necessary) for construction impacts from non-flow measures on sensitive natural communities. These mitigation measures are described for Impact TERR-1. These mitigation measures may be adjusted in the future to better address project-specific environmental resources.

Significance after Mitigation

With the implementation of MM TERR-1a and MM TERR-1b, and MM TERR-1d and MM TERR-1e (if necessary), actions would be taken to substantially avoid or minimize impacts to sensitive natural communities during implementation of non-flow measures. Impact TERR-2 would be reduced to a **less-than-significant** level with mitigation because substantial adverse effects on these sensitive natural communities would be prevented. In the long term, these communities would benefit from habitat restoration and enhancement efforts.

3.8.4.3 Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means (less than significant with mitigation)[18]

Based on previous delineations of these habitats performed for Valley Water, jurisdictional wetlands and other waters of the U.S. and state are present in most areas in the study area. Both Stevens Creek and the Guadalupe River, and their tributaries, are likely "other waters," up to the ordinary high-water mark (OHWM) and waters of the state. Wetlands along the reaches of the Stevens Creek and the Guadalupe River, and their tributaries, are also federally and/or state protected.

Flow Measures Impact Analysis

As described in Section 3.2, *Hydrology,* the proposed flow measures in Stevens Creek would not approach, and were projected to be significantly below, the 5,000 cfs capacity. In fact, over the 20-year modeled period, daily peak flows were only found to exceed baseline daily peak flows in 2 days. In the Guadalupe River portion of the study area, maximum daily peak flows for Los Gatos Creek, Guadalupe Creek, and Alamitos Creek would also be significantly under the estimated channel capacity. Calero Creek flows under the 2015 Proposed Project would exceed the channel capacity on 4 additional days compared with the current baseline condition. However, since there is no increase in the peak flows, the peak flow on the 4 days in question only exceeds the channel capacity by 31 cfs, and would not be considered substantial. While the future baseline and 2035 Proposed Project daily peak flows exceed the channel capacity of Calero Creek, there would be no impact since the modeled 2035 Proposed Project scenario does not increase the daily peak flows by more than 30 cfs relative to the future baseline scenario, and there would be 3 fewer days of Calero Creek flows exceeding the channel capacity under the 2035 Proposed Project scenario, relative to the future baseline condition.

The proposed flow measures would be similar to current flow regime in the creeks. The physical channel (bed and bank) and water column that make up the waters of the U.S. in the study area would not be dewatered, filled, reduced in size, or otherwise physically modified with the flow measure relative to current conditions. Winter and summer base flows would provide additional water to the stream and adjacent wetlands, providing additional water during drier periods and helping to sustain wetland functions seasonally. Overall, there would be no impact to state or federally protected wetlands from the proposed flow measures.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the Proposed Project analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality. The impacts from each of these non-flow measures are discussed in the sections below. Any adverse impacts would be from construction and access to the area.

Because of the programmatic consideration of the non-flow measure analysis provided in this EIR, a precise, project-level analysis of the specific impacts is not possible at this time, as only general locations and project concepts are known. As non-flow measures identified in the Proposed Project

[18] Impact conclusion provided after consideration of mitigation.

are further planned and designed, project-specific environmental review would be conducted by Valley Water or other agencies responsible for implementing such projects.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land covers types. The Fremont Fish Ladder area is located in urban-suburban land covers types with some areas of valley foothill riparian habitat up and down stream. The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe Creek and Alamitos Creek.

Any impacts to wetlands would be temporary in nature and occur only during construction. The placement of fill (for example, for cofferdams and temporary access roads), temporary hydrological interruption (for example, dewatering and diversion), degradation of water quality (for example, increased sedimentation and turbidity), removal of vegetation, and other ground-disturbing activities could have direct impacts to jurisdictional wetlands and other waters of the U.S or state. Furthermore, minor fuel and oil spills could occur during equipment or vehicle operation or refueling, in addition to the risk of larger accidental releases. Without rapid containment and cleanup, these materials could kill or impair the wetlands.

The use of vehicles could transport invasive plants or their seed to the location, which could spread in the disturbed area. Because many invasive plants are able to easily colonize recently disturbed areas and/or tolerate repeated disturbance better than many native plants, construction activities associated with non-flow measures, such as clearing and grading, might create conditions suitable for additional spreading of invasive plant species. In addition, bare upland soils left after construction of temporary staging areas might encourage growth of weedy species and mulching or erosion-control mixes might include and thus introduce invasive, nonnative plant species. Further, nonnative plant species could temporarily benefit from any dewatering associated with the measures.

All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Proposed Project's effects on all vegetation that could be considered wetland vegetation. Prior to Project activities, a qualified botanist would perform a survey of sensitive natural vegetation communities and wetlands in the Project area, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-4, WQ-5, and WQ-9 would minimize the Proposed Project's effects on wetlands by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds. Implementation of Valley Water BMPs BI-3, BI-7, BI-8, and VEG-3 would also reduce impacts to wetland habitat by removing any temporary fills, minimizing impacts to vegetation from survey work, using local ecotypes of native plants for revegetation and erosion control, and using appropriate equipment when working in or adjacent to streams.

The Proposed Project would adhere to VHP conditions 3, 4, 5, 7, 8, 11, and 12 where applicable, which would reduce impacts to waters and wetlands within the covered areas by minimizing impacts to these areas, avoiding and reducing impacts to instream biota and water quality, preventing the introduction or spread of invasive weeds, and avoiding wetland areas where feasible.

Prior to ground-disturbing activities occurring within or adjacent to wetlands or other areas that may fall under the jurisdiction of USACE or SWRCB, Valley Water will retain a qualified wetland scientist to complete a jurisdictional delineation of the area. The delineation will identify areas to be protected, permitted, or mitigated for through implementation of project-specific mitigation measures. Where feasible and appropriate, all jurisdictional aquatic resources not directly affected by construction activities will be avoided and protected by establishing staking, flagging, or fencing between the identified construction areas and aquatic resources to be avoided and/or preserved. Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Therefore, there is a potential that short-term adverse impacts could be significant as they could be substantial.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. General locations identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. The proposed Stevens Creek site is located within oak woodland and valley foothill riparian habitat. The Guadalupe Creek sites are located within annual grasslands and oak woodlands. The Guadalupe River site includes a small riparian habitat area surrounded by development. Finally, the Los Gatos Creek sites include valley foothill riparian and scrub, as well as urban development.

Impacts to wetlands would be the same as described above for fish barrier remediation projects. All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Proposed Project's effects on all vegetation that could be considered wetland vegetation. Prior to Project activities, a qualified botanist would perform a survey of sensitive natural vegetation communities and wetlands in the Project area, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-4, WQ-5, and WQ-9 would minimize the Proposed Project's effects on wetlands by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds. Implementation of Valley Water BMPs BI-3, BI-7, BI-8, and VEG-3 would also reduce impacts to wetland habitat by removing any temporary fills, minimizing impacts to vegetation from survey work, using local ecotypes of native plants for revegetation and erosion control, and using appropriate equipment when working in or adjacent to streams.

The Proposed Project would adhere to VHP conditions 3, 4, 5, 7, 8, 11, and 12 where applicable, which would reduce impacts to waters and wetlands within the covered areas by minimizing impacts to these areas, avoiding and reducing impacts to instream biota and water quality, preventing the introduction or spread of invasive weeds, and avoiding wetland areas where feasible.

Prior to ground-disturbing activities occurring within or adjacent to wetlands or other areas that may fall under the jurisdiction of USACE or SWRCB, Valley Water will retain a qualified wetland scientist to complete a jurisdictional delineation of the area. The delineation will identify areas to be protected, permitted, or mitigated for through implementation of project-specific mitigation measures. Where feasible and appropriate, all jurisdictional aquatic resources not directly affected by construction activities will be avoided and protected by establishing staking, flagging, or fencing between the identified construction areas and aquatic resources to be avoided and/or preserved. Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Therefore, there is a potential that short-term adverse impacts could be significant as they could be substantial.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact to wetlands, as the project would take place in disturbed areas related to the dam.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts to wetlands could occur if they are within the restoration areas. All attempts would be made to avoid wetlands as described for other non-flow measures.

Prior to ground-disturbing activities occurring within or adjacent to wetlands or other areas that may fall under the jurisdiction of USACE or SWRCB, Valley Water will retain a qualified wetland scientist to complete a jurisdictional delineation of the area. The delineation will identify areas to be protected, permitted, or mitigated for through implementation of project-specific mitigation measures. Where feasible and appropriate, all jurisdictional aquatic resources not directly affected by construction activities will be avoided and protected by establishing staking, flagging, or fencing between the identified construction areas and aquatic resources to be avoided and/or preserved. Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Therefore, there is a potential that short-term adverse impacts could be significant as they could be substantial.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect terrestrial biological resources. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. Monitoring activities would likely only require foot access to areas and impacts to wetlands would be avoided.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. Therefore, no impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed flow and non-flow measures; therefore, impacts could occur but would likely be less than significant given any initial impacts from construction.

Significance Conclusion Summary

The proposed flow measures would be similar to current flow regime in the creeks. The physical channel (bed and bank) and water column that make up the waters of the U.S. in the study area would not be dewatered, filled, reduced in size, or otherwise physically modified with the flow measure relative to current conditions. Overall, there would be a **less-than-significant** impact to state or federally protected wetlands from the proposed flow measures. Winter and summer base flows would provide additional water to the stream and adjacent wetlands, providing additional water during drier periods and helping to sustain wetland functions seasonally.

The proposed non-flow measures could result in temporary impacts to wetland functions and values. Despite the implementation of Valley Water BMPs and VHP conditions, it may not be possible to completely avoid impacts to jurisdictional waters and wetlands. Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Therefore, there is a potential that short-term adverse impacts could be **significant** as they could be substantial.

Mitigation

Valley Water would implement MM TERR-1d, as well as MM TERR-2 introduced below, to reduce impacts to wetlands and other waters of the U.S. MM TERR-1d would require Valley Water to mitigate its impacts to VHP-covered wetlands through payment of land cover fees to the Santa Clara Valley Habitat Agency. These fees would be used to offset impacts to wetlands that would not be minimized by reestablishment of wetlands within 1 year through the creation or restoration of equivalent habitat on a regional basis. The VHP conservation program will restore, enhance, preserve, and manage in perpetuity numerous habitat types throughout the VHP Reserve System, including protecting at least 100 miles of streams, enhancing or restoring a minimum of 70 acres and up to 428 acres of riparian woodland and wetlands, and creating a minimum of 20 acres and up to 72 acres of ponds. Thus, the Reserve System would provide benefits not only to covered species but also to sensitive habitats such as wetlands and other waters. As a result, these wetlands and other waters would form the conservation program to which Valley Water would contribute as mitigation for the impacts of this Project.

MM TERR-2 may be adjusted in the future to better address project-specific environmental resources.

Mitigation Measure TERR-2: Mitigation for Wetlands and Other Waters of the United States and State outside of VHP-covered Areas

Areas temporarily affected by individual projects will be analyzed for the presence of jurisdictional wetlands and waters, and project-specific impacts will be documented. If necessary, affected wetlands and waters will be restored to pre-project functions and values at a minimum mitigation ratio (performance objective) of 1:1. Valley Water will monitor restoration to track mitigation success. This process will be documented in a project-specific mitigation plan that will be refined during the federal or state permitting processes.

Significance after Mitigation

Project-related impacts to wetlands and other waters of the U.S. and state would be reduced to a **less-than-significant** level through implementation of MM TERR-1d and MM TERR-2. After mitigation, the Proposed Project would not have a substantial adverse effect on jurisdictional wetlands and other waters.

3.8.4.4 Impact TERR-4: Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites (less than significant)

For many species, the landscape is a mosaic of suitable and unsuitable habitat types. Wildlife corridors are segments of land that provide a link between these different habitats while also providing cover. On a broader level, corridors also function as avenues along which wide-ranging animals can travel, plants can propagate, genetic interchange can occur, populations can move in response to environmental changes and natural disasters, and threatened species can be replenished from other areas. In the study area, the vegetation communities along streams and rivers often function as wildlife corridors.

Figure 5-6 of the VHP depicts landscape linkages in most of the study area associated with movement of animals within the two watersheds. In addition, other natural habitats (for example, oak woodlands and scrub) and the shorelines of reservoirs function as pathways for terrestrial wildlife movement (such as mammals), allowing animals to move in these corridors through the developed portions of the study area.

Flow Measures Impact Analysis

Winter and summer base flows and a spring pulse flow would not adversely affect wildlife movements or any known wildlife corridors, as flows would remain within the channel, and only rarely top the bank on Calero Creek. Ramping rates would increase and decrease flows slowly enough for wildlife to adjust travel if necessary. The increased flows would provide benefits to wildlife by providing additional water during dry periods. With respect to terrestrial nursery sites, there are no known sites within the portions of the study area that would be affected by flow measures. There would therefore be no impact to native wildlife movement or their corridors or the use of nursery sites as a result of the Proposed Project flow measures.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the Proposed Project analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality. The impacts from each of these non-flow measures are discussed in the sections below. Any adverse impacts would be from construction and access to the area.

Because of the programmatic consideration of the non-flow measure analysis provided in this EIR, a precise, project-level analysis of the specific impacts is not possible at this time, as only general locations and project concepts are known. As non-flow measures identified in the Proposed Project are further planned and designed, project-specific environmental review would be conducted by Valley Water or other agencies responsible for implementing such projects.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land covers types. The Fremont Fish Ladder area is located in urban-suburban land covers types with some areas of valley foothill riparian habitat up and down stream. The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe Creek and Alamitos Creek.

By creating open areas or patches with unsuitable vegetation types, grading and excavation activities could temporarily restrict some wildlife species from moving between suitable habitat patches. In addition, noise and disturbance associated with construction activities could cause species which commonly use habitats on the project site(s) for dispersal to at least temporarily avoid dispersal through the project site(s). This would mostly likely occur with small mammals, amphibians, and reptiles with reduced range mobility. Once construction activities are complete, however, wildlife movement conditions would be similar to or better than pre-project conditions, and wildlife dispersal through the project site would return to the existing condition, or one that better facilitates movement by eliminating hardscape and grade separation. Larger, more mobile wildlife species would likely avoid construction activities and skirt the areas of disturbance.

The impact area would be limited to only the area needed for project construction. These areas are discrete locations that would be subjected to limited construction activities and would not experience substantial permanent habitat removal or the introduction of structures that would block, remove, or otherwise substantially impact the ability of wildlife to disperse through the project site(s) and use existing wildlife corridors or breeding and rearing sites.

Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Proposed Project's effects on riparian vegetation that could be used as wildlife corridors by avoiding and/or minimizing disturbance. The Proposed Project would also adhere to VHP conditions 7 and 11, which would reduce Proposed Project impacts to wildlife corridors within the covered areas by minimizing impacts to sensitive land cover types, avoiding or reducing impacts to riparian habitat, preventing the introduction or spread of invasive weeds, and providing setbacks to riparian vegetation where possible. Although impacts could be minimized, there is a potential for disturbance and other temporary adverse impacts, though they would be less than significant as they would not likely interfere substantially with the wildlife movement, established wildlife corridors, or impede the use of nursery sites.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. General locations identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek.

Impacts to wildlife movement, established wildlife corridors, or the use of nursery sites would be the same as described above for fish barrier remediation projects. All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Proposed Project's effects on riparian vegetation that could be used as wildlife corridors by avoiding and/or minimizing disturbance. The Proposed Project would also adhere to VHP conditions 7 and 11, which would reduce Proposed Project impacts to wildlife corridors within the covered areas by minimizing impacts to sensitive land cover types, avoiding or reducing impacts to riparian habitat, preventing the introduction or spread of invasive weeds, and providing setbacks to riparian vegetation where possible. Although impacts could be minimized, there is a potential for disturbance and other temporary adverse impacts, though they would be less than significant as they would not likely interfere substantially with the wildlife movement or established wildlife corridors, or impede the use of nursery sites.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impacts to wildlife movement, established wildlife corridors, or the use of nursery sites, as the project would take place in disturbed areas related to the dam.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts to wildlife movement, established wildlife corridors, or the use of nursery sites could occur if they are within the restoration areas. All attempts would be made to avoid impacts as described for other non-flow measures.

Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Proposed Project's effects on riparian vegetation that could be used as wildlife corridors by avoiding and/or minimizing disturbance. The Proposed Project would also adhere to VHP conditions 7 and 11, which would reduce Proposed Project impacts to wildlife corridors within the covered areas by minimizing impacts to sensitive land cover types, avoiding or reducing impacts to riparian habitat, preventing the introduction or spread of invasive weeds, and providing setbacks to riparian vegetation where possible. Although impacts could be minimized, there is a potential for disturbance and other temporary adverse impacts, though they would be less than significant as they would not likely interfere substantially with the wildlife movement or established wildlife corridors, or impede the use of nursery sites.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect terrestrial biological resources. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. Monitoring activities would likely only require foot access to areas and impacts to wildlife movement, established wildlife corridors, or the use of nursery sites would be avoided.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. Therefore, no impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed flow and non-flow measures; therefore, impacts could occur but would likely be less than significant given any initial impacts from construction.

Significance Conclusion Summary

The proposed flow measures would be similar to current flow regime in the creeks. Winter and summer base flows would provide additional water to the stream and adjacent wetlands, providing additional water during drier periods and helping to sustain wetland functions seasonally. Flow measures would not interfere substantially with the movement of any native resident or migratory species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife breeding or rearing sites; therefore, there would be **no impact** from flow measures, and no mitigation is required.

Implementation of non-flow measures would impact terrestrial wildlife movement during construction; however, these impacts would be temporary, as animals would continue to move through the project site(s) following project completion. The ability of animals to move through the project site(s) following project completion would be similar to current conditions and would be improved by the channel-enhancement activities including riparian restoration. Thus, the proposed non-flow measures would not interfere substantially with the movement of any native wildlife species or with established native terrestrial wildlife corridors or impede the use of native wildlife breeding or rearing sites. In addition, implementation of the BMPs and VHP conditions would help reduce project impacts to wildlife movement. Based on the above analysis, Impact TERR-4 would be **less than significant**.

Mitigation

No mitigation would be required for Impact TERR-4.

3.8.4.5 Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance (less than significant with mitigation)[19]

As discussed in Section 3.8.2, Santa Clara County and the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Milpitas have general plan policies and regulatory programs, including local tree ordinances that encourage protection of terrestrial biological resources. The County's and Cities' general plans in the study area outline goals and objectives in preserving and protecting biological resources, including trees that are protected under these local policies.

Flow Measures Impact Analysis

The proposed flow measures would not conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance. Increases in flows would be ramped up and down at rates primarily to reduce impacts to aquatic species. These ramping rates would also avoid eroding stream banks and washing out or stranding aquatic species. These ramping rates would be slower than what would be experienced naturally in a storm event. The proposed flows would also not reduce water availability but could increase water sources during dry times. There would therefore be no impact to local policies or ordinances protecting biological resources as a result of the proposed flow measures

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the Proposed Project analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality. The impacts from each of these non-flow measures are discussed in the sections below. Any adverse impacts would be from construction and access to the area.

Because of the programmatic consideration of the non-flow measure analysis provided in this EIR, a precise, project-level analysis of the specific impacts is not possible at this time, as only general locations and project concepts are known. As non-flow measures identified in the Proposed Project are further planned and designed, project-specific environmental review would be conducted by Valley Water or other agencies responsible for implementing such projects.

With the exception of tree removal related to construction of non-flow measures, the results of the non-flow measures would be a benefit to the biological resources that are the subject of local protection policies. The proposed non-flow measures would improve fish passage; stabilize and

[19] Impact conclusion provided after consideration of mitigation.

improve geomorphic functions of the watersheds; preserve and restore rare, sensitive, and special-status habitats and species; maintain the existing character of the specific project area(s); retain and/or enhance the existing form of existing creek channels; avoid excessive grading and disturbance of vegetation and soils; maintain natural drainage patterns; and enhance the functions and values of creeks and adjacent vegetation. These actions and the resulting biological benefits would inherently be consistent with applicable local policies designed to protect biological resources.

As detailed in the section for Impact TERR-2, the non-flow measures would only result in temporary impacts to trees in portions of the study area that are identified for construction activities.

In addition, Valley Water would implement BMP GEN-4, limiting impacts to the minimum area required to address the impact of the Proposed Project on ordinance trees, and would comply with the applicable requirements of local tree ordinances. However, complete avoidance of these trees may not be practicable for individual projects; therefore, impacts could be significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect terrestrial biological resources. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. The effects of monitoring, maintenance, and AMP activities of habitat improvements would not conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance. Any impacts would be similar to those experienced during construction.

Significance Conclusion Summary

The proposed flow measures would be similar to current flow regime in the creeks. Winter and summer base flows would provide additional water to the stream and adjacent wetlands, providing additional water during drier periods and helping to sustain wetland functions seasonally. Flow measures would not conflict with any applicable provisions of local policies or ordinances protecting biological resources. There would be **no impact** for Impact TERR-5, and no mitigation is required.

To limit impacts from non-flow measures, implementation of BMP GEN-4 would minimize the loss of ordinance trees where tree ordinances apply to Valley Water. However, complete avoidance of these trees may not be practicable for individual projects; therefore, impacts could be **significant** because there could be conflicts with applicable provisions of local policies or ordinances protecting trees.

Mitigation

No mitigation would be required for Impact TERR-5 for flow measures.

For non-flow measures, mitigation measures for trees would help meet applicable provisions of local policies and ordinances protecting trees. Valley Water would implement MM TERR-3. This mitigation measure may be adjusted in the future to better address project-specific environmental resources.

Mitigation Measure TERR-3: Tree Replacement

Valley Water will replace ordinance trees if required by applicable ordinances in accordance with Section 5.5 in Appendix C of the SMP (Valley Water 2011) (*Mitigation for Tree and Shrub Removals 6–12 Inches dbh*). This section provides a specific tree appraisal and evaluation protocol to determine how replacement planting should occur. It is possible that this mitigation measure may be refined during the permitting process by USACE, the San Francisco Bay RWQCB, or CDFW, in which case the refinements required by these agencies will be implemented. Special attention will be given to the size of tree replacement if using container material; larger container sizes and held over plant stock in a nursery setting may contain *Phytophthora* spp., a water mold plant pathogen. Appropriate nursery BMPs should be employed for all container stock.

Significance after Mitigation

MM TERR-3 would mitigate impacts from implementation of non-flow measures to locally protected trees to a **less-than-significant** level by replacing trees that cannot be avoided so that the Proposed Project does not conflict with the provisions of local tree protection policies or ordinances.

3.8.4.6 Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan (less than significant)

A number of plant and animal species are covered by the VHP, which is an adopted HCP and NCCP. Approval of impacts to covered species from project activities covered by the VHP (that is, projects that meet a number of criteria concerning location, proponent, and type) would be considerably expedited. Fees paid in accordance with the extent and nature of the projects' impacts are used to further conservation efforts via the acquisition, creation, or enhancement, as well as the preservation and management, of habitat for these species. In addition, covered projects are subject to a number of measures concerning avoidance and minimization of impacts to covered species and habitats through project design and construction measures (such as preconstruction species surveys and seasonal restrictions on construction activities) to directly protect species.

Flow Measures Impact Analysis

Based on the previous analyses in sections 3.8.4.1 and 3.8.4.2, proposed flow measures would not affect VHP-covered species. Therefore, there would be no VHP conflict.

Non-flow Measures Impact Analysis

All impacts to VHP-covered species that could be affected by the non-flow measures are discussed earlier in this EIR. Similarly, impacts to sensitive habitats, such as stream, wetland, riparian, and serpentine habitats, for which the VHP requires specific impact fees, are discussed earlier in this EIR. Valley Water would apply for VHP coverage for covered activities and would adhere to all applicable VHP conditions during Project implementation. Therefore, the Proposed Project would have no impact.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect terrestrial biological resources. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. The effects of monitoring, maintenance, and AMP activities of habitat improvements would not conflict with, but rather comply with, the VHP. Therefore, there would be no impact.

Significance Conclusion Summary

The Proposed Project's flow measures, non-flow measures, and monitoring would not be in conflict with any adopted HCPs or NCCPs, or with any other approved local, regional, or state HCPs. Therefore, there would be **no impact** for Impact TERR-6.

Mitigation

No mitigation would be required for Impact TERR-6. Nevertheless, MM TERR-1 would include the payment of impact fees in accordance with VHP requirements.

3.8.4.7 Terrestrial Biological Resources Impacts Summary

Table 3.8-2 summarizes the terrestrial biological resources impacts of the Proposed Project.

Table 3.8-2. Terrestrial Biological Resources Impacts Summary

Impact	Flow and Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Includes Benefits	Types of Benefits
TERR-1	Flow Measures	NI	N/A	NI	Yes	Additional water available during the dry season
TERR-1	Non-flow Measures	SI	MM TERR-1a, MM TERR-1b, MM TERR-1c, MM TERR-1d, MM TERR-1e	S/M	Yes	Long-term habitat improvements
TERR-2	Flow Measures	NI	N/A	NI	Yes	Additional water available during the dry season
TERR-2	Non-flow Measures	SI	MM TERR-1a, MM TERR-1b, MM TERR-1d, MM TERR-1e	S/M	Yes	Long-term habitat improvements
TERR-3	Flow Measures	NI	N/A	NI	Yes	Additional water available during the dry season
TERR-3	Non-flow Measures	SI	MM TERR-1d, MM TERR-2	S/M	N/A	

Impact	Flow and Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Includes Benefits	Types of Benefits
TERR-4	Flow Measures	NI	N/A	NI	Yes	Additional water available during the dry season
TERR-4	Non-flow Measures	LTS	N/A	LTS	Yes	Improved wildlife corridor habitat through restoration
TERR-5	Flow Measures	NI	N/A	NI	N/A	
TERR-5	Non-flow Measures	SI	MM TERR-3	S/M	N/A	
TERR-6	Flow Measures	NI	N/A	NI	N/A	
TERR-6	Non-flow Measures	NI	N/A	NI	N/A	

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A = not applicable, NI = no impact, SI = significant impact, S/M = significant but mitigable to a less-than-significant impact

3.9 Cultural Resources

This section describes the archaeological, prehistoric, ethnographic, and historical background of the study area, including historical resources and historic properties. In addition, this section discusses the Proposed Project's impacts to cultural resources in the study area. The study area used to assess the impacts of the Proposed Project to cultural resources is defined as all terrain within a maximum of 0.5 mile from the Project area described in Chapter 2, *Project Description*, and includes all areas that may be directly or indirectly disturbed by implementation of the Proposed Project. The following definitions apply:

- **Cultural resources** are sites, buildings, structures, objects, and districts that may have traditional or cultural value for the historical significance they possess or convey. Cultural resources include, but are not limited to, the following types of resources: prehistoric and historic-era archaeological deposits, historic-era features such as roads and railroad tracks, buildings and structures of architectural significance, and places that are important for maintaining a community's identity or culture (that is, traditions, beliefs, lifeways, and social institutions).
- **Historical resources** are those cultural resources that are listed in or determined eligible for listing in the California Register of Historical Resources (CRHR) pursuant to PRC Section 5024.1 or included in certain local historical resources registers or surveys. Generally, a resource shall be considered to be "historically significant" if it meets at least one of the CRHR criteria, including the following:
  - (A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
  - (B) Is associated with the lives of persons important in our past;
  - (C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
  - (D) Has yielded, or may be likely to yield, information important in prehistory or history.
- **Historic properties** are cultural resources that are found eligible for listing in the National Register of Historic Places (NRHP) by meeting the criteria in 36 CFR 60.4.
- **Tribal cultural resources** are a subset of historic properties/historical resources and are discussed further in Section 3.10.

Generally, for a cultural resource to be considered a historical resource (or a historic property), it must be at least 50 years old. However, properties less than 50 years of age that are of exceptional importance or are contributors to a district can also be included in the CRHR and/or NRHP.

3.9.1 Environmental Setting

The environmental setting represents the existing conditions of cultural resources in the study area. This setting is also referred to as the current baseline conditions, which for the purpose of this analysis is 2020, although some environmental setting information is based on older studies or data that are nevertheless representative of 2020 conditions. It forms the basis for comparison of Proposed Project impacts.

This environmental setting discussion is based on data previously compiled and summarized for Valley Water for the *Stream Maintenance Program Update 2012–2022, Final Subsequent EIR* (Valley Water 2011). The discussion summarizes the cultural history of the Santa Clara Valley region. Since cultural resources in the study area have not materially changed since publication of that report (Valley Water 2011), the discussion of the prehistoric, ethnographic, and historic context serves as the current baseline conditions, which are used to evaluate the impacts of the Proposed Project to cultural resources in the study area.

Available online registries of cultural resources indicate that, between the NRHP, CRHR, and the California Historical Landmarks, there are more than 400 listed resources in Santa Clara County alone. Although many of these resources are not within the study area, it is important to note that, in addition to the listed resources, the California Historical Resources Information System also maintains a database of CRHR- and NRHP-eligible resources; these results are confidential and are released only as a result of a formal records search request by professional archaeologists and other cultural resources specialists who meet the Secretary of the Interior's Professional Qualifications Standards.

The Office of Historic Preservation defines an archaeological "site" as consisting of three or more related resources discovered in one locality. In the event of archaeological discovery, the resources are collected, documented, and curated at an educational institution such as a school or a museum.

Humans have occupied the San Francisco Bay area for at least 10,000 years, and, as a result, Santa Clara County contains numerous archaeological resources. The locations of Native American villages, burial grounds, and other archaeological sites are confidential. To preserve the integrity of these sites, archaeologists do not reveal information for these locales. Unknown sites run the risk of being affected, as their locations are unknown and cannot be avoided prior to surveys.

It is likely that numerous prehistoric and historic period archaeological resources in the region have not been located, recorded, or evaluated. Large areas of the county that may contain archaeological resources have not been subjected to archaeological surveys. Additionally, it is likely that a large number of archaeological resources have been located and recorded but have not been evaluated for eligibility for listing in the CRHR or NRHP because that entails further study, including excavation, which is destructive to the resource. Therefore, it is highly likely that the study area contains significant archaeological resources for the purposes of CEQA.

Prehistoric archaeological resources are likely to be encountered near areas of prior Native American occupation and activity, which includes areas both within and outside areas of current development. Surficial archaeological deposits are more likely to be heavily disturbed in urban areas and more intact in rural settings; however, this conclusion does not preclude the presence of buried archaeological resources that may be significant in urban settings. Additionally, not all archaeological resources are visible on the ground surface. Depending on the location and landform, archaeological sites have the potential to be located wherever Holocene alluvium has accumulated, and deposits have been uncovered at depths of up to 20 feet in the Central Valley (Meyer et al. 2010).

3.9.1.1 Cultural History – Prehistoric Context

An analytic framework for the interpretation of south San Francisco Bay and Central Coast Ranges prehistory is provided by Milliken et al. (2007) and Hylkema (2007). Hylkema observes three broad periods of human history in south San Francisco Bay: the Early Holocene (10,000 to 6,650 before present [B.P.]), the Middle Holocene (6,650 to 3,350 B.P.), and the Late Holocene (3,350 B.P. to present). Milliken et al. (2007) observe six temporal periods that build from the temporal sequence originally outlined by Frederickson (1994) and synthesize subsequent dating schemes with new Olivella bead data.

The post-Pleistocene era (post–10,000 B.P.) is generally characterized as a period of dramatic environmental change. Very little is known about the human history of central California and the San Francisco Bay region before approximately 9,950 B.P., but hunter-gatherers presumably inhabited the region as evidenced by Pleistocene faunal remains and other isolated finds, including fluted projectile points (Erlandson et al. 2007; Parkman 2006; Rosenthal et al. 2007). Warming trends in the global environment after 10,000 B.P. contributed to rising sea levels and the gradual inundation of the verdant plain now submerged beneath present-day San Francisco Bay. The rising sea level eventually slowed approximately 6,000 B.P. During this time, lush tidal marsh habitats formed around the margins of the bay, creating a diverse regional ecosystem that, in turn, attracted fish, waterfowl, sea mammals, terrestrial game, and humans.

During the lower and upper Middle Periods (2,450 to 1,250 B.P.), an intensified tidal marsh economy was present and contributed to the formation of large shell mounds along the San Francisco Bay shore. This subsistence strategy persisted into the Middle Period, though use of local resources intensified. Hylkema (2007) outlines general trends in south bay prehistory. Early mobile forager land use gave way to semi-sedentary collector land use—and shell mound construction—near the close of the Early Holocene. Stone mortars and pestles appear in greater frequency within Middle Period archaeological deposits in the Santa Clara Valley, which suggests a milling economy with emphasis on vegetal foods, especially acorns and small seeds (Hylkema 2007; Moratto 1984).

The Late Period is generally considered a period of cultural and environmental florescence. At this time, growing hunter-gatherer populations in the Santa Clara Valley, southern Santa Clara Valley, and broader San Francisco Bay region contributed to intensified collection of animal and plant resources from diverse coastal, intertidal, and interior habitats. They further developed social innovations to efficiently procure animal, plant, and mineral resources, including co-harvesting subsistence strategies, storage practices, and exchange systems (Hylkema 2002, 2007).

In general, the following archaeological resources could be encountered during ground-disturbing activities near bodies of water in the Santa Clara Valley: remnants of large shell mounds, shallow or broadly dispersed midden sites, lithic scatters, multicomponent villages, and cemeteries. Over 400 shell mounds once ringed the San Francisco Bay shoreline, and several are recorded in Santa Clara County. Some mound sites reached heights of between 5 and 60 feet, and many contain multiple depositional episodes spanning several hundred to several thousands of years. Used in prehistory and in historic times, the Yñigo Mound (CA-SCL-12/H) was once part of a cluster of 13 mounds along the southern edge of San Francisco Bay, and it rose approximately 5 feet. This mound—like many around the Bay Area—has been affected by commercial development, although intact deposits are buried beneath Moffett Field Naval Air Station (Bryne and Byrd 2009).

3.9.1.2 Ethnographic Context/Ohlone

The study area is located within the ethnographic territory of the Muwekma Costanoan/Ohlone Indians. For the Costanoan/Ohlones, areas around streams were frequently settled and/or heavily used and, as described in Section 3.9.1.1, are generally locations of high sensitivity for archaeological deposits. In general, protohistoric and colonial archaeological resources could be encountered during ground-disturbing activities near bodies of water in the Santa Clara Valley. These resources would include Native American village sites and processing areas as a continuation of settlement patterns associated with the Late Period (see Section 3.9.1.1), artifacts and features deposited by European settlers, as well as material evidence of cultural intermingling, perhaps similar to that recovered from mission and mercantile colonies in the Bay Area (Lightfoot 2005) and from subsequent Mexican ranchos and American settlements.

The primary sociopolitical unit was the village community, or tribelet. Ohlone tribelets consisted of a principal village, at which the chief resided, surrounded by several secondary settlements (Kroeber 1962). The Ohlone were further grouped into clans and each village community averaged 100 to 2,000 people with households averaging between 10 and 15 persons (Levy 1978).

An array of seasonally available plant and animal species typically were collected for dietary, medicinal, and other requirements. A steady harvest was ensured by careful management of the land, such as through the practice of controlled burning of extensive areas to curb the spread of unwanted species and to promote the growth of seed-bearing plants and grazing area for game animals (Levy 1978; Lightfoot and Parrish 2009). Gathered in the fall, acorns were an important food source, especially acorns from coast live oak, valley oak, tanbark oak (*Lithocarpus densiflora*), and California black oak (*Quercus kelloggii*).

Ohlone material culture includes finely woven twined and coiled basketry, tule balsas, shell beads and ornaments, bone tools, and stone tools—created from Franciscan chert, obsidian, steatite, and other rocks or minerals (Levy 1978). Red ocher (cinnabar) could be procured from hills at present-day New Almaden. Houses were made from available materials, but in most places in the San Francisco Bay area they were hemispheric frames of bent willow poles covered with a thatch of tule, rush, or grass. Additional structures include sweathouses, dance enclosures, and large earth-covered assembly houses.

By the mid-1800s, Spanish missionization, diseases, raids by Mexican slave traders, and dense immigrant settlement had disrupted Ohlone culture, dramatically reducing the population and displacing the native people from their villages and land-based resources. Reduction of Ohlone villages, conversion to Catholicism, and exposure to Spanish language, culture, and material practices began with the establishment of Mission Santa Clara in early 1777 and the settlement of San José in the same year (Milliken 1995).

At places like Alisal *ranchería*, near Pleasanton, Ohlone cultural practices endured as they regrouped and remade themselves following the closure of Spanish missions and during subsequent periods of Mexican and American settlement. Although the Ohlone lost their original land base because of Spanish missionizing, rancho allotments, and legal obstacles preventing favorable rulings in U.S. courts, their tribal status as the Verona Band was formally recognized by the U.S. Bureau of Indian Affairs as early as 1906. However, this status was short-lived, and the Ohlone were “lost in a bureaucratic paper shuffle in Washington D.C.” (Field et al. 2007), lost their federal status, and are currently an unrecognized Native American tribe.

3.9.1.3 Historic-period Background

After 1770, when the presidio of Monterey and Mission San Carlos Boromeo were founded, additional expeditions reached the south San Francisco Bay area. A 1776 expedition headed by Juan Bautista de Anza reached the Guadalupe River and possibly crossed near Tamien Station in search of suitable locations for additional Spanish settlements (Hylkema 2007). At this time, Anza observed that “the plains surrounding the Guadalupe River maintained large numbers of villages with a thriving Native American population” (Hylkema 2007). For this reason, Mission Santa Clara was established in 1777 and named *Santa Clara de Thamien*. The pueblo of *San José de Guadalupe* (San José Pueblo) was established later that year on the east side of the Guadalupe River. Flooding of the Guadalupe River in 1779 resulted in the relocation of the mission, and it was renamed *Misión Santa Clara de Asís*. After 1803, the area around Mission Santa Clara was designated as a rancho and used as pasture for livestock (Hylkema 2007).

With the establishment of the independent government of Mexico in 1821, Spanish missions were eventually secularized, and former mission lands typically were allotted to wealthy Mexican citizens. Fifty grants of land were made in what is now Santa Clara County (Kyle 1990). The Peralta Adobe, constructed in 1777 and the oldest building in San José, was located in *Rancho San Antonio*. One rancho—*Rancho Polsomi*—contains several prehistoric shell mounds and was granted to an Ohlone Indian, Lope Ínigo, who chose to be buried in one mound after his death in 1864.

Under Mexican law, settlement by non-Mexican citizens was permissible, and soon immigrants from the United States settled in the Bay Area, although they often illegally squatted on rancho lands. Following the end of the Mexican-American War in 1848, California was admitted to the Union (1850), becoming the 31st state. For Mexican landowners, most of their property was subsequently lost to American settlers. Several present-day towns in Santa Clara County emerged from disbursed Mexican lands: Gilroy, Los Gatos, Milpitas, San José, and Santa Clara (Gudde 1969).

As the American Period began, an influx of new economies resulted in an increase in settlement and the development of farming, ranching, industry, and businesses in Santa Clara County. The Santa Clara Valley's agricultural productivity was accelerated by (1) immigrants—especially of Italian origin—who arrived en masse to Santa Clara County around 1870 and became involved in one of the most productive fruit-growing and distribution regions in the United States (Hylkema 2007) and (2) technological innovations for irrigating crops and orchards. Significant alterations to watercourses in the Santa Clara Valley during the historic period can be represented archaeologically (as artifacts, features, and structural foundations) as a growing Bay Area population settled adjacent to and increasingly drew from available freshwater sources. By 1919, at least 10 fruit- and vegetable-canning plants were operating in Santa Clara County, and the region's fruit-packing industry peaked in the 1930s with 30 packing plants operating in the county. The town of Campbell, founded in 1885, was at one time the center of the fruit-growing and -canning industry in Santa Clara County (Kyle 1990).

After the booming agricultural economy of the 1930s, Santa Clara County focused on technology with the founding of Hewlett-Packard and Fairchild Semiconductor. The area is now synonymous with the term "Silicon Valley" and is the location of several of the world's leading computer, microprocessor, and internet companies.

3.9.1.4 Santa Clara County Water Facility History

In the 1920s, persistent flooding, growing communities, and agricultural productivity in Santa Clara County led farmers and community leaders to petition for the creation of a water conservation committee for controlling and managing the valley's water resources. At that time, the Santa Clara Valley Water Conservation Committee was formed, and it subsequently spearheaded the establishment of the Santa Clara Valley Water Conservation District in 1929. Since that time, 10 reservoirs have been constructed to alleviate problems associated with periodic droughts and to slow rapidly dropping groundwater levels, all of which meet the 50-year-old threshold for consideration for inclusion in the CRHR (Table 3.9-1).

Table 3.9-1. Valley Water Facility Construction Dates

Valley Water Facility	Date of Completion
Almaden Reservoir	1935
Calero Reservoir	1935
Guadalupe Reservoir	1935
Stevens Creek Reservoir	1935
Vasona Reservoir	1935
Coyote Lake[a]	1936
Anderson Lake[a]	1950
Lexington Reservoir	1953

Valley Water Facility	Date of Completion
Chesbro Reservoir	1955
Uvas Reservoir	1957

[a] Facility is not part of the Proposed Project.

In 1952, the County Board of Supervisors formed the Santa Clara County Flood Control and Water Conservation District. In 1974, the Santa Clara County Flood Control and Water Conservation District changed its name to the Santa Clara Valley Water District, with responsibilities for providing water supply and flood management (Valley Water 2020c). The Santa Clara Valley Water District, in February 2019, changed its public name to Valley Water; however, the official name of the organization remains the Santa Clara Valley Water District, pursuant to the Santa Clara Valley Water District Act (Chapter 1405 of the Statutes of 1951).

3.9.1.5 Archaeological Sensitivity

Although it is impractical and unnecessary for this EIR's programmatic analysis to perform record searches and archaeological surveys for the entire Project study area, each of the five barrier remediation locations (Figure 2.4-7 and Figure 2.4-8) were assessed for archaeological site sensitivity using existing archaeological site distribution models for Santa Clara County (Meyer and Rosenthal 2007; Rosenthal et al. 2003), as these locations have already been defined. Specifically, each of these locations was compared to existing models of archaeological site distribution and buried site sensitivity in Santa Clara County. These existing models classify a particular location on a scale ranging from Very Low to Very High potential for buried sites based on a variety of well-defined variables that cross-correlate topographic and geographic data with known site locations. For example, Pleistocene fan and floodplain deposits are considered to have little to no potential for buried sites, as these landforms developed prior to human occupation in the region. Conversely, late Holocene fan and floodplain deposits are thought to have a high potential for buried sites, as these landforms developed during a time when central California was densely populated.

Regional probability maps agree well with intuitive expectations about the distribution of archaeological sites with a surficial expression. Most high-sensitivity areas are located along watercourses near the edge of the broad, open valley floors. The overall sensitivity of the valley floor for surface sites is moderate to low; the few higher-sensitivity areas in the middle of a valley floor are along the natural levees that line watercourses, or on other natural rises (Rosenthal et al. 2003). In their comparison of previously recorded sites to the predicted sensitivity of those locations based on the weights of evidence analysis, Rosenthal et al. (2003) found that 70 percent of these sites are included in the combined Moderate, High, and Very High zones.

At a general level, it is relatively easy to understand that buried sites will be located in or beneath Holocene-age depositional landforms. Predicting exactly where they will occur, however, is much more difficult. Buried archaeological potential can be conceptualized as a set of factors that either encouraged or discouraged human occupation of certain landforms (for example, aspect, extent, setting, and slope) and those factors that affected the subsequent preservation (that is, erosion or burial) of those landforms. Prehistoric settlements in Santa Clara County are generally associated with landforms located near the Bay-Delta and along major inland watercourses. These are the same settings where sediment deposition was most frequent and/or extensive during the Holocene. Consequently, the past and present locations of Bay-Delta margins and of stream/river channels are areas where previously unidentified buried sites are most probably located.

The sensitivity analysis (Table 3.9-2) provides a general characterization of each location; however, it does not provide a project-specific analysis to identify, evaluate, and (if necessary) mitigate known, or newly discovered, archaeological resources. Additionally, the probability models provide a classification of a specific landform as it relates to these variables but, crucially, do not characterize a specific project site within that landform.

Table 3.9-2. Archaeological Sensitivity for the Barrier Remediation Locations

Location	Near-surface Archaeological Site Sensitivity	Buried Archaeological Site Sensitivity
Moffett Fish Ladder	High	Moderate
Fremont Fish Ladder	High	Moderate
Pheasant Creek Culvert	Moderate	Very low
Old Dam	Low to moderate	Very low
Bertram Road Drop Structure	Moderate	Very low

3.9.2 Regulatory Setting

This section summarizes the federal and state laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to cultural resources.

3.9.2.1 Federal

National Historic Preservation Act of 1966, as Amended in 1980 and 1992

The NHPA (54 USC 300101 et seq.) established federal policy on historic preservation at a time when post–World War II infrastructure development and urban renewal projects were rapidly destroying archaeological sites and historic buildings throughout the nation. The NHPA established the National Historic Landmarks designation, the State Historic Preservation Offices (SHPOs), the NRHP, and the Advisory Council on Historic Preservation as an independent federal entity. Section 106 of the Act requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking before licensing or approving the expenditure of funds on any undertaking that may affect properties listed, or eligible for listing, in the NRHP.

Federal review of projects is normally referred to as the Section 106 process. The Section 106 review normally involves a four-step procedure described in detail in the implementing regulations (36 CFR 800):

1. Identify and evaluate historic properties in consultation with the SHPO and interested parties;
2. Assess the effects of the undertaking on properties that are eligible for inclusion in the NRHP;
3. Consult with the SHPO, other agencies, and interested parties to develop an agreement that addresses the treatment of historic properties and notify the Advisory Council on Historic Preservation; and
4. Proceed with the project according to the conditions of the agreement.

Antiquities Act of 1906

The Antiquities Act (54 USC 320301–320303) provides for fines or imprisonment of any person convicted of appropriating, excavating, injuring, or destroying any historic or prehistoric ruin or monument or other object of antiquity that falls under the jurisdiction of the federal government.

American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act (42 USC 1996) established federal policy to protect and preserve the inherent rights of freedom for American Indians, Eskimos, Aleuts, and Native Hawaiians to believe, express, and exercise their traditional religions on federal and tribal trust lands. Among these rights are access to sites, use and possession of sacred objects, and the freedom to worship through traditional ceremonies and rites.

Archaeological Resources Protection Act of 1979

The Archaeological Resources Protection Act (16 USC 470aa et seq.) amended the Antiquities Act, set a broad policy stating that archaeological resources are important to the nation and should be protected, and required special permits before the excavation or removal of archaeological resources from public or Indian lands.

Native American Graves Protection and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001 et seq.) was intended to ensure the protection and rightful disposition of Native American cultural items and burials located on federal or tribal trust lands, and in the possession or control of the federal government. NAGPRA requires that an inventory of Native American human remains and funerary objects must be compiled by federal funded agencies and all museums and educational institutions receiving federal funds. Additionally, NAGPRA makes it illegal to traffic Native American remains and cultural items without the right of possession, whether or not they derive from federal or Native American lands.

Also, all Indian tribes and representatives identified by the Native American Heritage Commission (NAHC) must be consulted whenever archaeological investigations encounter, or are expected to encounter, Native American cultural items or when such items are unexpectedly discovered on federal or tribal lands. Excavation or removal of any such items also must be done under procedures required by the Archaeological Resources Protection Act.

The Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation

These standards, effective as of 1983, provide technical advice for archaeological and historic preservation practices. Their purposes are (1) to organize the information gathered about preservation activities; (2) to describe results to be achieved by federal agencies, states, and others when planning for the identification, evaluation, registration, and treatment of historic properties; and (3) to integrate the diverse efforts of many entities performing historic preservation into a systematic effort to preserve the nation's culture heritage (48 Federal Register 44716).

The Secretary of the Interior's Standards for Rehabilitation

These standards were established by the Secretary of the Interior in 1986 as a way to homogenize rehabilitation efforts of nationally significant historic properties and buildings. These standards pertain to actions involved in returning a property to a state of utility through repair or alteration. This allows for the preservation of historic and cultural values of the property, while giving it an efficient contemporary use (36 CFR 67).

The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings, 1995

The Standards for the Treatment of Historic Properties are a compilation of 34 guidelines to promote the responsible preservation of U.S. historic cultural resources. The standards specifically address preservation, rehabilitation, restoration, and reconstruction of historic materials. The standards are not intended to be the sole basis for decision-making in regard to whether a historic property should be saved, but rather are intended to provide consistency in conservation and restoration practices (36 CFR 68).

3.9.2.2 State

CEQA Statute and Guidelines

CEQA and the CEQA Guidelines include procedures for identifying, analyzing, and disclosing potential adverse impacts to cultural resources. For archaeological sites, the CEQA Guidelines [Section 15064.5(c)(1)] require that the lead agency first determine whether the site is a "historical resource" as defined in Section 15064.5(a) (see below definition). If the site qualifies as a historical resource, potential adverse impacts must be considered in the same manner as a historical resource, as described below [CEQA Guidelines Section 15064.5(c)(2)]. If the archaeological site does not qualify as a historical resource but does qualify as a "unique archaeological resource," then the archaeological site is treated in accordance with CEQA PRC Section 21083.2, which places certain limits on permissible mitigation measures [CEQA Guidelines Section 15064.5(c)(3)]. In practice, most archaeological sites that meet the definition of a unique archaeological resource will also meet the definition of a historical resource.

The CEQA Guidelines [Section 15064.5(a)] define a "historical resource" as including the following:

- A resource listed in, or eligible for listing in, the CRHR;
- A resource listed in a local register of historical resources (as defined at PRC Section 5020.1(k)];
- A resource identified as significant in a historical resources survey meeting the requirements of PRC Section 5024.1(g); or
- Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. (Generally, a resource is considered by the lead agency to be "historically significant" if the resource meets the criteria for listing in the CRHR.)

A project that causes a "substantial adverse change" in the significance of a historical resource may have a significant effect on the environment [CEQA Guidelines Section 15064.5(b)]. The CEQA Guidelines [Section 15064.5(b)(1)] define "substantial adverse change" as "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired." Generally, the significance of a historical resource is "materially impaired" when a project demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in or eligibility for the CRHR, or its inclusion in a local register of historical resources [CEQA Guidelines Section 15064.5(b)(2)].

Mitigation measures are discussed in CEQA Guidelines Section 15126.4. Generally, by following the Secretary of the Interior's Standards for the Treatment of Historic Properties or the Secretary of the Interior's Standards for Rehabilitation, impacts can be considered as mitigated to a less-than-significant level [CEQA Guidelines Section 15064.5(b)]. For archaeological resources, the CEQA Guidelines [Section 15126.4(b)(3)] provide that public agencies should, whenever feasible, seek to avoid damaging effects on any historical resource of an archaeological nature. The CEQA Guidelines also require consideration of preservation in place as the preferred manner of mitigation. Mitigation by data recovery is recommended only if preservation is not feasible.

PRC Section 5024.1: California Register of Historical Resources

The CRHR includes resources that are listed in or formally determined eligible for listing in the NRHP, as well as some designated California State Landmarks and Points of Historical Interest. Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR.

PRC Sections 5097.91 through 5097.98: California Native American Heritage Commission

The California NAHC identifies and catalogs places of special religious or social significance to Native Americans and known graves and cemeteries of Native Americans on private lands. Section 5097 was amended in 1987 (5097.9) to require consultation with the California NAHC whenever Native American graves are found. When the NAHC is notified of human remains, it shall immediately notify those persons it believes to be the most likely descendants. Section 5097.98 1(b) states:

> Upon the discovery of the Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this section, with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment.

It also states possible preferences the most likely descendants may have for said treatment, including preservation in place, nondestructive removal and analysis, relinquishment to the most likely descendants, or other appropriate treatment. Conferral or discussion between the most likely descendant and landowner is described in Section 5097.98 2(c) as "meaningful and timely discussion and careful consideration of the views of each party, in a manner that is cognizant of all parties' cultural values, and where feasible, seeking agreement."

Health and Safety Code Section 7050.5: Removal of Human Remains

Sections 7050.5(b) and 7050.5(c) pertain to the discovery of human remains in a location outside a dedicated cemetery. The statute requires that, in the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site, or any nearby area reasonably suspected to overlay adjacent remains, until the County Coroner has examined the remains. If the coroner determines, or has reason to believe, the remains to be those of a Native American, the coroner shall contact the NAHC by telephone within 24 hours. In addition, any person who mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor.

Assembly Bill 52

AB 52 (Chapter 532, Statutes of 2014) applies to all projects that file an NOP or notice of a Negative Declaration on or after July 1, 2015. The bill requires that a lead agency begin consultation with a California Native American tribe if that tribe has requested, in writing, to be kept informed of proposed projects by the lead agency, prior to the determination whether a Negative Declaration or EIR will be prepared. The bill also specifies mitigation measures that may be considered to avoid or minimize impacts to tribal cultural resources.

Section 3.10 evaluates the Proposed Project's impacts to tribal cultural resources. Note that formal tribal consultation for this EIR was not required because Valley Water filed the Proposed Project NOP on February 2, 2015.

Health and Safety Code Sections 8010 to 8030: California Native American Graves Protection and Repatriation Act of 2001

Sections 8010 to 8011 establish a state repatriation policy that is consistent with and facilitates implementation of the federal NAGPRA.

3.9.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies those relevant to cultural resources.

In most cases, the goals of regional and local policies for cultural resources are analogous to those mandated by the NHPA and CEQA. Local applicable policies include:

Santa Clara County General Plan, Policies C-RC 49 to 56

As first introduced in Section 3.2.2, the Resource Conservation Element of the Santa Clara County *General Plan* (1994) includes the following policies relevant to cultural resources:

C-RC 49 Cultural heritage resources within Santa Clara County should be preserved, restored wherever possible, and commemorated as appropriate for their scientific, cultural, historic, and place values.

C-RC 50 Countywide, the general approach to heritage resource protection should include the following strategies:

1. Inventory and evaluate heritage resources.
2. Prevent or minimize adverse impacts on heritage resources.
3. Restore, enhance, and commemorate resources as appropriate.

C-RC 51 Inventories of heritage resources should be maintained as the basis for local decision-making regarding such resources.

C-RC 52 Prevention of unnecessary losses to heritage resources should be ensured as much as possible through adequate ordinances, regulations, and standard review procedures. Mitigation efforts, such as relocation of the resource, should be employed where feasible when projects will have significant adverse impact upon heritage resources.

C-RC 53 Cities should balance plans for urban redevelopment with the objectives of heritage resource preservation in such cases where potential conflicting interest may arise. Care should be taken to integrate heritage resources with new development wherever possible.

C-RC 54 Heritage resources should be restored, enhanced, and commemorated as appropriate to the value and significance of the resource.

C-RC 55 Public awareness and appreciation of existing heritage resources and their significance should be enhanced through community organizations, neighborhood associations, the educational system, and governmental programs.

C-RC 56 Heritage resource acquisition, preservation, restoration, and interpretation projects eligible for funding with County Parks Charter Funds are identified in the "Santa Clara County Heritage Resources Inventory" adopted by the Board of Supervisors.

City of Mountain View General Plan, Policies LUD 11.1 to 11.6

As first introduced in Section 3.2.2, the Mountain View 2030 *General Plan* (2012) includes the following policies related to cultural resources:

LUD 11.1 Historical preservation. Support the preservation and restoration of structures and cultural resources listed in the Mountain View Register of Historic Resources, CRHR, or NRHP.

LUD 11.2 Adaptive re-use. Encourage the adaptive re-use of historic buildings in ways that retain their historical materials and character-defining features.

LUD 11.3 Incentives. Encourage historical preservation through incentives and opportunities.

LUD 11.4 Moffett Field. Support the preservation of historic buildings and hangars at Moffett Field and NASA Ames.

LUD 11.5 Archaeological and paleontological site protection. Require all new development to meet state codes regarding the identification and protection of archaeological and paleontological deposits.

LUD 11.6 Human remains. Require all new development to meet state codes regarding the identification and protection of human remains.

City of Sunnyvale General Plan, Policy LT-1.10f

As first introduced in Section 3.2.2, the Sunnyvale *General Plan* (2011) includes the following policy related to cultural resources:

LT-1.10f Continue to condition projects to halt all ground-disturbing activities when unusual amounts of shell or bone, isolated artifacts, or other similar features are discovered. Retain an archaeologist to determine the significance of the discovery. Mitigation of discovered significant cultural resources shall be consistent with Public Resources Code Section 21083.2 to ensure protection of the resource.

City of Cupertino General Plan, Policies LU-6.1 to 6.8

As first introduced in Section 3.2.2, the City of Cupertino 2040 *General Plan* (2014) outlines the following policies relevant to cultural resources:

LU-6.1 Historic Preservation. Maintain and update an inventory of historically significant structures and sites in order to protect resources and promote awareness of the city's history in the following four categories: Historic Sites, Commemorative Sites, Community Landmarks, and Historic Mention Sites.

LU-6.2 Historic Sites. Projects on Historic Sites shall meet the Secretary of Interior Standards for Treatment of Historic Properties.

LU-6.3 Historic Sites, Commemorative Sites, and Community Landmarks. Projects on Historic Sites, Commemorative Sites, and Community Landmarks shall provide a plaque, reader board and/or other educational tools on the site to explain the historic significance of the resource. The plaque shall include the city seal, name of resource, date it was built, a written description, and photograph. The plaque shall be placed in a location where the public can view the information.

LU-6.4 Public Access. Coordinate with property owners of public and quasi-public sites to allow public access of Historic and Commemorative Sites to foster public awareness and education. Private property owners will be highly encouraged, but not required, to provide public access to Historic and Commemorative Sites

LU-6.5 Historic Mention Sites. These are sites outside the City's jurisdiction that have contributed to the City's history. Work with agencies that have jurisdiction over the historical resource to encourage adaptive reuse and rehabilitation and provide public access and plaques to foster public awareness and education.

LU-6.6 Incentives for Preservation of Historic Resources. Utilize a variety of techniques to serve as incentives to foster the preservation and rehabilitation of Historic Resources.

LU-6.7 Heritage Trees. Protect and maintain the city's heritage trees in a healthy state.

LU-6.8 Cultural Resources. Promote education related to the city's history through public art in public and private developments.

Town of Los Gatos General Plan, Policies OSP-9.1 to OSP-9.4

As first introduced in Section 3.2.2, the Town of Los Gatos 2020 *General Plan* (2010) lists the following policies for cultural resources:

Policy OSP-9.1 Evaluate archaeological and/or cultural resources early in the development review process through consultation with interested parties and the use of contemporary professional techniques in archaeology, ethnography, and architectural history.

Policy OSP-9.2 Ensure the preservation, restoration, and appropriate use of archaeological and/or culturally significant structures and sites.

Policy OSP-9.3 Treat with respect and dignity any human remains discovered during implementation of public and private projects within the Town and fully comply with California laws that address the identification and treatment of human remains.

Policy OSP-9.4 Require that if cultural resources, including archaeological or paleontological resources, are uncovered during grading or other on-site excavation activities, construction shall stop until appropriate mitigation is implemented.

City of Campbell General Plan, Policy CNR-1.1

As first introduced in Section 3.3.2, the City of Campbell *General Plan* (2001) includes the following policy related to cultural resources.

Policy CNR-1.1 Historic Resource Preservation. Ensure that the City and its citizens preserve historic resources as much as possible.

City of San José General Plan, Goals, Policies, and Actions

As first introduced in Section 3.2.2, the City of San José 2040 *General Plan* (2011) prescribes an extensive set of goals, policies, and actions regarding identifying, evaluation, and mitigating historical resources in Goals LU-13, LU-14, LU-15, and ER-10:

Goal LU-13 Landmarks and Districts

Policies LU-13.1 to LU-13.16

Actions LU-13.17 to LU-13.24

Goal LU-14 Historic Structures of Lesser Significance

Policies LU-14.1 to LU-14.8

Action LU-14.9

Goal LU-15 Public Awareness

Policies LU-15.1 to LU-15.4

Actions LU-15.5 and LU-15.6

Goal ER-10 Archaeology and Paleontology

Policies ER-10.1 to ER-10.3

Action ER-10.4

City of Santa Clara General Plan, Policies 5.6.3-P1 to 5.6.3-P4

As first introduced in Section 3.2.2, the City of Santa Clara 2010 to 2035 *General Plan* (2010) outlines the following policies related to cultural resources:

Policy 5.6.3-P1 Require that new development avoid or reduce potential impacts to archaeological, paleontological, and cultural resources.

Policy 5.6.3-P2 Encourage salvage and preservation of scientifically valuable paleontological or archeological materials.

Policy 5.6.3-P3 Consult with California Native American tribes prior to considering amendments to the City's *General Plan*.

Policy 5.6.3-P4 Require that a qualified paleontologist/archaeologist monitor all grading and/or excavation if there is a potential to affect archeological or paleontological resources, including sites within 500 feet of natural water courses and in the Old Quad neighborhood.

City of Los Altos General Plan, Policies 6.1 to 6.5

As first introduced in Section 3.2.2, the Los Alto *General Plan* 2002–2020 (2002) lists the following policies related to cultural resources:

Policy 6.1 Ensure that the integrity of historic structures and the parcels on which they are located are preserved through the implementation of applicable design, building, and fire codes.

Policy 6.2 The City shall regard demolition of landmark and historic resources, listed in the Historic Resources Inventory, as a last resort. Demolition would be permitted only after the City determines that the resource has lost its physical integrity, retains no reasonable economic use, that demolition is necessary to protect health, safety, and welfare, or that demolition is necessary to proceed with a new project where the benefits of the new project outweigh the loss of the historic resource.

Policy 6.3 Work with property owners to preserve historic resources within the community, including the orchard, or representative portion thereof, on the civic center site.

Policy 6.4 Preserve archaeological artifacts and sites found in Los Altos or mitigate disturbances to them, consistent with their intrinsic value.

Policy 6.5 Require an archaeological survey prior to the approval of significant development projects near creeksides or identified archaeological sites.

3.9.3 Methodology

The identification of historical resources involves several steps, including identifying cultural resources within a project's boundaries, evaluating the resources to determine whether they qualify as historical resources, and determining the direct or indirect effects of the project on significant historical resources.

3.9.3.1 Flow Measures Impact Analysis Methodology

Implementation of the flow measures would not disturb native soil (and therefore archaeological resources) and/or built environment resources more than 50 years old. Because ground-disturbing activities are not proposed as part of the flow measures, effects on cultural resources would not be significant and are not evaluated further in this section.

3.9.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure, as introduced in Section 3.1.4.2, was considered in this analysis as it pertains to cultural resources.

Several of the proposed non-flow measures involve ground-disturbing activities during construction that could disturb previously documented or unknown and potentially important prehistoric and historic cultural resources. Such activities could include excavations, demolitions, installations, use and staging of construction equipment and vehicles, dewatering, and temporary diversion of flows during construction. The impacts analysis considered whether and to what extent these construction activities and continued maintenance of the areas would result in substantial ground disturbance.

The non-flow measures also may affect historic archaeological and built environment resources (refuse scatters, hollow features such as wells and privies, ditches, canals, roads, buildings, etc.) more than 50 years old, including Valley Water-owned structures. Impacts to these resources were evaluated based on a review of available historical background information related to the environmental setting of the study area, with consideration given to the magnitude and duration of activities related to the Proposed Project.

The analysis methodology for cultural resources focuses on the potential for each of these measures to disturb native soil (and therefore archaeological resources) and/or built environment resources more than 50 years old.

Fish Passage Barrier Remediation

The analysis of impacts to cultural resources from fish passage barrier remediation considers construction activities that could affect cultural resources, including use and staging of heavy equipment within the study area and on unpaved roads, channel dewatering within the limits of the active work area, and disturbance of channel bed and bank. Concrete and asphalt demolition and removal and installation of new concrete would also require ground disturbance that could affect cultural resources.

Additionally, the fish barriers constitute the historic built environment and, if more than 50 years old, these and other structures would be evaluated for their eligibility for the CRHR if they would be affected by the Proposed Project. Historical construction data provided by Valley Water for the five structures indicates that several, if not all, of the barriers may be more than 50 years old and would, therefore, be subject to consideration for inclusion in the CRHR if they cannot be avoided.

All areas in the study area have the potential for yielding as-yet-undiscovered archaeological resources, and the development, improvement, and/or removal of facilities may affect archaeological resources, primarily through the disturbance of buried resources. Frequently, these resources are previously unidentified. Therefore, any excavation in previously undisturbed soil has the potential to affect archaeological resources.

Spawning and Rearing Habitat Improvements

Instream habitat enhancement projects that have the potential to result in impacts to cultural resources include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bankfull channel. Dewatering would be necessary for most projects. Each of these activities has the potential to disturb native soil in or near streams and, in turn, impact previously identified and newly discovered archaeological sites.

Six representative gravel or LWD augmentation project sites have been identified, as noted on Table 2.4-5, on which to base this programmatic analysis. Although it is impractical and unnecessary for this EIR's analysis to perform record searches, archaeological surveys, and significance evaluations at the programmatic level, the six representative sites were assessed for archaeological site sensitivity using existing archaeological site distribution models for Santa Clara County (Meyer and Rosenthal 2007; Rosenthal et al. 2003).

Activities associated with spawning and rearing habitat improvements in the Stevens Creek and Guadalupe River watersheds (Figure 2.2-1 and Figure 2.2-2) may affect previously recorded and/or newly discovered archaeological sites. These areas, including the six gravel or LWD augmentation sites, are all considered *highly sensitive* for surface and near-surficial archaeological sites–both prehistoric and historical. Previous site distribution analyses, described in the section on Fish Passage Barrier Remediation, confirm that a significant portion of the archaeological record in California lies buried, occasionally deeply in alluvial fans and floodplains.

Other Non-flow Measures Specific to Each Watershed

Stevens Creek Watershed-specific Improvements: Portable Multiple Outlet

Construction of a portable multiport outlet would allow for cooler water flow releases during the summer from Stevens Creek Reservoir while meeting instream water temperature objectives and improve cold-water pool management in the reservoir. Construction and maintenance activities might affect cultural resources.

Guadalupe River Watershed-specific Improvements: Geomorphic Function Enhancement Pilot Projects

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes implementation of pilot projects to enhance geomorphic functions. These projects may involve channel enhancements, including modifying channel dimensions for the purpose of carrying bankfull flow; varying the meander shape; planting riparian vegetation; removing culverts, riprap, and other structures; and stabilizing the area with the use of bioengineering techniques. Geomorphic function pilot projects may include, but are not limited to, modification of channel dimensions and shape, culvert removal, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Each of these activities has the potential to disturb native soil in or near streams. Dewatering would be necessary for most projects.

Activities associated with geomorphic functions enhancement in the Stevens Creek and Guadalupe River watersheds also may affect previously recorded and/or newly discovered archaeological sites. These areas are all considered highly sensitive for surface and near surficial archaeological sites–both prehistoric and historical. Previous site distribution analyses, described in the section on Fish Passage Barrier Remediation, confirm that a significant portion of the archaeological record in California lies buried, occasionally deeply in alluvial fans and floodplains.

3.9.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed flow measures. The monitoring program indicators could then trigger adaptive management actions that would relate to the effects of seasonal flow regimes or pulse flows on fish habitat.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed non-flow measures for the purpose of complying with the measures and validating that habitat conditions are improved after implementation of proposed Phase 1 measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with restoration or operational repair of a barrier. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended.

As described in Section 2.6, *Adaptive Management Program*, methods of monitoring and implementation of the AMP (under both the proposed flow and non-flow measures) consist primarily of data gathering and analysis and would not disturb native soil (and therefore archaeological resources) and/or built environment resources more than 50 years old. However, maintenance activities may affect previously recorded and/or newly discovered archaeological sites during ground disturbance associated with remediation and barrier maintenance. Although highly fluvial environments are generally considered to be non-depositional, near-channel locations are particularly sensitive for surface and near surficial archaeological sites—both prehistoric and historical—because of their proximity to fresh water and important resources.

3.9.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to a cultural resource if it would:

- **CUL-1:** Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines
- **CUL-2:** Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines
- **CUL-3:** Disturb any human remains, including those interred outside of dedicated cemeteries

3.9.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs to avoid and minimize undesired adverse effects on the environment that could result from Proposed Project. Valley Water BMPs and SMP BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and applicable VHP conditions are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions. While Valley Water BMPs apply to all Project measures to be implemented by Valley Water, Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those barrier removal project measures to be implemented by others.

BMPs and SMP BMPs relevant to this analysis of cultural resources (along with a brief discussion of their effects on Project activities) include the following:

- **CU-1:** Accidental Discovery of Archaeological Artifacts or Burial Finds – Would formalize response and handling of accidental discovery so as to minimize the potential for disturbing previously recorded or newly discovered prehistoric or historic archaeological resources
- **GEN-40:** Discovery of Cultural Remains or Historic or Paleontological Artifacts – Would formalize response and handling of accidental discovery so as to minimize the potential for disturbing previously recorded or newly discovered prehistoric or historic archaeological resources
- **GEN-41:** Review of Projects with Native Soil – Would require the review and evaluation of those sites that would involve disturbance/excavation of native soil to determine their potential for affecting significant cultural resources.

3.9.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur during implementation. This section evaluates the effects of Proposed Project measures on cultural resources, as compared to current baseline conditions.

3.9.4.1 Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources (significant and unavoidable)[20]

Flow Measures Impact Analysis

Implementation of the flow measures would not disturb historical built environment resources more than 50 years old because although operational changes to nonemergency flow releases have the potential to increase erosion and sedimentation in some creeks, these changes in stream flow are primarily based on the seasonal timing of water releases and would not increase erosion and sedimentation beyond the yearly norm to have an effect on historical built-environment resources. As a result, there would be no impact.

Non-flow Measures Impact Analysis

Non-flow measures associated with implementation of the Proposed Project could cause substantial adverse changes to historical resources that are part of the built environment via removal of fish passage barriers or construction and continued maintenance of fish passage facilities. Habitat restoration may include multiple stages such as removing sources of disturbance, restoring natural cycles/processes, rehabilitating soils, and restoring vegetation. Such activities could either destroy or modify elements that contribute to the eligibility of a particular resource. Any of the five fish barriers slated for removal are potential historic structures and are treated as CRHR-eligible for the purposes of this EIR. Impacts to these structures would be significant.

Spawning and rearing habitat improvements would be confined to the overflow bank, interior banks, and stream channel of the watershed and would not impact any built environment resources.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect cultural resources. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The

[20] Impact conclusion provided after consideration of mitigation.

monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. As such, implementing monitoring protocols and the AMP would have no impact to historical built environment resources as these efforts will not disturb any of the character-defining features of an eligible resource. Activity associated with the maintenance effort could either destroy or modify elements of a historical built environment resource and, if that resource were to be considered eligible for CRHR listing, those impacts would be significant.

Significance Conclusion Summary

Implementation of the flow measures, monitoring protocols, and AMP would have **no impact** to known built-environment historical resources. In the event that implementation of the non-flow measures and/or maintenance activities cannot avoid built-environment historical resources, this impact would be **significant** if it resulted in a substantial adverse change to the significance of the resource.

Mitigation

To reduce the impacts of Impact CUL-1, Valley Water would implement MM-CUL-1a, MM-CUL-1b, and MM-CUL-1b, as described below.

Mitigation Measure CUL-1a: Conduct Cultural Resources Studies and Avoid Impacts on Built Environment Resources

In areas potentially containing built-environment historical resources, when specific non-flow measure projects are proposed for implementation, Valley Water will ensure that architectural history studies and surveys will be conducted by professionals who meet the Secretary of the Interior's Professional Qualifications Standards, to identify the presence of built-environment resources within a particular project location. These studies can be combined with the archaeological studies conducted under BMP GEN-41 but must include a historic buildings survey. If buildings or structures that are eligible for listing in the NRHP or CRHR are identified within the study area, impacts to those resources resulting from the non-flow measure will be avoided, if feasible. Project relocation and redesign are appropriate avoidance measures. If avoidance is not feasible, MM CUL-1b will be implemented (see below).

Mitigation Measure CUL-1b: Follow the Secretary of the Interior's Standards for the Treatment of Historic Properties

In some cases, completely avoiding an element of the built environment that qualifies as a historical resource or historic property may not be feasible, and the feature must be altered as part of Project implementation.

In this situation, any Project-related alterations of eligible historic-era buildings or structures, including relocations, would conform to the *Secretary of the Interior's Standards for the Treatment of Historic Properties and Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Weeks and Grimmer 1995). Valley Water will develop and implement any plans necessary to mitigate alterations in accordance with these standards. If necessary (that is, if the Proposed

Project requires compliance with Section 106 and concurrence from the SHPO because of federal involvement), the plans will be submitted to the SHPO for approval before Project implementation. If these standards cannot be met, MM CUL-1c will be implemented (see below).

Mitigation Measure CUL-1c: Record Built Environment Resources to Historic American Buildings Survey and Historic American Engineering Record Standards

In some cases, avoiding or relocating a building or structure considered eligible for the NRHP or CRHR may not be feasible, and that resource must be demolished. In this situation, Valley Water will retain a qualified architectural historian to document the affected historical built-environment resource according to Historic American Buildings Survey (HABS) or Historic American Engineering Record (HAER) standards, as appropriate. HABS and HAER documentation packages will be entered into the Library of Congress as well as the appropriate Information Center of the California Historical Resources Information System.

Significance after Mitigation

Implementing MMs CUL-1a or CUL-1b would reduce Impact CUL-1 to a **less-than-significant** level. Where a built environment resource can be modified or relocated consistent with the Secretary of the Interior's standards and no further mitigation is required, implementing MM CUL-1b would reduce Impact CUL-1 to a **less-than-significant** level.

Recording a building or structure to HABS/HAER standards as described for MM CUL-1c may not reduce the impact to significant historic buildings and structures to a less-than-significant level; although information regarding the building or structure would be recorded, the building or structure would still be removed. Where MM CUL-1c must be implemented, Impact CUL-1 would be **significant and unavoidable**.

3.9.4.2 Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources (significant and unavoidable)[21]

Flow Measures Impact Analysis

Implementation of the flow measures has little potential to disturb archaeological resources because although operational changes to nonemergency flow releases have the potential to increase sedimentation and erosion in some creeks, these changes in stream flow are primarily based on the seasonal timing of water releases and would not increase sedimentation and erosion beyond the yearly norm. Therefore, there would be no impact associated with implementation of the flow measures.

Non-flow Measures Impact Analysis

Analysis of the five fish barrier-removal projects, the six representative gravel or LWD augmentation project sites, and the areas of spawning and rearing habitat improvements indicates that archaeological sensitivity for surficial sites ranges from Low to High and from Very Low to Moderate for buried sites. Specifically, it is highly likely that the study area contains significant archaeological resources for the purposes of CEQA. Furthermore, ground-disturbing activity associated with the implementation of non-flow measures could affect NRHP- and CRHR-eligible prehistoric and historic-era archaeological resources that are buried and not visible on the ground surface. However, as noted above, site sensitivity models are based on a variety of environmental variables and cannot

[21] Impact conclusion provided after consideration of mitigation.

be used as a proxy or predictor for determining the absence or presence of project-specific archaeological resources. A resource's type, location, components, and associations must be verified following the procedures for BMP GEN-41 and reiterated below for MM CUL-2.

When BMP Gen-41 is implemented the presence (or absence) of existing cultural resources associated with any project is typically determined using the methodologies described below.

- Archaeological site record and archival searches are requested from the appropriate Information Center of the California Historical Resources Information System for the study area and immediate vicinity (generally within a 0.5-mile radius around the study area). The site record and archival search consists of reviewing archaeological and historic structure records and previous cultural studies.
- Various maps, including General Land Office maps, U.S. Geological Survey topographic quadrangles, historic maps, and prior reports, are reviewed to identify potential cultural resources in the vicinity of any proposed project area.
- Following the archival research, previous survey coverage and resource locations are identified and compared against known project locations, as they become available, to determine whether pedestrian archaeological and historic built-environment surveys need to be conducted. Pedestrian surveys are conducted by qualified practitioners (that is, practitioners who meet the Secretary of the Interior's Professional Qualifications Standards for archaeology). These practitioners verify the location and extent of known resources and fully document to current professional standards all newly discovered cultural resources.

By implementing BMP GEN-41, Valley Water would be able to identify and avoid or document all previously recorded and newly discovered archaeological and built-environment resources. However, in cases where this is not feasible, impacts to cultural resources would be assessed following the impact analysis described in Section 3.9.4. BMPs CU-1 and GEN-40 would be implemented when an inadvertent discovery of previously unknown archaeological resources or human remains is made during ground disturbance.

Accordingly, when project activity requires modifying or removing a significant (that is, NRHP or CRHR eligible, or "unique") archaeological resource, significant impacts would likely occur. Impacts could result from ground disturbance associated with project-related earth-moving activity in previously undisturbed soils. Improvements and modifications to existing structures, and routine maintenance, would have less potential to impact archaeological resources because these projects are generally in areas where soils have previously been disturbed.

Disturbing archaeological features or resources can compromise the physical integrity and information potential of any archaeological deposits. Disturbance could result in a significant impact if the resource were eligible for listing in federal or state registers and the physical characteristics of a historical resource that convey its significance and qualify it for inclusion in the CRHR, or in a local register or survey that meets the requirements of PRC Sections 5020.1(k) and 5024.1(g), are demolished or substantially altered. Substantial adverse changes to "unique archaeological resources" would also be significant. If significant archaeological resources cannot be completely avoided by project design, ground-disturbing and other activities associated with the Proposed Project may damage or destroy significant archaeological resources.

Developing detailed, project-specific analysis of archaeological impacts at the programmatic level is not feasible for this EIR because details of non-flow measures designs, locations, and/or timing are not known. However, in general, substantial adverse changes to significant archaeological resources cannot be ruled out and could occur as a result during project activity. Thus, impacts to archaeological resources related to implementation of the Proposed Project are considered significant for Impact CUL-2.

Monitoring, Maintenance, and Adaptive Management

Implementing the monitoring protocols and the AMP would have no impact to archaeological resources as these efforts have no associated ground-disturbing activity. Actions associated with the maintenance effort, however, are similar to the non-flow measures analysis above and could affect NRHP and CRHR eligible prehistoric and historic era archaeological resources that are buried and not visible on the ground surface. The process for identifying and avoiding archaeological resources is detailed in BMP GEN-41, which would be implemented when ground-disturbing activities are identified. As noted above, developing detailed, site specific analysis of archaeological impacts at the programmatic level is not feasible for this EIR because details of maintenance designs, locations, and/or timing are not known. However, in general, substantial adverse changes to significant archaeological resources cannot be ruled out and could occur as a result during project activity. Thus, impacts to archaeological resources related to maintenance of non-flow measures are considered significant for Impact CUL 2.

Significance Conclusion Summary

Implementation of the monitoring protocols and the AMP would have **no impact** to archaeological resources. Implementation of the flow measures would have **no impact** to archaeological resources. Impacts from non-flow measures and/or maintenance activities on archaeological resources would be **significant**.

Mitigation

To reduce the impacts of Impact CUL-2, Valley Water would implement MM-CUL-2a and MM-CUL-2b, as described below.

Mitigation Measure CUL-2a: Conduct Cultural Resources Studies and Avoid Impacts on Archaeological Resources

- During environmental review of projects, and consistent with the BMPs CU-1, GEN-40, and GEN-41 (described in Section 3.9.3.4), Valley Water will conduct a records search at the Northwest Information Center (Sonoma State University) to determine whether the study area has been previously surveyed and whether resources were identified.
- If the records indicate that no previous survey has been conducted, the Northwest Information Center will make a recommendation regarding whether a survey is warranted based on the archaeological sensitivity of the study area. If a survey is recommended, a qualified archaeologist will be retained to conduct archaeological surveys.
- Although avoidance is always the preferred alternative, the significance of any resources that are determined to be in the study area and unavoidable will be assessed according to the applicable local, state, and federal significance criteria.
- Valley Water will devise treatment measures to ameliorate “substantial adverse changes” to significant archaeological resources. Such treatment measures may include avoidance through project redesign, data recovery excavation, and public interpretation of the resource.

Valley Water will adhere to the following requirements:

- If a project is located in an area rich with cultural materials, Valley Water will retain a qualified archaeologist to monitor subsurface operations, including but not limited to grading, excavation, trenching, or removal of existing features of the subject property, which may extend beyond existing disturbances into undisturbed sediments.

- Consistent with BMPs CU-1 and GEN-40, if, during the course of construction, cultural resources (that is, prehistoric sites, historic sites, and isolated artifacts and features) are discovered, work will be halted immediately within 50 meters (165 feet) of the discovery, and a qualified archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology will be retained to determine the significance of the discovery (see MM CUL-2b below).
- Valley Water will consider mitigation recommendations, consistent with the CEQA Guidelines Section 15126.4(b)(3) mitigation hierarchy, presented by a professional archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology for any unanticipated discoveries and will carry out the measures deemed feasible and appropriate. Such measures may include avoidance or preservation in place as preferred options, followed by excavation, documentation, curation, data recovery, or other appropriate measures.

Mitigation Measure CUL-2b: If Cultural Resources Are Discovered, Immediately Halt Construction and Implement an Accidental Discovery Plan

In accordance with BMPs CU-1 and GEN-40, if cultural resources such as structural features, unusual amounts of bone or shell, artifacts, human remains, or architectural remains are encountered during construction activities, Valley Water will suspend work immediately at the location of the find and within a 50-meter (165-foot) radius. A qualified archaeologist will conduct a field investigation of the specific site and recommend mitigation that Valley Water will implement necessary to protect or recover any cultural resource determined by the archaeologist to represent a historical resource or unique archaeological resource. Mitigation will be consistent with the CEQA Guidelines Section 15126.4(b)(3) mitigation hierarchy, with preservation in place as the preferred option.

Significance after Mitigation

Implementation of MMs CUL-2a and CUL-2b could reduce impacts to less than significant. However, because this EIR evaluates impacts at the programmatic level, all project circumstances are not foreseeable, and, therefore, even with implementation of MMs CUL-2a and-2b, impacts could remain **significant and unavoidable**.

3.9.4.3 Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries (less than significant)

Flow Measures Impact Analysis

Implementation of the flow measures has little potential to disturb human remains, including those interred outside of dedicated cemeteries, because although operational changes to nonemergency flow releases may have the potential to increase sedimentation and erosion in some creeks, these changes in stream flow are primarily based on the seasonal timing of water releases and would not increase sedimentation and erosion beyond the yearly norm. As a result, there would no impact to human remains.

Non-flow Measures Impact Analysis

Cemeteries are defined by fencing or grave markers or both, but they may also be unmarked. Marked cemeteries may be informal family cemeteries found in rural settings or formal entities managed by local governments or cemetery boards. Formal cemeteries, in particular, can often be identified during record searches early in the planning process.

As discussed above, humans have occupied Santa Clara County for at least 10,000 years, and it is not always possible to predict where human remains may be present outside of formal burials. Therefore, excavation and construction activities, regardless of depth, may yield human remains that are not interred in marked, formal burials. Project-related construction activity could result in a significant impact relative to the discovery of human remains. Under CEQA, human remains are protected under the definition of archaeological materials as being "any evidence of human activity." Human remains are also protected under NAGPRA, which was enacted to provide protection to Native American graves as well as culturally affiliated items, associated funerary objects, unassociated funerary objects, sacred objects, and objects of cultural patrimony.

The Proposed Project has the potential to yield previously undiscovered human remains because some non-flow measures involving ground disturbance would take place in previously undisturbed areas or areas with only a little previous disturbance. Excavation and soil removal of any kind, irrespective of depth, have the potential to encounter human remains. However, Sections 7050.5 and 8011 of the California Health and Safety Code (CHSC) and Section 5097 of the California PRC provide measures to protect historic-era and Native American human burials, skeletal remains, and items associated with Native American interments from vandalism and inadvertent destruction. Consistent with the provisions of BMPs CU-1 and GEN-40, in the event of discovery or recognition of any human remains during construction or excavation activities, Valley Water would cease further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the following steps are taken in accordance with the CHSC and PRC:

- The Santa Clara County Coroner has been informed and has determined that no investigation of the cause of death is required.
- If the remains are of Native American origin, either of the following steps will be taken:
  - The coroner will contact the NAHC to determine the proper descendants from the deceased person. The coroner will make a recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods, which may include obtaining a qualified archaeologist or team of archaeologists to properly excavate the human remains.
  - Valley Water will retain a Native American monitor, and an archaeologist, if recommended by the Native American monitor, and will rebury the Native American human remains and any associated grave goods, with appropriate dignity, on the property and in a location that is not subject to further subsurface disturbance when any of the following conditions occurs:
    - The NAHC is unable to identify a descendant.
    - The descendant identified fails to make a recommendation.
    - Valley Water rejects the recommendation of the descendant, and the mediation by the NAHC fails to provide measures acceptable to the landowner.

Because Valley Water, as well as all other local and regional agencies, must enforce and abide by the rules and regulations of both the CHSC and the PRC, the Proposed Project, when evaluated with BMPs CU-1 and GEN-40, is considered to have a less-than-significant impact in the case of the discovery of human remains.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect cultural resources. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. As such, implementing the monitoring protocols and the AMP would have no impact to human remains as these efforts have no associated ground-disturbing activity. Actions associated with the maintenance effort, however, are similar to the non-flow measures analysis above and have the potential to yield previously undiscovered human remains, because some maintenance measures may involve ground disturbance and could take place in previously undisturbed areas or areas with only a little previous disturbance. Consistent with the provisions of BMPs CU-1 and GEN-40, in the event of discovery or recognition of any human remains during maintenance activities, Valley Water would cease further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until steps are taken in accordance with the CHSC and PRC (detailed above). Because Valley Water, as well as all other local and regional agencies, must enforce and abide by the rules and regulations of both the CHSC and the PRC, the maintenance of non-flow measures, when evaluated with BMPs CU-1 and GEN-40, is considered to have a less-than-significant impact in the case of the discovery of human remains.

Significance Conclusion Summary

Non-flow measure impacts would be **less than significant**. There would be **no impact** from flow measure. Impacts from monitoring, maintenance, and the AMP would be **less than significant**.

Mitigation

No mitigation would be required for Impact CUL-3.

3.9.4.4 Cultural Resources Impacts Summary

Table 3.9-3 summarizes the cultural resources impacts of the Proposed Project.

Table 3.9-3. Cultural Resources Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
CUL-1	Flow Measures	NI	N/A	NI	N/A
CUL-1	Non-flow Measures	SI	MM CUL-1a, MM CUL-1b, MM CUL-1c	S/U	N/A
CUL-2	Flow Measures	NI	N/A	NI	N/A
CUL-2	Non-flow Measures	SI	MM CUL-2a, MM CUL-2b	S/U	N/A
CUL-3	Flow Measures	NI	N/A	NI	N/A
CUL-3	Non-flow Measures	LTS	N/A	LTS	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A = not applicable, NI = no impact, SI = significant impact, S/U = significant and unavoidable

3.10 Tribal Cultural Resources

This section describes the tribal cultural resources of the study area. In addition, this section discusses the Proposed Project's impacts to tribal cultural resources in the study area. The study area used to assess the impacts of the Proposed Project on tribal cultural resources is defined as all terrain within a maximum of 0.5 mile from the Project area described in Chapter 2, *Project Description*, and includes all areas that may be directly or indirectly disturbed by implementation of the Proposed Project.

A tribal cultural resource is defined in PRC Section 21074 as a site, feature, place, or cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

- Listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k); or
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, lead agencies must consider the significance of the resource to a California Native American tribe.

Tribal cultural resources may be found eligible for listing in the CRHR and/or the NRHP "because of [their] association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998). Examples of properties possessing such significance include:

- A location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world;
- A location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice; and
- A location where the Native American community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historic identity.

3.10.1 Environmental Setting

The environmental setting represents the existing conditions of tribal cultural resources in the study area. This setting is also referred to as the current baseline conditions, which for the purpose of this analysis is 2020 although some environmental setting information is based on older studies or data that are nevertheless representative of 2020 conditions. It forms the basis for comparison of Proposed Project impacts.

The environmental setting for tribal cultural resources includes data previously compiled and summarized for Valley Water for the *Stream Maintenance Program Update 2012–2022, Final Subsequent EIR* (Valley Water 2011) and is described in detail in Section 3.9.1. The discussion of the ethnographic contexts in Section 3.9.1 serves as the current baseline conditions, which is used to evaluate the impacts of the Proposed Project on tribal cultural resources in the study area.

There are no known tribal cultural resources listed in the CRHR or NRHP directories for Santa Clara County. However, this conclusion is limited because (1) the Northwest Information Center's database has not been consulted for site-specific information, and (2) the locations and nature of tribal cultural resources are, by definition, confidential and not typically publicly available.

3.10.2 Regulatory Setting

This section summarizes the state laws pertinent to evaluation of the Proposed Project's impacts to tribal cultural resources. The federal and state laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to cultural resources, as described in Section 3.9.2, also apply to tribal cultural resources. In addition, the following sections of AB 52 apply.

Implementation of Proposed Project measures would also comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County.

3.10.2.1 State

AB 52 PRC Section 21084.2

As stated in AB 52 (Chapter 532, Statutes of 2014), a project that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. PRC Section 21084.3 states that:

(a) Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource; and

(b) if the lead agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process provided in Section 21080.3.2 [formal AB 52 consultation], additional mitigation measures may be considered to avoid or minimize the significant adverse impacts.

AB 52 PRC Section 21084.3

PRC Section 21084.3 provides the following examples of possible mitigation measures for significant impacts to tribal cultural resources:

1. Avoidance and preservation of the resources in place, including, but not limited to, planning and construction to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
2. Treating the resource with culturally appropriate dignity taking into account the tribal cultural values and meaning of the resource, including, but not limited to (A) Protecting the cultural character and integrity of the resource; (B) Protecting the traditional use of the resource; or (C) Protecting the confidentiality of the resource.
3. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
4. Protecting the resource.

3.10.3 Methodology

Project- and program-level impacts to tribal cultural resources were evaluated based on a review of available historical background information related to the environmental characteristics of the study area, with consideration given to the magnitude and duration of activities related to construction and continued maintenance of the Proposed Project. Impacts associated with construction include the elements of the Proposed Project that involve implementation of the Project components, which include the fish passage barrier remediation and spawning and rearing habitat improvements.

Construction impacts were evaluated based on the potential for these activities to disturb native soil as a result of excavations, demolitions, installations, use, and staging of construction equipment and vehicles, dewatering, alteration of flows, or other ground-disturbing actions that may be necessary. Impacts from continued maintenance of facilities were assessed, as well as monitoring activities.

Valley Water is actively seeking input from the local tribal community as interested stakeholders in the Proposed Project. Outreach with the NAHC, the Muwekma Ohlone Indian Tribe of the San Francisco Bay Area, the Ohlone Indian Tribe, representatives of the Trina Marine Ruano family, the Amah Mustun Tribal Band, and the Indian Canyon Mustun Band of Costanoan Indians was initiated in August 2018. No responses from the tribal community have been received.

Project-specific environmental reviews of non-flow measures may require an additional request for a Sacred Lands File search from NAHC. Additional consultation with identified representatives will be conducted in accordance with the PRC if AB 52 consultation is required[22] when non-flow measure projects are proposed (see Section 3.10.2).

3.10.3.1 Flow Measures Impact Analysis Methodology

Implementation of the flow measures would not disturb native soil or built-environment resources, activities that could affect tribal cultural resources. Because such activities are not proposed as part of the Proposed Project's flow measures, effects on tribal cultural resources, as well as effects of monitoring, would be no impact or less-than-significant impacts and are not further evaluated.

3.10.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure as introduced in Section 3.1.4.2 was considered in this analysis as it pertains to tribal cultural resources.

Because details about the precise location, design, and/or timing of the various non-flow measures are not known, it is impractical and unnecessary for this EIR's programmatic analysis to perform record searches and tribal cultural resource surveys.

Fish Passage Barrier Remediation

The analysis of impacts to tribal cultural resources from fish passage barrier remediation considers construction activities that could affect tribal cultural resources, including use and staging of heavy equipment within the study area and on unpaved roads, channel dewatering within the limits of the active work area, and disturbance of channel bed and bank. Concrete and asphalt demolition and removal and installation of new concrete would also require ground disturbance that could affect tribal cultural resources.

However, particular consideration was paid to the five known fish barrier-removal locations. Analysis of the five barrier-removal projects indicates an archaeological sensitivity for surficial sites ranges from Low to High and from Very Low to Moderate for buried site archaeological sensitivity. Recent archaeological surveys around Lake Almaden also noted a high degree of previous disturbance. However, as noted in Section 3.9.3.2, site sensitivity models are based on a variety of environmental variables and cannot be used as project-specific analysis determining the absence or presence of archaeological resources.

All areas in the study area have the potential for yielding as-yet-undiscovered archaeological resources, and the development, improvement, and/or removal of facilities may affect archaeological resources, primarily through the disturbance of buried resources. Frequently, these resources are

[22] Formal AB 52 consultation for the Proposed Project was not required because AB 52 consultation is required only for EIRs with NOPs filed on or after July 1, 2015. The NOP for this EIR was filed on February 2, 2015.

previously unidentified. Therefore, any excavation in previously undisturbed soil has the potential to affect tribal cultural resources.

Spawning and Rearing Habitat Improvements

Instream habitat enhancement projects that have the potential to result in impacts to tribal cultural resources include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bankfull channel. Dewatering would be necessary for most projects. Each of these activities has the potential to disturb native soil in or near streams and, in turn, impact previously identified and newly discovered archaeological sites.

Six representative gravel or LWD augmentation project sites have been identified, as noted on Table 2.4-5, on which to base this programmatic analysis. Although it is impractical and unnecessary for this EIR's analysis to perform site specific analyses at the programmatic level, the six representative sites were assessed for archaeological site sensitivity using existing archaeological site distribution models for Santa Clara County (Meyer and Rosenthal 2007; Rosenthal et al. 2003).

Activities associated with spawning and rearing habitat improvements in the Stevens Creek and Guadalupe River watersheds (Figure 2.2-1 and Figure 2.2-2) may impact previously recorded and/or newly discovered archaeological sites. These areas are all considered *highly sensitive* for surface and near-surficial archaeological sites which may also represent an unrecorded tribal cultural resource. Previous site distribution analyses, described in the section on Fish Passage Barrier Remediation, confirm that a significant portion of the archaeological record in California lies buried, occasionally deeply in alluvial fans and floodplains.

Other Non-flow Measures Specific to Each Watershed

Stevens Creek Watershed-specific Improvements: Portable Multiport Outlet

Construction of a portable multiport outlet would allow for cooler water flow releases during the summer from Stevens Creek Reservoir while meeting instream water temperature objectives and improve cold-water pool management in the reservoir. Construction and maintenance activities might affect tribal cultural resources.

Guadalupe River Watershed-specific Improvements: Geomorphic Function Enhancement Pilot Projects

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes implementation of pilot projects to enhance geomorphic functions. These projects may involve channel enhancements, including modifying channel dimensions for the purpose of carrying bankfull flow; varying the meander shape; planting riparian vegetation; removing culverts, riprap, and other structures; and stabilizing the area with the use of bioengineering techniques. Geomorphic function pilot projects may include, but are not limited to, modification of channel dimensions and shape, culvert removal, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Each of these activities has the potential to disturb native soil in or near streams. Dewatering would be necessary for most projects.

Activities associated with geomorphic functions enhancement in the Stevens Creek and Guadalupe River watersheds may also impact previously recorded and/or newly discovered archaeological sites. These areas are all considered highly sensitive for surface and near surficial archaeological sites. Previous site distribution analyses, described in the section on Fish Passage Barrier Remediation, confirm that a significant portion of the archaeological record in California lies buried, occasionally deeply in alluvial fans and floodplains.

3.10.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed flow measures. The monitoring program indicators could then trigger adaptive management actions that would relate to the effects of seasonal flow regimes or pulse flows on fish habitat.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed non-flow measures for the purpose of complying with the measures and validating that habitat conditions are improved after implementation of proposed Phase 1 measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself, with restoration or operational repair of a barrier. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended.

As described in Section 2.6, *Adaptive Management Program*, methods of monitoring and implementation of the AMP (under both the proposed flow and non-flow measures) consist primarily of data gathering and analysis and would not disturb native soil (and therefore tribal cultural resources). However, maintenance activities may affect previously recorded and/or newly discovered archaeological sites during ground disturbance associated with remediation and barrier maintenance. These sites may also be considered tribal cultural resources. Although highly fluvial environments are generally considered to be non-depositional, near-channel locations are particularly sensitive for surface and near surficial sites—both prehistoric and historical—because of their proximity to fresh water and important resources, including plant species.

3.10.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to tribal cultural resources if it would:

- **TRI-1**: Cause a substantial adverse change in the significance of a tribal cultural resource (defined in PRC Section 21074 as a site, feature, place, or cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe) that is:
    - (1) listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k), or
    - (2) a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1.

3.10.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs to avoid and minimize undesired adverse effects on the environment that could result from Proposed Project measures. Valley Water BMPs and SMP BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and applicable VHP conditions are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions. While Valley Water BMPs apply to all Project measures to be implemented by Valley Water, Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those barrier removal project measures to be implemented by others.

BMPs and SMP BMPs relevant to tribal cultural resources include the following:

- **CU-1:** Accidental Discovery of Archaeological Artifacts or Burial Finds – Would formalize response and handling of accidental discovery so as to minimize the potential for disturbing previously recorded or newly discovered prehistoric or historic archaeological resources
- **GEN-40:** Discovery of Cultural Remains or Historic or Paleontological Artifacts – Would formalize response and handling of accidental discovery so as to minimize the potential for disturbing previously recorded or newly discovered prehistoric or historic archaeological resources
- **GEN-41:** Review of Projects with Native Soil – Would require the review and evaluation of those sites that would involve disturbance/excavation of native soil to determine their potential for affecting significant cultural resources.

3.10.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur during implementation. This section evaluates the effects of Proposed Project measures on tribal cultural resources, in relation to current baseline conditions.

3.10.4.1 Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant (significant and unavoidable)[23]

Flow Measures Impact Analysis

As discussed in Section 3.10.3.1, implementation of the flow measures would not affect tribal cultural resources and would, therefore, have no impact.

Non-flow Measures Impact Analysis

Traditional cultural resources (TCRs) have tangible locations that are important to the cultural continuity and longevity of a community, have been important to the community for more than 50 years, and meet the criteria for eligibility for listing in the NRHP and CRHR. Tribal cultural resources are often locations on the landscape that have sacred or other special meaning to Native American communities. Cultivating and harvesting plants for traditional medicines and foods, and for uses such as basketry, remain important activities to Native American communities. Some of the areas where such plants grow, which are often located adjacent to rivers and streams, may qualify as TCRs. Ground-disturbing construction activities or the demolition or modification of the built environment associated with non-flow measures could cause a significant impact to TCRs.

Construction activities associated with the non-flow measures could impact native soils, traditional gathering areas, and/or ceremonial locations and, by extension, affect prehistoric or historical resources that are listed in, or eligible for listing in, the NRHP and/or the CRHR. These resources may also be further considered as tribal cultural resources. Significant impacts to tribal cultural resources could result from such actions as disturbances to channel beds and banks, weir installation, channel modification, and the removal of culverts, riprap, or other structures.

[23] Impact conclusion provided after consideration of mitigation.

Analysis of the five barrier removal sites and areas of spawning and rearing habitat improvements indicates that they have some level of archaeological sensitivity, whether surficial or buried. Although tribal cultural resources can be identified without an archaeological component (that is, an important plant gathering location can be a tribal cultural resource, but may not have any associated artifacts), they are generally confirmed through consultation conducted in conjunction with the identification effort for a given project. Additionally, the locations and nature of tribal cultural resources are typically confidential and are not made publicly available given the potential for looting and other adverse effects.

The presence (or absence) of existing cultural and tribal cultural resources associated with any project is typically determined using the methodologies described below and prescribed by BMP-41.

- Archaeological site record and archival searches are requested from the appropriate Information Center of the California Historical Resources Information System for the study area and immediate vicinity (generally within a 0.5mile radius around the study area). The site record and archival search consists of reviewing archaeological and historic structure records, and previous cultural studies.
- Various maps, including General Land Office maps, U.S. Geological Survey topographic quadrangles, historic maps, and prior reports, are reviewed to identify potential cultural resources in the vicinity of any proposed study area.
- Following the archival research, previous survey coverage and resource locations are identified and compared against known project locations, as they become available, to determine whether pedestrian archaeological and historic built-environment surveys need to be conducted. Pedestrian surveys are conducted by qualified practitioners (that is, practitioners who meet the Secretary of the Interior's Professional Qualifications Standards). These practitioners verify the location and extent of known resources and fully document to current professional standards all newly discovered cultural resources.
- If warranted, an ethnographic study will be conducted covering the study area and vicinity and (minimally) consisting of research into the ethnographic archives at various repositories, genealogical research, oral interviews, and field visits.

Valley Water intends that, by implementing BMP GEN-41, it will be able to identify and avoid all previously recorded and newly discovered tribal cultural resources prior to ground disturbance. However, in cases where this is not feasible, impacts to tribal cultural resources would be assessed following the impact analysis described above. BMPs CUL-1 and GEN-40 would be implemented when an inadvertent discovery of previously unknown archaeological resources, which may also be a tribal cultural resource, is made during the course of ground disturbance. Consistent with the analysis in Section 3.9, *Cultural Resources*, an inadvertent discovery of human remains is also subject to the provisions of the CHSC and the PRC.

Based on the above analysis, Proposed Project non-flow measure impacts to tribal cultural resources are significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect tribal cultural resources. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations.

Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. As such, implementing the monitoring protocols and the AMP would have no impact to archaeological resources as these efforts have no associated ground-disturbing activity. Actions associated with the maintenance effort, however, are similar to the non-flow measures analysis above and could affect tribal cultural resources. The process for identifying and avoiding archaeological resources is detailed in BMP GEN-41, which would be implemented when ground-disturbing activities are identified. As noted above, developing detailed, site specific analysis of archaeological impacts at the programmatic level is not feasible for this EIR because details of maintenance designs, locations, and/or timing are not known. However, in general, substantial adverse changes to significant tribal cultural resources cannot be ruled out and could occur as a result during project activity. Thus, impacts to tribal cultural resources related to implementation of non-flow maintenance are considered significant for Impact TRI-1.

Significance Conclusion Summary

Non-flow measure and maintenance impacts would be **significant**. Flow measures and monitoring would have **no impact**.

Mitigation

To reduce the impacts of Impact TRI-1, Valley Water would implementation MM-TRI-1a, as described below.

Mitigation Measure TRI-1a: Conduct Cultural Resources Studies and Avoid Effects on TCRs

In areas potentially containing tribal cultural resources, Valley Water would retain an ethnographer or archaeologist who meets the Secretary of the Interior’s standards to consult with appropriate tribes before approval of any project during AB 52 consultation (if applicable) and identify the presence of any TCRs at the project location. Native American TCRs may be identified by an ethnographer who has worked extensively with community members (often, but not always, elders) who have considerable knowledge about places important to the community. If TCRs are identified in the study area, they will be avoided by project redesign or relocation, if feasible.

Where avoidance is implemented and no further mitigation is required, implementing this mitigation measure would reduce Impact TRI-1 to a less-than-significant level. However, if avoidance is not feasible, see MM TRI-1b below.

Mitigation Measure TRI-1b: Consult with Native American Communities and Implement Appropriate Measures to Mitigate Effects on TCRs

Effects on tribal cultural resources would be rare occurrences. However, where an identified TCR cannot be fully avoided by a proposed Valley Water action, Valley Water will engage in consultation with affected Native American communities (including formal AB 52 consultation if applicable) to identify other ways to effectively mitigate impacts to tribal cultural resources. These may include:

- Treating the resource with culturally appropriate dignity taking into account the tribal cultural values and meaning of the resource, including, but not limited to (A) Protecting the cultural character and integrity of the resource; (B) Protecting the traditional use of the resource; or (C) Protecting the confidentiality of the resource.

- Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places
- Protecting the resource.

Significance after Mitigation

Implementing MM TRI-1a and the additional measures as necessary in MM TRI-1b would reduce Impact TRI-1 to a less-than-significant level in most cases but may not necessarily reduce impacts to some categories of TCR, for example, sacred sites, to less-than-significant levels. In such instances, Impact TRI-1 would be **significant and unavoidable**.

3.10.4.2 Tribal Cultural Resources Impacts Summary

Table 3.10-1 summarizes the tribal cultural resources impacts of the Proposed Project.

Table 3.10-1. Tribal Cultural Resources Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
TRI-1	Flow Measures	NI	N/A	NI	N/A
TRI-1	Non-flow Measures	SI	TRI-1a, TRI-1b	S/U	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
N/A = not applicable, NI = no impact, SI = significant impact, S/U = significant and unavoidable

3.11 Geology and Soils

This section describes the geology and soil resources of the study area, including soil types and the potential for a unique paleontological resource or site to be discovered. No other unique geologic features were identified for geology and soils. In addition, this section discusses the Proposed Project's impacts to geology and soils. The study area is defined as the Project area described in Chapter 2, *Project Description*.

According to the Paleontological Resources Preservation Act (PRPA), a paleontological resource is defined as "any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest, and that provide information about the history of life on earth" (36 CFR 291.5). The term does not include any materials associated with an archaeological resource or any cultural item. Those are addressed in Section 3.9, *Cultural Resources*.

The *Initial Study* (Appendix F) eliminated four geology and soils impact thresholds from further analysis because the Proposed Project would not result in impacts related to the exposure of people or structures to earthquakes or ground failure; unstable geologic units or soils, including expansive soils; or soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems.

The impact analysis includes assessing how the Proposed Project could affect the soils and geological features that surround and underlie the Stevens Creek and Guadalupe River watersheds, and the Valley Water-owned and -maintained facilities. Section 3.2, *Hydrology*, also discusses erosion and siltation as it relates to the alteration of the existing drainage pattern of the site or area.

3.11.1 Environmental Setting

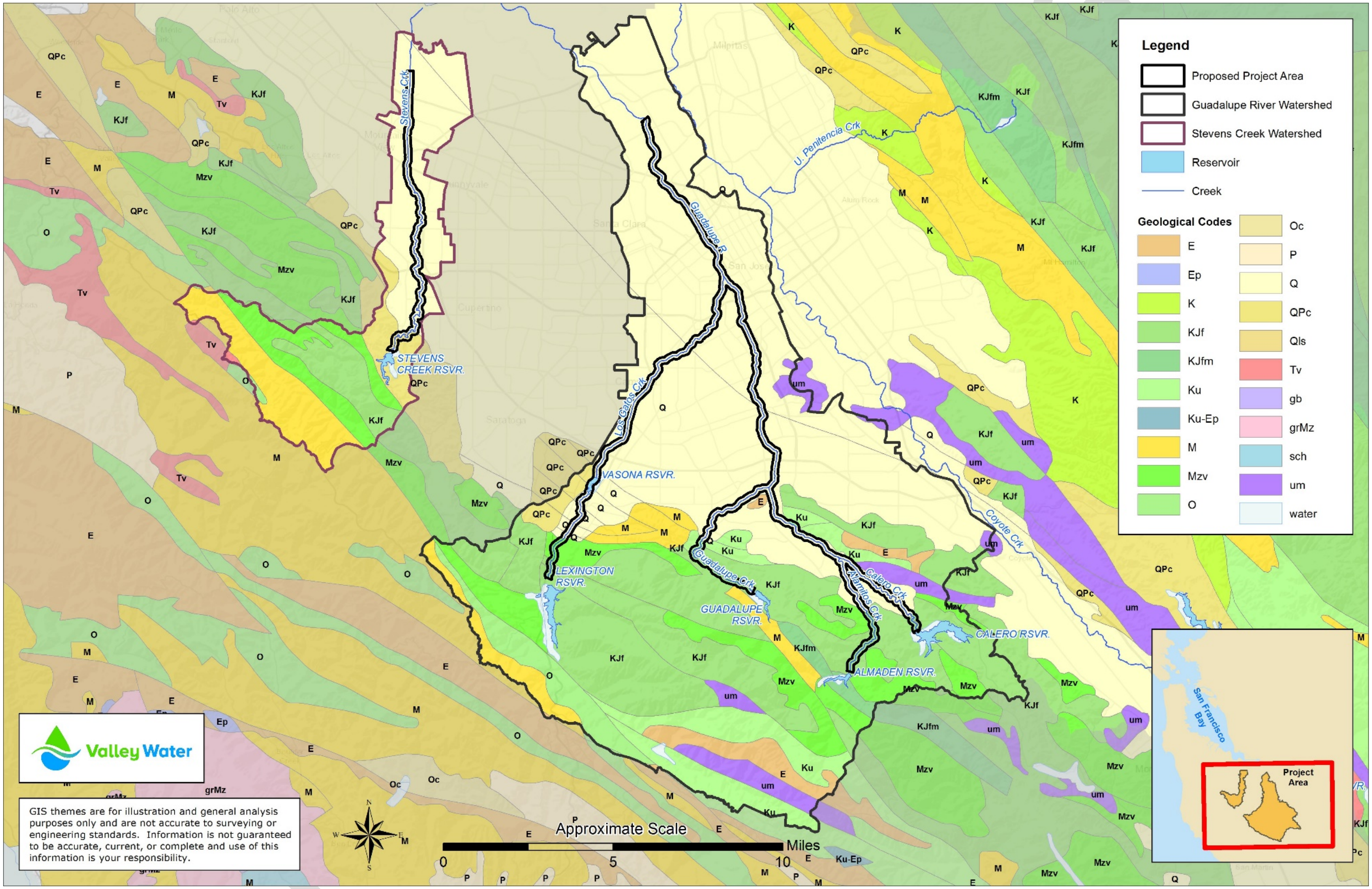
The environmental setting represents the existing conditions of geologic and soil resources in the study area. This setting is also referred to as the current (2020) baseline condition although some environmental setting information is based on older studies or data that are nevertheless representative of 2020 conditions. It forms the basis for comparison of Proposed Project impacts.

3.11.1.1 Geology and Soil Characteristics

The study area is located within the southern coastal ranges and the Coast Ranges Geomorphic Province. This geomorphic province extends from south of the Oregon border to central coastal California (CGS 2015). The Coast Ranges Geomorphic Province is characterized by mountains that range in elevation from 2,000 to 4,000 feet above mean sea level and sometimes reach elevations of 6,000 feet above mean sea level (CGS 2015).

A wide range of soil types and characteristics are present in the study area (Figure 3.11-1). Soils in the low-lying areas of the Santa Clara Valley consist primarily of clay, while soils in the upper portion of the valley are characterized by loam and gravelly loam, and soils in the hills of the Santa Clara Valley consist primarily of eroded rocky clay loam. Loams are soils composed mostly of sand, silt, and a smaller amount of clay. Gravelly loam and rocky clay loams are loams that contain a higher percentage of gravel and rocky clay, respectively. Clayey soils located along the valley floor are derived from alluvial deposits (that is, materials deposited by rivers consisting of silt, sand, clay, gravel, and other organic matter) from surrounding geological formations. Approximately 1,950 feet of alluvial sediment have accumulated to form the essentially flat-lying deposits that fill the valley floor (Santa Clara County Parks and California State Parks 2011).

Figure 3.11-1. Geological and Soil Characteristics



3.11.1.2 Paleontological Resources

The geologic record of the Santa Clara Valley dates from the Jurassic Period (approximately 200 to 145.5 million years ago) to the present. Fossilized Pleistocene vertebrates, dating from approximately 2.6 million to 11,700 years ago, have been discovered in Quaternary deposits (dating from 2.588 million years ago to the present) in the south San Francisco Bay area, which has resulted in paleontological interest in the region (Valley Water 2011). Fossil mammal assemblages have also been discovered in Quaternary sediments located along the south San Francisco Bay, all of which have produced fossil elephant, camel, and bison specimens.

The study area contains loose unconsolidated soils and alluvium from the Quaternary age that are suitable for preserving vertebrate and microvertebrate taxa; however, deposits have been obscured or removed by urban development. Sediments from the Holocene age (approximately 11,700 years ago to the present) are also found in the region but are considered to have a low potential for fossil specimens (Valley Water 2011).

According to the Final Subsequent EIR for the Valley Water SMP update, paleontological resource surveys and assessments were conducted in the study area between 2002 and 2011. In 2005, the fossil of a young Columbian mammoth (*Mammuths columbi*) dating from the Pleistocene epoch was found in the study area east of the Guadalupe River and downstream of Trimble Road in San José (Valley Water 2011).

3.11.2 Regulatory Setting

This section summarizes the federal and state laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to geology and soils.

3.11.2.1 Federal

Paleontological Resources Preservation Act (Public Law 111-11, Title VI, Subtitle D; 16 U.S. Code Sections 470aaa to 470aaa-11)

The PRPA was passed on March 30, 2009. The PRPA is intended to preserve, manage, and protect paleontological resources on lands administered by the Bureau of Land Management, the Bureau of Reclamation, the National Parks Service, and USFWS. The PRPA addresses the management, collection, and curation of paleontological resources from federal lands and authorizes civil and criminal penalties for illegally collecting, damaging, defacing, or selling paleontological resources.

3.11.2.2 State

General Permit for Construction Activities

The State of California adopted the Construction General Permit, Order No. 2012-0006-DWQ, amending Order No. 2009-0009-DWQ, effective July 17, 2012. SWRCB Water Quality Order 2012-0006-DWQ (Construction General Permit) regulates construction site stormwater management. For a discussion of the Construction General Permit, see Section 3.2.2.2.

California Building Code

The State of California mandates minimum standards for building design through the California Building Code (California Code of Regulations, Title 24). The California Building Code applies to building design and construction and is based on the International Conference of Building Officials Uniform Building Code used widely throughout the country (generally adopted on a state-by-state or district-by-district basis). The Uniform Building Code was incorporated as part of the California

Building Code, which has been modified for California conditions with more detailed and/or more stringent regulations.

3.11.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies the other regional and local regulations relevant to geology and soils.

Santa Clara County Geologic Ordinance

The Geologic Ordinance establishes minimum requirements for the geologic evaluation of land based on proposed land uses, as well as procedures to enforce these requirements. The Geologic Ordinance also establishes rules and regulations for the development of land which is on or adjacent to known potentially hazardous areas, which can result in geologic hazards. The provisions of the Geologic Ordinance are intended to ensure that the County fulfills its duties under state law regarding geologic hazards, including the Alquist-Priolo Earthquake Fault Zoning Act and the Seismic Hazards Mapping Act (Santa Clara County 2002, Title C, Division C12, Chapter IV).

Santa Clara County Grading and Drainage Ordinance

The Santa Clara County Grading Ordinance requires the use of erosion and sediment controls to protect water quality during construction. Prior to the issuance of a permit for grading activity that could occur during the rainy season, all construction and demolition Project applicants must submit an Erosion Control Plan including BMPs for the prevention of discharge of stormwater pollutants to local waterways to the County Land Development Engineering Office for approval (Santa Clara County 2018c, Title C, Division C12, Chapter III).

Cities through which Stevens Creek and Guadalupe River watersheds pass also have local grading and erosion-control ordinances, or chapters and sections of ordinances, that heavily address grading and erosion-control measures during ground disturbance and construction activities. These include the following:

City of Sunnyvale Municipal Code, Chapter 12.60.230 (c): Construction Site Stormwater Pollution Controls. This chapter requires that all construction sites implement effective erosion control, run-on and runoff control, sediment control, active treatment systems (as appropriate), good site management, and non-stormwater management through all phases of construction.

City of Cupertino Municipal Code, Chapter 16.08: Excavations, Grading, and Retaining Walls. This chapter establishes minimum requirements and standards for regulating excavation, grading, clearing, and retaining wall construction. The chapter sets forth regulations to preserve and enhance water quality by controlling surface runoff, erosion, and sedimentation, and establishing procedures by which these requirements may be enforced.

City of Los Gatos Municipal Code, Chapter 12: Grading, Erosion and Sediment Control. The purpose of this chapter is to protect and enhance the quality of water in natural and human made watercourses, water bodies, and wetlands by controlling sedimentation, increases in surface runoff, and related environmental damage caused by construction-related activities, and to ensure that the intended use of a graded site is consistent with the Town General Plan. This chapter applies only to private property.

City of Campbell Municipal Code, Chapter 20.80.20: Grading and Erosion Control. Projects pursuant to this chapter must be conditioned on compliance with the requirements for grading and erosion control, including the prevention of sedimentation or damage to off-site property.

City of San José Municipal Code, Chapter 17.04: Building Code Part 6. Excavation and Grading. The purpose of this chapter is to promote public welfare by regulating grading, establishing uniform engineering standards and procedures for grading, and allowing reasonable deviations from these standards. This chapter establishes rules and regulations to control excavation, grading, and earthwork, including fills and embankments. The chapter establishes the administrative procedure for issuance of permits, and provides approval plans, specifications, and inspection of grading construction.

Milpitas California Municipal Code, Section 15.02: Grading and Erosion Control. Projects approved pursuant to this ordinance shall be conditioned on compliance with the requirements for grading and erosion control, including the prevention of sedimentation or damage to off-site property.

The following are Santa Clara County General Plan policies related to geologic and seismic hazards:

R-HS 16 No new building site shall be approved on a hazardous fault trace, active landslide, or other geologic or seismic hazard area that poses a significant risk.

R-HS 19 In areas of high potential for activation of landslides, there shall be no avoidable alteration of the land or hydrology which is likely to increase the hazard potential, including: (a) saturation due to drainage or septic systems; (b) removal of vegetative cover; and (c) steepening of slopes or undercutting the base of a slope.

R-HS 21 Proposals involving potential geologic or seismic hazards shall be referred to the County Geologist for review and recommendations.

3.11.3 Methodology

Impacts were evaluated based on the magnitude and duration of activities causing the impact, including construction activities and operation of the Proposed Project. For non-flow measures, construction activities evaluated in the impact analysis associated with implementation of fish passage barrier remediation and spawning and rearing habitat improvements include ground-disturbing activities such as excavations, demolitions, and installations; the use and staging of construction equipment and vehicles; and dewatering. Operational impacts evaluated in this assessment involve the implementation of reservoir re-operation rule curves, as well as maintenance and monitoring activities.

While rare, undiscovered paleontological resources could occur in areas of ground-disturbing activities related to the Proposed Project. As a result, this analysis focuses on the potential for the Proposed Project to result in both direct and indirect impacts to paleontological resources.

Impacts associated with the Proposed Project are compared to current baseline conditions.

3.11.3.1 Flow Measures Impact Analysis Methodology

The flow measures impact analysis evaluates whether and to what extent the implementation of reservoir re-operation rule curves would result in substantial soil erosion, loss of topsoil, or direct and indirect impacts to a paleontological resource or site. The impact analysis evaluates whether operational changes to non-emergency flow releases would increase erosion and sedimentation in the study area.

3.11.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure as introduced in Section 3.1.4.2 was considered in this analysis as it pertains to geology and soils.

Fish Passage Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation could affect geology and soils. The impact analysis considered whether and to what extent these construction activities and continued maintenance of the areas would result in substantial erosion or loss of topsoil or impacts to a unique geological resource or site.

Spawning and Rearing Habitat Improvements

Instream habitat improvement projects that could affect geology and soils include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bankfull channel. Six representative gravel or LWD augmentation project sites have been identified, as noted on Table 2.4-5, on which to base this programmatic analysis. Impacts to the six project sites were assessed at a programmatic level based on the whether these activities could result in soil erosion, loss of topsoil, and direct or indirect disturbance to paleontological resources. The assessment also considered whether the alteration of flows under this measure could result in erosion or the loss of topsoil.

Watershed-specific Improvements

Stevens Creek Watershed-specific Improvements: Portable Multiport Outlet

Construction of a portable multiport outlet would allow for cooler water flow releases during the summer from Stevens Creek Reservoir while meeting instream water temperature objectives and improve cold-water pool management in the reservoir. The impact analysis considered whether and to what extent these construction activities and continued maintenance of the areas would result in substantial erosion or loss of topsoil or impacts to a unique geological resource or site.

Guadalupe River Watershed-specific Improvements: Geomorphic Function Enhancement Pilot Projects

Measures to enhance geomorphic function would involve ground disturbance, such as the removal of culverts and structures, and installation activities. The impact analysis assessed whether and to what extent these activities would result in impacts to geology, soils, and undiscovered paleontological resources.

3.11.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed flow measures. The monitoring program indicators could then trigger adaptive management actions that would relate to the effects of seasonal flow regimes or pulse flows on fish habitat. The geology and soils analysis considers how changes in flow could result in increased levels of erosion loss of topsoil, and disturbance to paleontological resources.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed non-flow measures. Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. These activities do not require ground disturbance and would not result in erosion or loss of topsoil. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. The geology and soils analysis evaluates the potential for the limited ground disturbance associated with these maintenance activities to result in an increase in erosion, loss of topsoil, and disturbance to paleontological resources in the study area. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.11.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to geology and soils if it would:

- **GEO-1:** Result in substantial soil erosion or the loss of topsoil
- **GEO-2:** Directly or indirectly destroy a unique paleontological resource or site

3.11.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs to avoid and minimize undesired adverse effects on the environment that could result from Proposed Project. Valley Water BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and applicable VHP conditions are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions.

BMPs relevant to this analysis of geology and soils (along with a brief discussion of their effects on Project activities) include the following:

- General Maintenance Practices
  - **GEN-20:** Erosion and Sediment Control Measures – Would minimize and/or control erosion and sedimentation
  - **GEN-21:** Staging and Stockpiling of Materials – Would specify appropriate placement and management of staging and stockpile areas to protect onsite vegetation and water quality
  - **GEN-22:** Sediment Transport – Would prevent sediment-laden water from being released back into waterways
  - **GEN-23:** Stream Access – Would restrict development of new access routes or when necessary specify placement and management to minimize impacts and disturbance to streams
- Sediment Removal BMPs
  - **SED-1:** Groundwater Management – Would specify appropriate groundwater management during pumping and water quality testing
  - **SED-2:** Prevent Scour Downstream of Sediment Removal – Would reduce the potential for scour by enforcing grading zones
  - **SED-3:** Restore Channel Features – Would effectively restore channel features by installing contouring within low-flow channels within nontidal streams
- Vegetation Management BMPs
  - **VEG-1:** Minimize Local Erosion Increase from In-channel Vegetation Removal – Would minimize the potential for localized erosion by protecting the toe of bank

3.11.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur during implementation. This section evaluates the effects of Proposed Project measures on geology and soils, as compared to current baseline conditions.

3.11.4.1 Impact GEO-1: Result in substantial soil erosion or the loss of topsoil (less than significant)

Flow Measures Impact Analysis

While ground-disturbing activities and earthwork are not proposed under the reservoir re-operation rule curves, operational changes to nonemergency flow releases could result in increased erosion potential in Stevens Creek and Guadalupe River watersheds. Although operational changes to non-emergency flow releases have the potential to increase erosion in these two watersheds, these changes in stream flow are based primarily on the seasonal timing of water releases and would not increase erosion beyond the yearly norm.

As a result, impacts from soil erosion and loss of topsoil during implementation of reservoir re-operation rule curves would be less than significant.

Non-flow Measures Impact Analysis

Construction activities would conform to the federal, state, and local regulations related to geology and soils described in Section 3.11.2. Much of the work required to implement the proposed non-flow measures would be completed during the summer months when low flows occur. However, dewatering would be necessary for most projects and would require the use of a cofferdam upstream of the work area to temporarily impound water. The impounded water would be piped around the active work area using either pumps placed in the impoundment pool or a gravity-fed inlet. The water would be released into the active channel below the project area. To reduce the potential for erosion of the channel bed during dewatering activities, rock may be placed to the pipe outlet as an energy-dissipation measure. Construction activities involving ground disturbance and demolition; work within the channel or stream bed; pruning or removal of riparian vegetation; channel dewatering within the limits of the active work area; concrete and asphalt demolition and removal; installation of new concrete; vehicle and equipment staging; and alteration of flows associated with the implementation of non-flow measures could result in short-term impacts to erosion and loss of topsoil. The physical changes associated with the Proposed Project would mainly include upgrades to existing Valley Water-owned and -maintained facilities. However, access to remote sites for implementation of individual measures may require the use of lands under public or private ownership, such as County-owned park lands, and for that reason may require the removal of topsoil in undisturbed areas.

Erosion- and sediment-control measures in BMP GEN-20 would be implemented throughout the entire construction phase. Sediment-removal BMPs, including SED-1, SED-2, and SED-3, would also be implemented during earthwork to manage groundwater, reduce the potential for scour, and effectively restore channel features requiring disturbance. Erosion resulting from in-channel vegetation removal would be reduced with BMP VEG-1. Potential impacts to erosion and loss of topsoil resulting from the use of construction vehicles and equipment on unpaved areas, equipment staging, stockpiling, transport of sediment, and stream access would be minimized through BMPs GEN-21, GEN-22, and GEN-23.

Based on these factors, and with implementation of the BMPs listed above, impacts from erosion and loss of topsoil would be less than significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect geology and soils. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. As such, implementing the monitoring protocols and the AMP would not require ground disturbance but could result in changes in flow which could result in erosion or loss of topsoil. Maintenance activities would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. These activities would require ground disturbance and would have potential to result in erosion and loss of topsoil. With implementation of BMPs described above, impacts to erosion and loss of topsoil would be less than significant.

Significance Conclusion Summary

Flow measures and non-flow-measures would result in **less-than-significant** impacts to soil erosion and the loss of topsoil because these impacts would not be substantial.

Mitigation

No mitigation would be required for Impact GEO-1.

3.11.4.2 Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site (less than significant with mitigation)[24]

Flow Measures Impact Analysis

Implementation of reservoir re-operation rule curves would result in increased erosion and sedimentation as well as increased stream flow and water depth, and changes in temperature in Stevens Creek and Guadalupe River watersheds. Although operational changes to non-emergency flow releases have the potential to increase erosion in these watersheds, these changes in stream flow are based primarily on the seasonal timing of water releases and would not increase erosion beyond the yearly norm. Therefore, these impacts would not disturb paleontological resources. Furthermore, given that ground-disturbing activities are not proposed, it is unlikely that implementation of reservoir re-operation rule curves would unearth or result in the inadvertent disturbance of a unique paleontological resource or site.

Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Monitoring activities have little to no potential disturb a unique paleontological resource or site because ground-disturbing activities would be minimal. Therefore, there would be no impact.

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[24] Impact conclusion provided after consideration of mitigation.

Non-flow Measures Impact Analysis

Construction activities associated with non-flow measures including demolition and removal of structures, excavations, installations, and other ground-disturbing activities could result in the inadvertent disturbance of paleontological resources. The study area contains soils from the Quaternary age that are considered suitable for the preservation of paleontological resources; however, deposits have been obscured or removed by urban development. Other soils from the Holocene age present in the study area are considered to have a low potential for paleontological resources.

According to the Society of Vertebrate Paleontology (SVP), areas of low paleontological potential generally do not require mitigation (SVP 2010). In addition, the physical changes associated with the Proposed Project would mainly include upgrades to existing Valley Water-owned and -maintained facilities. However, there is a potential that undiscovered paleontological resources are present in the study area.

Non-flow measures could result in significant impacts to a unique paleontological resource or site during ground-disturbing activities because a unique paleontological resource could be damaged or destroyed. In general, effects on significant paleontological resources under CEQA can be reduced to a less-than-significant level through proper treatment or management measures. In 2010, the SVP developed *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*, which are guidelines to mitigate against damage to paleontological resources (SVP 2010). The mitigation measures in the SVP guidelines, discussed later in this analysis, are recommended for areas determined to have a high or undetermined potential for significant paleontological resources and would be incorporated into the Proposed Project.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect paleontological resources. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility.

As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. As such, implementing the monitoring protocols and the AMP would have no impact to paleontological resources as these efforts have no associated ground-disturbing activity. Maintenance activities, however, would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. These activities would require ground disturbance and would have potential to disturb a unique paleontological resource or site. Impacts to a unique paleontological resource or site are therefore considered significant.

Significance Conclusion Summary

Flow measures analyzed against Impact GEO-2 would result in **no impact** to unique paleontological resources or sites. Non-flow measures impacts would be **significant.**

Mitigation

To reduce the impacts of Impact GEO-2, Valley Water would implementation MM-GEO-1, as described below.

Mitigation Measure GEO-1: Follow the Society of Vertebrate Paleontology Standard Procedures for the Assessment and Mitigation of Adverse Impacts on Paleontological Resources

Valley Water will mitigate temporary and permanent impacts to a unique paleontological resource or site during construction and ground disturbance by implementing the following measures:

- Conduct an intensive field survey and surface salvage prior to earth moving, if applicable;
- Hire a qualified paleontological resource monitor to monitor excavations in previously disturbed rock units;
- Salvage unearthed fossil remains and/or traces (for example, tracks, trails, burrows, etc.);
- Wash screens to recover small specimens, if applicable;
- Prepare salvaged fossils to a point of being ready for curation (that is, removal of the enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles where appropriate);
- Identify, catalog, curate, and provide for repository storage of prepared fossil specimens; and
- Prepare a final report of the finds and their significance.

Significance after Mitigation

Under the proposed non-flow measures, Valley Water will implement MM GEO-1, which will require surveying and monitoring of the Project area by a certified paleontologist prior to and during construction and ground-disturbing activities. In the event of discovery of a unique paleontological resource or site, Valley Water will implement MM GEO-1 provision to properly avoid, preserve, and document the resource. With implementation of MM GEO-1, impacts to paleontological resources would be reduced to a **less-than-significant** level because destruction or damage to unique paleontological resources would be minimized.

3.11.4.3 Geology and Soils Impacts Summary

Table 3.11-1 summarizes the geology and soils impacts of the Proposed Project.

Table 3.11-1. Geology and Soils Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
GEO-1	Flow Measures	LTS	N/A	LTS	N/A
GEO-1	Non-flow Measures	LTS	N/A	LTS	N/A
GEO-2	Flow Measures	NI	N/A	NI	N/A
GEO-2	Non-flow Measures	SI	MM GEO-1	S/M	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A = not applicable, NI = no impact, SI = significant impact, S/M = significant but mitigable to a less-than-significant impact

3.12 Air Quality

This section describes the air quality in the study area. In addition, this section discusses the Proposed Project's impacts to air quality. The study area used to assess the impacts of the Proposed Project on air quality is defined as the San Francisco Bay Area Air Basin (SFBAAB or Bay Area).

3.12.1 Environmental Setting

The environmental setting represents the existing conditions of air quality in the study area. This setting is also referred to as the current (2020) baseline condition although some environmental setting information is based on older studies or data that are nevertheless representative of 2020 conditions. It forms the basis for comparison of Proposed Project impacts.

3.12.1.1 Climate and Meteorology

Bay Area topography is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays. This complex terrain, especially the higher elevations, distorts the normal wind flow patterns in the Bay Area. The greatest distortion occurs when low-level inversions are present and the air beneath the inversion flows independently of air above the inversion, a condition that is common in the summertime (BAAQMD 2017a).

The only major break in California's Coast Range occurs in the Bay Area. Here the Coast Range splits into western and eastern ranges. Between the two ranges lies San Francisco Bay. The gap in the western Coast Range is known as the Golden Gate, and the gap in the eastern coast range is the Carquinez Strait. These gaps allow air to pass into and out of the Bay Area and the Central Valley (BAAQMD 2017a).

During the summer, the large-scale meteorological condition that dominates the West Coast known as the Pacific High is a semi-permanent high-pressure cell centered over the northeastern Pacific Ocean. This high-pressure cell keeps storms from affecting the California coast. Hence, the Bay Area experiences little precipitation in the summer. Winds tend to blow on shore out of the north and northwest.

The steady northwesterly flow induces upwelling of cold water from below. This upwelling produces a band of cold water off the California coast. When air approaches the California coast, already cool and moisture-laden from its long journey over the Pacific, it is further cooled as it crosses this bank of cold water. This cooling often produces condensation resulting in a high incidence of fog and stratus clouds along the northern California coast in the summer.

Generally during the winter, the Pacific High weakens and shifts southward, winds tend to flow offshore, upwelling ceases, and storms occur. During the winter rainy periods, inversions (layers of warmer air over colder air) are weak or nonexistent, winds are usually moderate, and air pollution potential is low. The Pacific High does periodically become dominant, however, bringing strong inversions, light winds, and high pollution potential.

Summertime temperatures in the Bay Area are determined in large part by the effect of differential heating between land and water surfaces. Because land tends to heat up and cool off more quickly than water, a large-scale gradient (differential) in temperature is often created between the coast and the Central Valley, and small-scale local gradients are often produced along the shorelines of the ocean and bays. The temperature gradient near the ocean is also exaggerated, especially in summer, because of the upwelling of cold ocean-bottom water along the coast. Thus, during summer afternoons, the temperatures at the coast can be 35°F cooler than temperatures 15 to 20 miles inland. At night, the contrast between the coast and inland temperatures is usually less than 10°F.

In the winter, the relationship of minimum and maximum temperatures is reversed. During the daytime, the temperature contrast between the coast and inland areas is small, whereas at night the variation in temperature is large (BAAQMD 2017a).

3.12.1.2 Monitored Air Quality

The closest monitoring station to the study area is the San José monitoring station. This station monitors carbon monoxide (CO), ozone (O_3), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). Brief descriptions of each criteria pollutant are provided below. Table 3.12-1 shows pollutant levels, the state and federal standards, and the number of exceedances recorded at the San José monitoring station from 2017 to 2019. The ambient air toxic levels measured at the San José stations are available from the Air Resources Board (ARB) website.[25]

Carbon Monoxide (CO)

CO concentrations are influenced by local meteorological conditions, primarily wind speed, topography, and atmospheric stability. As shown in Table 3.12-1, the CO concentrations in the study area have not exceeded the federal or state standards in the past 3 years.

Ozone (O_3)

O_3 is a colorless gas that is formed in the atmosphere when reactive organic gases (ROGs), which include volatile organic compounds (VOCs) and oxides of nitrogen (NO_X), react in the presence of ultraviolet sunlight. O_3 is not a primary pollutant; it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. Meteorology and terrain play major roles in O_3 formation. Ideal conditions occur during summer and early autumn, days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. As shown in Table 3.12-1, the 1-hour and 8-hour O_3 standards were exceeded at the San José monitoring station.

Coarse Particulate Matter

Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. Inhalable particulate matter, or PM_{10}, is about 1/7th the thickness of a human hair. As shown in Table 3.12-1, the state PM_{10} standards have been exceeded at the San José monitoring station. The federal standards have not been exceeded in the last 3 years.

Fine Particulate Matter

$PM_{2.5}$ is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (for example, motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as SO_2, NO_X, and VOC. As shown in Table 3.12-1, the $PM_{2.5}$ standards have been exceeded at the San José monitoring station.

Nitrogen Dioxide (NO_2)

NO_2, like O_3, is not directly emitted into the atmosphere but is formed by an atmospheric chemical reaction between nitric oxide and atmospheric oxygen. Nitric oxide and NO_2 are collectively referred to as NO_X and are major contributors to O_3 formation. NO_2 also contributes to the formation of PM_{10}. High concentrations of NO_2 can result in a brownish-red cast to the atmosphere with reduced visibility

[25] http://www.arb.ca.gov/adam/toxics/toxics.html

and can cause breathing difficulties. As shown in Table 3.12-1, the NO_2 standards at the San José monitoring station have not been exceeded in the last 3 years.

Sulfur Dioxide (SO_2)

SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary-source emissions of SO_2 and limits on the sulfur content of fuels. As shown in Table 3.12-1, the SO_2 standards have not been exceeded at the San José monitoring station in the last 3 years.

Volatile Organic Compounds or Reactive Organic Gases

VOCs are carbon-containing compounds that evaporate into the air. VOCs contribute to the formation of smog and/or may be toxic. VOCs often have an odor, and examples include gasoline, alcohol, and the solvents used in paints. There are no specific state or federal VOC thresholds, as they are regulated by individual air districts as O_3 precursors.

Table 3.12-1. Ambient Air Quality Monitoring Concentrations at the San José Monitoring Station

Pollutant	Pollutant Concentration and Standard	2017 Maximum Concentration	2018 Maximum Concentration	2019 Maximum Concentration
Carbon monoxide	Maximum 1-hour concentration (parts per million [ppm])	2.1	2.5	1.7
	Days >20 ppm (state 1-hr standard)	0	0	0
	Days >35 ppm (federal 1-hr standard)	0	0	0
	Maximum 8-hour concentration (ppm)	1.8	2.1	1.3
	Days >9 ppm (state 8-hr standard)	0	0	0
	Days >9 ppm (federal 8-hr standard)	0	0	0
Ozone	Maximum 1-hour concentration (ppm)	0.121	0.078	0.095
	Days >0.09 ppm (state 1-hr standard)	3	0	1
	Maximum 8-hour concentration (ppm)	0.098	0.061	0.081
	Days >0.070 ppm (state 8-hr standard)	4	0	2
	Days >0.070 ppm (federal 8-hr standard)	4	0	2
Nitrogen dioxide	Maximum 1-hour concentration (ppm)	0.068	0.086	0.060
	Days >0.18 ppm (state 1-hr standard)	0	0	0
	Days >0.10 ppm (federal 1-hr standard)	0	0	0
	Annual arithmetic mean (ppm)	0.012	0.012	0.011
	Exceeds 0.030 ppm? (state annual standard)	No	No	No
	Exceeds 0.053 ppm? (federal annual standard)	No	No	No
Sulfur dioxide	Maximum 1-hour concentration (parts per billion [ppb])	3.6	6.9	14.5
	Days >250 ppb (state 1-hr standard)	0	0	0
	Days >75 ppb (federal 1-hr standard)	0	0	0

Pollutant	Pollutant Concentration and Standard	2017 Maximum Concentration	2018 Maximum Concentration	2019 Maximum Concentration
Coarse particulate matter (PM_{10})	Maximum 24-hour concentration (µg/m^3)	69.4	115.4	75.4
	Days >50 µg/m^3 (state 24-hr standard)	6	4	4
	Days >150 µg/m^3 (federal 24-hr standard)	0	0	0
	Annual arithmetic mean (µg/m^3)	20.7	20.9	18.4
	Exceeds 20 µg/m^3? (state annual standard)	Yes	Yes	No
Fine particulate matter ($PM_{2.5}$)	Maximum 24-hour concentration (µg/m^3)	49.7	133.9	27.6
	Days> 35 µg/m^3 (federal 24-hr standard)	6	15	0
	Annual arithmetic mean (µg/m^3)	9.5	12.7	9.0
	Exceeds 12 µg/m^3? (state annual standard)	No	Yes	No
	Exceeds 12 µg/m^3? (federal annual standard)	No	Yes	No

Sources: ARB (2020a), USEPA (2019)

3.12.1.3 Air Toxics

Hazardous air pollutants, also known as toxic air contaminants (TACs) or air toxics, are those pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects. USEPA is required to control 187 hazardous air pollutants. Examples of TACs include benzene, which is found in gasoline; perchloroethlyene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries.

Most air toxics originate from human-made sources, including mobile sources (for example, cars, trucks, and uses) and stationary sources (for example, factories, refineries, power plants), as well as indoor sources (for example, building materials and activities such as cleaning) (USEPA 2018d).

3.12.1.4 Sensitive Receptors

Sensitive populations are more susceptible to the effects of air pollution than the general population. Sensitive populations include various types of sensitive receptors. Sensitive receptors that are in proximity to local sources of toxics, particulate matter, and CO are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Figure 3.12-1 shows selected sensitive receptors (hospitals, schools, and recreation areas) in the study area.

3.12.2 Regulatory Setting

This section summarizes the federal and state laws, regulations, and plans pertinent to evaluation of the Proposed Project's impacts to air quality.

3.12.2.1 Federal

Clean Air Act and National Ambient Air Quality Standards

The federal Clean Air Act (FCAA; 42 USC 7401), as amended, is the primary federal law that governs air quality, while the California Clean Air Act (CCAA; see Section 3.12.2.2) is its companion state law.

The FCAA and related regulations by the USEPA set standards for the concentration of pollutants in the air, called National Ambient Air Quality Standards (NAAQS).

NAAQS have been established for six criteria pollutants that have been linked to potential health concerns: CO, NO_2, O_3, PM_{10}, $PM_{2.5}$, and SO_2. In addition, national standards exist for lead.

The NAAQS are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. The federal regulatory schemes also cover TACs (air toxics); some criteria pollutants are also air toxics or may include certain air toxics in their general definition.

The FCAA requires USEPA to designate areas as attainment, nonattainment, or maintenance (an area that was previously nonattainment and is currently attainment) for each criteria pollutant based on whether the NAAQS have been achieved. The federal standards are summarized in Table 3.12-2, which includes state standards, the health effects of the air pollutants with standards, and the SFBAAB attainment status.

The FCAA requires each State to prepare an air quality control plan referred to as the State Implementation Plan (SIP). USEPA is responsible for implementing the programs established under the FCAA, programs such as establishing and reviewing the federal ambient air quality standards and judging the adequacy of SIPs. If a state contains areas that violate the national standards, the FCAA requires the State to revise its SIP to incorporate additional control measures to reduce air pollution. USEPA has authorized States such as California with air programs that meet or exceed federal standards to implement many of the federal programs while retaining an oversight role.

National Emission Standards for Hazardous Air Pollutants

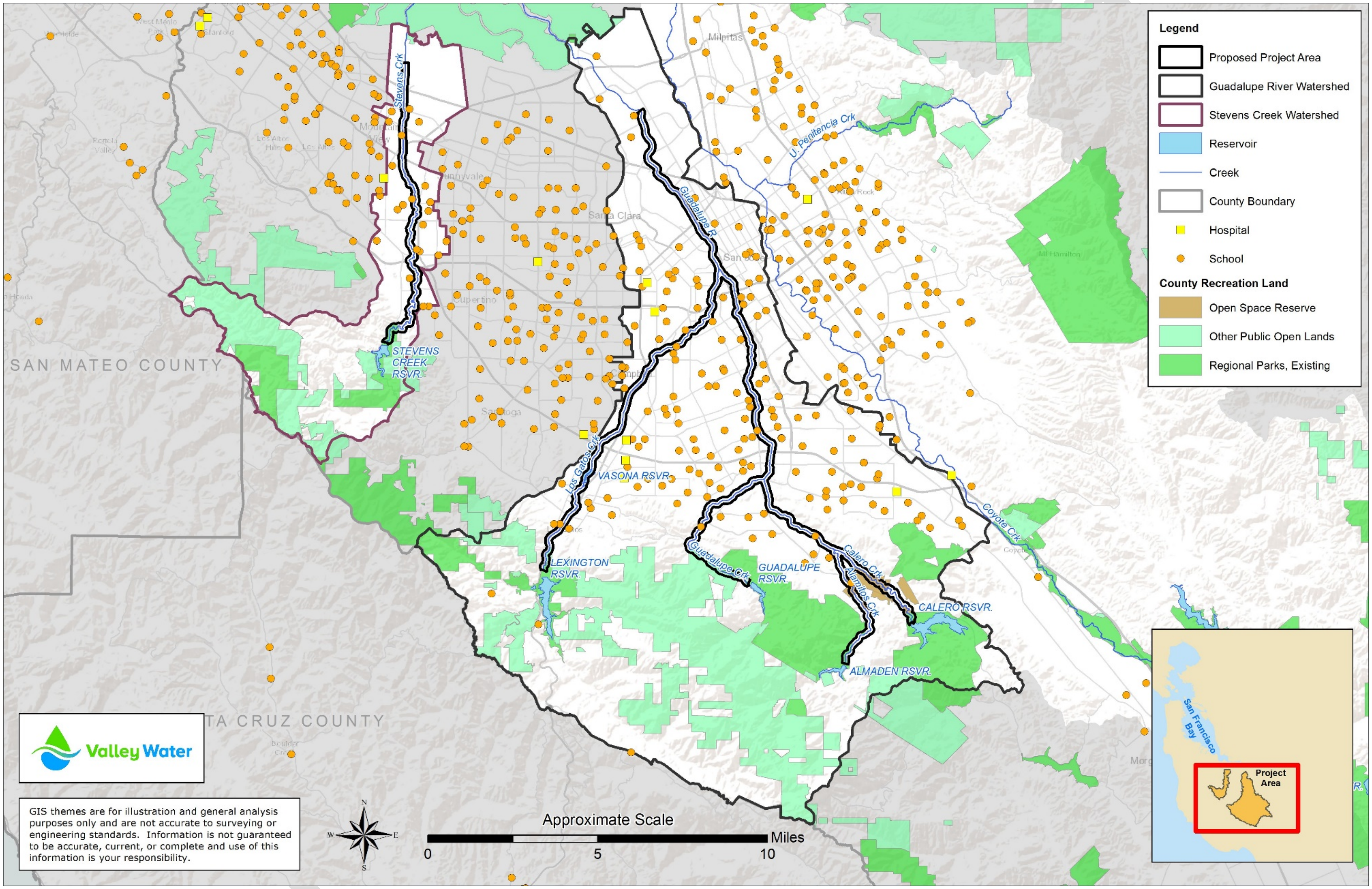
National Emission Standards for Hazardous Air Pollutants are stationary source standards for hazardous air pollutants (40 CFR 63). Hazardous air pollutants are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects (USEPA 2018c).

3.12.2.2 State

California Clean Air Act

In California, the CCAA is administered by the California ARB at the state level and by the air quality management districts and air pollution control districts at the regional and local levels (air districts). ARB is responsible for meeting the state requirements of the FCAA, administering the CCAA, establishing the California Ambient Air Quality Standards (CAAQS), and establishing motor vehicle emissions standards. The CCAA, as amended in 1992, requires all air districts in the state to endeavor to achieve and maintain the CAAQS.

Figure 3.12-1. Selected Sensitive Receptors



CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. ARB is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. ARB also establishes passenger vehicle fuel specifications. ARB oversees the functions of air districts, which in turn administer air quality activities at the regional and county levels. The state standards are summarized in Table 3.12-2.

The CCAA requires ARB to designate areas in California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data show that a state standard for the pollutant was violated at least once during the previous 3 calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard and are not used as a basis for designating areas as nonattainment.

State Implementation Plan

SIPs are not single documents but rather a compilation of new and previously submitted plans, programs, district rules, state regulations, and federal controls. Many of California's SIPs rely on the same core set of control strategies, including emission standards for cars and heavy trucks, fuel regulations, and limits on emissions from consumer products.

State law makes ARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to ARB for review and approval. ARB then forwards SIP revisions to USEPA for approval and publication in the Federal Register. CFR Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items that are included in the California SIP.

Airborne Toxic Control Measures

ARB has established multiple mobile- and stationary-source Airborne Toxic Control Measures. Specific examples include control measures for diesel particulate matter (DPM) from portable engines rated at 50 horsepower and greater and limits on diesel-fueled commercial motor vehicle idling (ARB 2018b).

Off-road Vehicle and Equipment Regulations

ARB has established a number of regulations pertaining to off-road vehicles and equipment that may be used for Valley Water construction activities. Engines designated as nonroad engines by USEPA are known as off-road engines in California state regulations implemented by ARB. Similar to the USEPA Nonroad Diesel Rule, the Off-road Emissions Regulation for New Compression-Ignition Engines and Equipment (ARB 2012) applies to diesel engines such as those found in construction, general industrial, and terminal equipment. Initially adopted in 2000 and amended in 2004, the regulation establishes tier emissions standards, test procedures, and warranty and certification requirements. For some model years and engine size, the California ARB tier emission standards are more stringent than the USEPA standards.

Also, in July 2007, ARB adopted the In-Use Off-Road Diesel Vehicle Regulation and amended it in December 2011 (ARB 2011). The regulation requires owners of off-road mobile equipment powered by diesel engines 25 horsepower or larger to meet the fleet average or best available control technology requirements for NO_X and PM emissions by January 1 of each year. The regulation also establishes idling restrictions, limitations on buying and selling older off-road diesel vehicles, reporting requirements, and retrofit and replacement requirements.

Table 3.12-2. State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[a]	Federal Standard[b]	Principal Health and Atmospheric Effects	Typical Sources	SFBAAB Attainment Status
Ozone (O_3)[c]	1 hour 8 hours	0.09 ppm 0.070 ppm	— 0.070 ppm[d] (4th highest in 3 years)	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include many known TACs. Biogenic VOC may also contribute.	Low-altitude O_3 is almost entirely formed from ROGs or VOCs and NO_x in the presence of sunlight and heat. Major sources include motor vehicles and other mobile sources, solvent evaporation, and industrial and other combustion processes.	Federal: Nonattainment (8-hour) State: Nonattainment (1-hour and 8-hour)
Carbon monoxide (CO)	1 hour 8 hours 8 hours (Lake Tahoe)	20 ppm 9.0 ppm[e] 6 ppm	35 ppm 9 ppm —	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical O_3.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.	Federal: Attainment State: Attainment
Respirable particulate matter (PM_{10})[f]	24 hours Annual	50 µg/mg 20 µg/mg	150 µg/mg —[f] (expected number of days above standard < or equal to 1)	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some TACs. Many aerosol and solid compounds are part of PM_{10}.	Dust- and fume-producing industrial and agricultural operations; combustion smoke and vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.	Federal: Unclassified State: Nonattainment

Pollutant	Averaging Time	State Standard[a]	Federal Standard[b]	Principal Health and Atmospheric Effects	Typical Sources	SFBAAB Attainment Status
Fine particulate matter ($PM_{2.5}$)[f]	24 hours Annual Secondary Standard (annual)	— 12 µg/mg —	35 µg/mg 12.0 µg/mg 15 µg/mg (98th percentile over 3 years)	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter—a TAC—is in the $PM_{2.5}$ size range. Many toxic and other aerosol and solid compounds are part of $PM_{2.5}$.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical (including photochemical) reactions involving other pollutants including NO_x, sulfur oxides, ammonia, and ROG.	Federal: Nonattainment State: Nonattainment
Nitrogen dioxide (NO_2)	1 hour Annual	0.18 ppm 0.030 ppm	100 ppb[h] (98th percentile over 3 years) 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain. Part of the “NO_x” group of O_3 precursors.	Motor vehicles and other mobile sources; refineries; industrial operations.	Federal: Attainment State: Attainment
Sulfur dioxide (SO_2)	1 hour 3 hours 24 hours Annual Arithmetic Mean	0.25 ppm — 0.04 ppm —	75 ppb[i] (99th percentile over 3 years) 0.5 ppm[b] 0.14 ppm 0.03 ppm	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.	Federal: Attainment/ Unclassified State: Attainment/ Unclassified
Lead[g]	Monthly Calendar Quarter Rolling 3-month average	1.5 µg/mg — —	— 1.5 µg/mg 0.15 µg/mg[j]	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a TAC and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from gasoline may exist in soils along major roads.	Federal: Attainment/ Unclassified State: Attainment/ Unclassified

Pollutant	Averaging Time	State Standard[a]	Federal Standard[b]	Principal Health and Atmospheric Effects	Typical Sources	SFBAAB Attainment Status
Sulfate	24 hours	25 µg/mg	—	Premature mortality and respiratory effects. Contributes to acid rain. Some TACs attach to sulfate aerosol particles.	Industrial processes, refineries and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.	Federal: N/A State: Attainment/ Unclassified
Hydrogen sulfide	1 hour	0.03 ppm	—	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment plants, and mines. Some natural sources like volcanic areas and hot springs.	Federal: N/A State: Attainment/ Unclassified
Visibility reducing particles	8 hours	Visibility of 10 miles or more (Tahoe: 30 miles) at relative humidity less than 70 percent	—	Reduces visibility. Produces haze. Note: not related to the Regional Haze program under the FCAA, which is oriented primarily toward visibility issues in National Parks and other "Class I" areas.	See particulate matter above.	Federal: N/A State: Attainment/ Unclassified
Vinyl chloride[g]	24 hours	0.01 ppm	—	Neurological effects, liver damage, cancer. Also considered a TAC.	Industrial processes	Federal: N/A State: Attainment/ Unclassified

Sources: ARB (2016, 2018a)

[a] California standards for O_3, CO (except 8-hour Lake Tahoe), SO_2 (1 and 24 hour), NO_2, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles) are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than O_3, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact USEPA for further clarification and current national policies.

[c] The 0.08 ppm 1997 O_3 standard is revoked *for conformity purposes only* when area designations for the 2008 0.75 ppm standard become effective for conformity use (July 20, 2013). Conformity requirements apply for all NAAQS, including revoked NAAQS, until emission budgets for newer NAAQS are found adequate, SIP amendments for the newer NAAQS are approved with a emission budget, USEPA specifically revokes conformity requirements for an older standard, or the area becomes attainment/unclassified. SIP-approved emission budgets remain in force indefinitely unless explicitly replaced or eliminated by a subsequent approved SIP amendment. During the "Interim" period prior to availability of emission budgets, conformity tests may include some combination of build vs. no build, build vs. baseline, or compliance with prior emission budgets for the same pollutant.
[d] Prior to June 2005, the 1-hour NAAQS was 0.12 ppm. Emission budgets for 1-hour O_3 are still in use in some areas where 8-hour O_3 emission budgets have not been developed, such as the San Francisco Bay Area. On October 1, 2015, the national 8-hour O_3 primary and secondary standards were lowered from 0.075 to 0.070 ppm.
[e] Rounding to an integer value is not allowed for the State 8-hour CO standard. Violation occurs at or above 9.05 ppm.
[f] Annual PM_{10} NAAQS revoked October 2006; was 50 µg/m^3. 24-hour $PM_{2.5}$ NAAQS tightened in October 2006; was 65 µg/m^3. Annual $PM_{2.5}$ NAAQS tightened from 15 µg/m^3 to 12 µg/m^3 December 2012, and secondary standard set at 15 µg/m^3.
[g] ARB has identified vinyl chloride and the particulate matter fraction of diesel exhaust as TACs. Diesel exhaust particulate matter is part of PM_{10} and, in larger proportion, $PM_{2.5}$. Both ARB and USEPA have identified lead and various organic compounds that are precursors to O_3 and $PM_{2.5}$ as TACs. There are no exposure criteria for substantial health effects attributable to TACs, and control requirements may apply at ambient concentrations below any criteria levels specified above for these pollutants or the general categories of pollutants to which they belong.
[h] Final 1-hour NO_2 NAAQS published in the Federal Register on February 9, 2010, effective March 9, 2010. Initial area designation for California (2012) was attainment/ unclassifiable throughout. Project-level hot-spot analysis requirements do not currently exist. Near-road monitoring starting in 2013 may cause redesignation to nonattainment in some areas after 2016.
[i] USEPA finalized a 1-hour SO_2 standard of 75 ppb in June 2010. Nonattainment areas have not yet been designated as of September 2012.
[j] Lead NAAQS are not considered in transportation conformity analysis.

3.12.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies the other regional and local regulations relevant to air quality.

Bay Area Air Quality Management District

BAAQMD is the regional agency primarily responsible for preparing regional clean air plans, regulating air pollution emissions from stationary sources (for example, factories), and controlling indirect sources (for example, land use project emissions), as well as monitoring ambient pollutant concentrations. BAAQMD's jurisdiction encompasses seven counties—Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa—and portions of Solano and Sonoma Counties.

Air Quality Management Plan

BAAQMD's most recently adopted clean air plan is the 2017 Clean Air Plan (BAAQMD 2017b), which BAAQMD adopted in April 2017. To fulfill state O_3 planning requirements, the 2017 control strategy includes all feasible measures to reduce emissions of O_3 precursors—ROG and NO_x—and reduce the transport of O_3 and its precursors to neighboring air basins. BAAQMD uses the Clean Air Plan to evaluate a project's potential cumulative air quality impacts. The BAAQMD CEQA Guidelines (see the section *CEQA Guidelines* below) state that, "for any project that does not individually have significant operational air quality impacts, the determination of significant cumulative impacts should be based on an evaluation of the consistency of the project with the local general plan and the general plan with the regional air quality plan." A proposed project would be consistent with the 2017 Clean Air Plan if the project is consistent with assumptions used in the local general plans.

CEQA Guidelines

The BAAQMD CEQA Air Quality Guidelines (Guidelines) advise lead agencies about how to evaluate potential air quality impacts, including establishing quantitative and qualitative thresholds of significance.

In May 2017, BAAQMD released its 2017 update to the Guidelines (BAAQMD 2017a). This update contains the thresholds of significance formally presented in the 2011 Guidelines for the consideration of lead agencies in assessing air quality impacts. The 2017 CEQA Guidelines also include thresholds for TACs. However, BAAQMD advises that the TAC thresholds are not mandatory, and agencies should apply them only after determining that they reflect an appropriate measure of a project's impacts.

Operational Impact Thresholds

Table 3.12-3 presents the thresholds of significance for operational-related criteria air pollutant and precursor emissions. These represent the levels at which a project's individual emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to SFBAAB's existing air quality conditions. If a proposed project's daily average or annual emissions of operational-related criteria air pollutants or precursors would exceed any applicable threshold of significance listed in Table 3.12-3, the project would result in a cumulatively significant impact.

Table 3.12-3. Thresholds of Significance for Operational-related Criteria Air Pollutants and Precursors

Pollutant/Precursor	Maximum Annual Emissions (tons per year)	Average Daily Emissions (pounds per day)
ROG	10	54
NOX	10	54
PM_{10}	15	82
$PM_{2.5}$	10	54

Source: BAAQMD CEQA Air Quality Guidelines (BAAQMD 2017a)

Construction Impact Thresholds

Table 3.12-4 presents the thresholds of significance for construction-related criteria air pollutant and precursor emissions. If a proposed project's daily average emissions of construction-related criteria air pollutants or precursors would exceed any applicable threshold of significance listed in Table 3.12-4, the project would result in a significant cumulative impact.

Table 3.12-4. Thresholds of Significance for Construction-related Criteria Air Pollutants and Precursors

Pollutant/Precursor	Average Daily Emissions (pounds per day)
ROG	54
NOX	54
PM_{10}	82[a]
$PM_{2.5}$	54[a]

Source: BAAQMD CEQA Air Quality Guidelines (BAAQMD 2017a)
[a] applies to construction exhaust emissions only

Local Community Risk and Hazard Impact Thresholds

The BAAQMD thresholds of significance for local community risk and hazard impacts are identified below. These thresholds apply to siting a new source of air pollution. Local community risk and hazard impacts are associated with TACs and $PM_{2.5}$ because emissions of these pollutants can have significant health impacts at the local level. If a proposed project's emissions of TACs or $PM_{2.5}$ exceed any of the thresholds of significance listed below, the project would result in a significant impact:

- Non-compliance with a qualified risk reduction plan; or
- An excess cancer risk level of more than 10 in one million, or a non-cancer (that is, chronic or acute) hazard index greater than 1.0; or
- An incremental increase of greater than 0.3 microgram per cubic meter ($\mu g/m^3$) annual average $PM_{2.5}$.

A proposed project would have a cumulative considerable impact if the aggregate total of all past, present, and foreseeable future sources within a 1,000-foot radius from the fence line of a source plus the contribution from the project exceeds the following:

- Non-compliance with a qualified risk reduction plan; or

- An excess cancer risk levels of more than 100 in one million or a chronic non-cancer hazard index (from all local sources) greater than 10.0; or
- 0.8 μg/m^3 annual average $PM_{2.5}$.

A lead agency should enlarge the 1,000-foot radius on a case-by-case basis if an unusually large source (or sources) of risk or hazard emissions that may affect a proposed project is (are) beyond the recommended radius.

Local Carbon Monoxide Impact Thresholds

The BAAQMD thresholds of significance for local CO emissions are the 1- and 8-hour CAAQS of 20.0 ppm and 9.0 ppm, respectively. By definition, these represent levels to protect public health. If a proposed project would cause local emissions of CO to exceed these thresholds of significance, the project would have a significant impact to air quality.

Odor Impact Thresholds

The BAAQMD thresholds of significance for odor impacts are qualitative. The lead agency for a proposed project that would site a new source should consider the screening-level distances and the complaint history of the odor sources.

- Projects that would site a new odor source farther than the applicable screening distance shown in Table 3.12-5 from an existing receptor would not likely result in a significant odor impact.
- A type of odor source with five or more confirmed complaints in the new source area per year averaged over 3 years is considered to have a significant impact to receptors within the screening distance shown in Table 3.12-5.

Table 3.12-5 presents odor screening distances recommended by BAAQMD for a variety of land uses. Projects that would site a new odor source or a new receptor farther than the applicable screening distance shown in Table 3.12-5 from an existing receptor or odor source, respectively, would not likely have a significant odor impact. The odor screening distances in Table 3.12-5 should not be used as absolute screening criteria but rather as information to consider along with the odor parameters and complaint history.

Table 3.12-5. Odor Screening Distances

Land Use/Type of Operation	Project Screening Distance (miles)
Wastewater treatment plant	2
Wastewater pumping facilities	1
Sanitary landfill	2
Transfer station	1
Composting facility	1
Petroleum refinery	2
Asphalt batch plant	2
Chemical manufacturing	2
Fiberglass manufacturing	1
Painting and coating operations	1
Rendering plant	2

Land Use/Type of Operation	Project Screening Distance (miles)
Coffee roaster	1
Food processing facility	1
Confined animal facility/feed lot/dairy	1
Green waste and recycling operations	1
Metal smelting plants	2

Source: BAAQMD CEQA Air Quality Guidelines (BAAQMD 2017a)

Santa Clara County General Plan 2015 Health Element

The County's Health Element was adopted by the Board of Supervisors on August 25, 2015. The goal of the County's Health Element is to demonstrate the correlation between well-planned, safe, highly livable urban environments and improved health outcomes, such as reductions in chronic disease. The Health Element includes four major strategies for improving air quality, protecting the climate, and protecting public health (Santa Clara County 2015). These four strategies are:

Strategy #1 Strive for air quality improvement through regional and local land use, transportation, and air quality planning.

Strategy #2 Reduce health impacts from and increase resiliency to extreme heat events and rising temperatures.

Strategy #3 Increase awareness of and reduce vector-borne and other infectious illnesses resulting from climate change.

Strategy #4 Increase investment in readiness and coordinated planning to meet expected needs in serving more vulnerable populations

3.12.3 Methodology

3.12.3.1 Flow Measures Impact Analysis Methodology

Implementation of the flow measures would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to affect air quality. Because such activities are not proposed as part of the Proposed Project's flow measures, effects on air quality, as well as effects of monitoring, would be no impact or less-than-significant impacts; these effects are not further evaluated.

3.12.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure as introduced in Section 3.1.4.2 was considered in this analysis as it pertains to air quality.

Fish Passage Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation could affect air quality. The primary adverse air quality effects of the Proposed Project would be a result of the heavy equipment and haul truck trips.

Spawning and Rearing Habitat Improvements

Instream habitat improvement projects that could affect air quality include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bankfull channel. Six representative gravel or LWD augmentation project sites have been identified, as noted on Table 2.4-5, on which to base this programmatic analysis. The primary adverse air quality effects of the Proposed Project would be a result of the heavy equipment and haul truck trips

Watershed-specific Improvements

Stevens Creek Watershed-specific Improvements: Portable Multiport Outlet

Construction of a portable multiport outlet would allow for cooler water flow releases during the summer from Stevens Creek Reservoir while meeting instream water temperature objectives and improve cold-water pool management in the reservoir. The primary adverse air quality effects of the Proposed Project would be a result of the heavy equipment and haul truck trips

Guadalupe River Watershed-specific Improvements: Geomorphic Function Enhancement Pilot Projects

Measures to enhance geomorphic function would involve ground disturbance, such as the removal of culverts and structures, and installation activities. The primary adverse air quality effects of the Proposed Project would be a result of the heavy equipment and haul truck trips.

3.12.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed flow measures. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed non-flow measures. Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Monitoring does not include activities that could affect air quality, aside from occasional vehicle travel. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. During maintenance, the primary adverse air quality effects would be a result of heavy equipment and haul truck trips. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.12.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to air quality if it would:

- **AIR-1:** Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan
- **AIR-2:** Violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants
- **AIR-3:** Expose sensitive receptors to substantial pollutant concentrations
- **AIR-4:** Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people

3.12.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs to avoid and minimize undesired adverse effects on the environment that could result from Proposed Project measures. Valley Water BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and applicable VHP conditions are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions.

BMPs relevant to this analysis of air quality (along with a brief discussion of their effects on Project activities) include the following:

- **AIR-1:** Use Dust Control Measures – Would reduce the impact of dust generated during Project construction
- **AIR-2:** Avoid Stockpiling Odorous Materials – Would minimize the impacts of odorous materials on residential areas and other sensitive receptors
- **GEN-29:** Dust Management – Would reduce the impact of dust generated during Project construction

3.12.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur during implementation. This section evaluates the effects of Proposed Project measures on air quality, as compared to current baseline conditions.

3.12.4.1 Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan (less than significant)

Flow Measures Impact Analysis

Flow measures would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to affect air quality. As a result, there would be no conflict with or obstruction of the implementation of the BAAQMD 2017 Clean Air Plan from flow measures and no impact from proposed flow measures under Impact AIR-1.

Non-flow Measures Impact Analysis

BAAQMD prepared the 2017 Clean Air Plan to address nonattainment in the SFBAAB for both the 1- and 8-hour state O_3 standards. The 2017 Clean Air Plan provides a control strategy to address O_3 and O_3 precursors (ROGs and NO_x), particulate matter (primarily $PM_{2.5}$), air toxics, and GHGs. The Proposed Project would conflict with or obstruct the 2017 Clean Air Plan if construction of the Proposed Project non-flow measures generate criteria pollutants that exceed numerical thresholds defined by BAAQMD to attain the goals and objectives of the 2017 Clean Air Plan (Table 3.12-4).

As indicated for Impacts AIR-2 and AIR-3 (Sections 3.12.4.2 and 3.12.4.3, respectively), the Proposed Project would not exceed the BAAQMD's significance criteria for criteria air pollutant emissions during construction or operation. In addition, the Project would result in a less-than-significant impact with respect to exposure to TACs. Therefore, the Project's non-flow measures would not conflict with or obstruct implementation of the applicable air quality plan, and impacts would be less than significant with Project implementation.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect air quality. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. Monitoring would require data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Monitoring does not include activities that are likely to affect air quality, aside from occasional vehicle travel. Minor maintenance activities would be required over the lifetime of the Project. Emissions generated during maintenance activities would not exceed BAAQMD's significance criteria for criteria air pollutant emissions. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. As a result, monitoring, maintenance, and adaptive management would not conflict with or obstruct the implementation of the BAAQMD 2017 Clean Air Plan, and impacts would be less than significant.

Significance Conclusion Summary

Because the Proposed Project would not conflict with the 2017 Clean Air Plan, the impacts would be **less than significant**. There would be **no impact** from proposed flow measures.

Mitigation

No mitigation would be required for Impact AIR-1.

3.12.4.2 Impact AIR-2: Violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants (less than significant)

Flow Measures Impact Analysis

Flow measures would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to affect air quality. As a result, there would be no violation of any air quality standard or cumulatively considerable net increase in an existing or projected air quality violation from flow measures and no impact from proposed flow measures under Impact AIR-2.

Non-flow Measures Impact Analysis

Project construction activities have the potential to generate emissions from equipment used during construction as well as to generate dust. Likely air pollutants from construction include the following: PM dust, criteria pollutants from fuel combustion, and DPM. Construction activities at individual sites in the Project area would result in short-term increases in emissions associated with the operation of construction equipment.

The exact required equipment for and timing of the non-flow measure are currently unknown. Therefore, the potential air quality impacts were assessed using the types of equipment typically required to complete the construction activities, and typical air quality effects associated with earth-moving activities.

The construction emissions for the typical construction equipment and activities associated with a typical barrier-removal project were calculated using the CalEEMod model (version 2016.3.2). The total exhaust emissions generated during the entire assumed construction period are listed in Table 3.12-6, and the detailed model results are included in Appendix Q, *CalEEMod Air Quality Modeling*. As identified in Table 3.12-6, the daily construction emissions would not exceed BAAQMD's thresholds. It is unlikely that the timing of non-flow measures implementation would overlap such that daily impacts from multiple projects would be additive.

Table 3.12-6. Construction Emissions

Phase	CO	ROG	NO_x	PM_{10}	$PM_{2.5}$
Demolition	14.4	1.7	17.1	1.2	0.8
Construction	13.3	1.7	13.3	0.8	0.6
Peak day (pounds/day)	14.4	1.7	17.1	1.2	0.8
BAAQMD thresholds	NA	54	54	82	54
Exceedance	NA	No	No	No	No

Source: Appendix Q

Fugitive dust emissions are generally associated with land clearing, exposure, and cut-and-fill operations. Dust generated daily during construction would vary substantially depending on the level of activity, the specific operations, and weather conditions. Fugitive dust emissions would be minimized and controlled through the implementation of BMP AIR-1 and GEN-2-9. As a result, impacts from fugitive dust would be less than significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect air quality. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring would not result in emissions that would violate air quality standards. Minor maintenance activities and regular stockpiling of materials would be required over the lifetime of the Project. These activities can be completed with less equipment and fewer haul truck trips than what would be required for the construction activities discussed above. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. As a result, these activities would generate emissions similar to or lower than those listed in Table 3.12-6, which are less than BAAQMD's thresholds of significance. Therefore, there would be no violation of any air quality standard or cumulatively considerable net increase in an existing or projected air quality violation from maintenance, resulting in a less-than-significant impact.

Significance Conclusion Summary

The air quality impacts from the Project's construction and operational activities would not exceed the BAAQMD thresholds. Therefore, there would be no violation of air quality standards or cumulatively considerable net increase in an existing or projected air quality violation, and because therefore there would be no significant indirect health impacts associated with criteria pollutants, this impact would be **less than significant**. There would be **no impact** from proposed flow measures.

Mitigation

No mitigation would be required for Impact AIR-2.

3.12.4.3 Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations (less than significant)

Flow Measures Impact Analysis

Flow measures would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to affect air quality. As a result, no sensitive receptors would be exposed to substantial pollutant concentrations as a result of flow measures and there would be no impact from proposed flow measures under Impact AIR-3.

Non-flow Measures Impact Analysis

Project construction would result in emissions of DPM from heavy-duty construction equipment and trucks operating in the study area (for example, water trucks and haul trucks).

Sensitive land uses are located within 1,000 feet, the area of effect for analysis of health risks in accordance with the BAAQMD Guidelines (BAAQMD 2017a), of each of the barrier remediation sites. However, health risk assessments for DPM are typically based on 9-, 40-, and 70-year exposure periods. Because of the short-term and highly variable nature of DPM emissions associated with the Proposed Project, exposure to diesel exhaust, including for sensitive receptors, would be well below the exposure period of concern. Therefore, exposure of persons to DPM generated by the Proposed Project would be less than significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect air quality. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring would not result in emissions that would expose sensitive receptors to substantial pollutant concentrations. Minor maintenance activities and regular stockpiling of materials would be required over the lifetime of the Proposed Project. These activities can be completed with less equipment and fewer haul truck trips than what would be required for the construction activities discussed above. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. As a result, these activities would generate emissions similar to or lower than emissions from the construction activities. Therefore, impacts related to exposure of sensitive receptors to maintenance-period TACs and health risks would be less than significant.

Significance Conclusion Summary

Considering the short-duration and limited activity required, the air quality impacts from the Project's construction and operational activities would be **less than significant**. There would be **no impact** from proposed flow measures.

Mitigation

No mitigation would be required for Impact AIR-3.

3.12.4.4 Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people (less than significant)

Flow Measures Impact Analysis

Flow measures would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to affect air quality. As a result, flow measures would not result in substantial emissions, such as odors, adversely affecting a substantial number of people and there would be no impact from proposed flow measures under Impact AIR-4.

Non-flow Measures Impact Analysis

Construction of the Proposed Project non-flow measures could result in emission of odors from construction equipment and vehicles (for example, diesel exhaust). These odors would be short-term, limited in extent at any given time, and distributed throughout the study area and therefore would not affect a substantial number of individuals. Operational odors would be minimized and controlled through the implementation of BMP AIR-2. As a result, impacts from odors would be less than significant.

As indicated under Impact AIR-2, fugitive dust emissions would be minimized and controlled through the implementation of BMP AIR-1.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect air quality. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring would not result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people. Maintenance activities could result in emission of odors from construction equipment and vehicles (for example, diesel exhaust). These odors would be short term, limited in extent at any given time, and distributed throughout the study area. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. Therefore, monitoring, maintenance, and adaptive management would not result in substantial emissions, such as odors, adversely affecting a substantial number of people. As a result, impacts from odors would be less than significant.

Significance Conclusion Summary

The odor and dust impacts of the Proposed Project would be **less than significant** because emissions would not be substantial and would not affect a substantial number of people. There would be **no impact** from proposed flow measures.

Mitigation

No mitigation would be required for Impact AIR-4.

3.12.4.5 Air Quality Impacts Summary

Table 3.12-7 summarizes the air quality impacts of the Proposed Project.

Table 3.12-7. Air Quality Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
AIR-1	Flow Measures	NI	N/A	NI	N/A
AIR-1	Non-flow Measures	LTS	N/A	LTS	N/A
AIR-2	Flow Measures	NI	N/A	NI	N/A
AIR-2	Non-flow Measures	LTS	N/A	LTS	N/A
AIR-3	Flow Measures	NI	N/A	NI	N/A
AIR-3	Non-flow Measures	LTS	N/A	LTS	N/A
AIR-4	Flow Measures	NI	N/A	NI	N/A
AIR-4	Non-flow Measures	LTS	N/A	LTS	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A= not applicable, NI = no impact

3.13 Greenhouse Gas Emissions and Energy

This section describes GHG emissions and energy resources of the study area and the Proposed Project's impacts to GHGs and energy resources in the study area. The study area used to assess the impacts of the Proposed Project on GHG emissions and energy resources is defined as the SFBAAB.

3.13.1 Environmental Setting

3.13.1.1 Climate Change and GHG Emissions

The environmental setting represents the existing conditions of GHG and energy resources in the study area. This setting is also referred to as the current (2020) baseline conditions, although some environmental setting information is based on older studies or data that are nevertheless representative of 2020 conditions. It forms the basis for comparison of Proposed Project impacts.

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to GHG emissions, particularly those generated from the production and use of fossil fuels (BAAQMD 2017a).

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change by the United Nations and the World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are concerned primarily with the emissions of GHGs generated by human activity, GHGs including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, HFC-23 (fluoroform), HFC-134a (1,1,1,2-tetrafluoroethane), and HFC-152a (difluoroethane).

In the United States, the main source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (including passenger cars, light-duty trucks, other trucks, buses, and motorcycles) make up the largest share of GHG-emitting sources. The dominant GHG emitted is CO_2, mostly from fossil fuel combustion.

3.13.1.2 Greenhouse Gas Emission Inventories

An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing climate change. This section summarizes recent information on global, national, California, and local GHG emission inventories.

Global Emissions

Worldwide emissions of GHGs in 2018 were 33.51 billion metric tons (MT) of carbon dioxide equivalent (CO_2e) per year (International Energy Agency 2021). Global estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change.

Federal Emissions

In 2018, total U.S. emissions of GHGs were 6,676.6 million MT of CO_2e (USEPA 2020). Total U.S. emissions increased by 3.7 percent from 1990 to 2018, down from a high of 15.2 percent above 1990 levels in 2007. Emissions increased from 2017 to 2018 by 2.9 percent (188.4 million MT CO_2e). Net emissions (including sinks) were 5,903 million MT of CO_2e. Overall, net emissions increased 3.1 percent from 2017 to 2018 and decreased 10.2 percent from 2005 levels. Between 2017 and 2018, the increase in total GHG emissions was largely driven by an increase in CO_2 emissions from fossil fuel combustion. The increase in CO_2e emissions from fossil fuel combustion was a result of multiple factors, including increased energy use from greater heating and cooling needs because of a colder winter and hotter summer in 2018 compared to 2017.

California Emissions

The State of California uses the annual statewide GHG emission inventory to track progress toward meeting statewide GHG targets. In 2018, emissions from GHG emitting activities statewide were 425 million MT of CO_2e (ARB 2020b), 0.8 million MT of CO_2e higher than 2017 levels and 6 million MT of CO_2e below the 2020 GHG target of 431 million MT of CO_2e. Emissions vary from year to year depending on the weather and other factors, but the State of California will continue to implement its GHG-reductions program to ensure that the state remains on track to meet its climate targets in 2020 and beyond. These reductions come while California's economy grows and continues to generate jobs. From 2000 to 2018, the carbon intensity of California's economy decreased by 43 percent while the GDP increased by 59 percent. In 2018, GDP grew 4.3 percent while the emissions per GDP declined by 0.4 percent compared to 2017 (ARB 2020b).

3.13.1.3 Energy

Electricity in California is supplied through a complex grid of transmission lines and power plants. Approximately 68 percent of electricity consumed in California in 2018 was produced within the state, while the remaining 32 percent was imported. In 2018, electricity generated through nuclear, hydroelectric, solar, wind, and other renewable and non-CO_2-emitting sources accounted for approximately 53 percent of the total in-state electricity generation, compared to 56 percent in 2017 (California Energy Commission [CEC] 2020a).

Total system electric generation is the sum of all utility-scale in-state generation plus net electricity imports. In 2018, total generation for California was 285,488 gigawatt-hours, down 2 percent, or 6,549 gigawatt-hours, from 2017. The overall decline observed in California's total system electric generation for 2018 is consistent with the trends observed in energy demand. In recent years, electricity demand has been flat or slightly declining as energy efficiency programs have resulted in end-use energy savings and as customers install behind-the-meter solar photovoltaic systems that directly displace utility-supplied generation. In 2018, behind-the-meter solar generation was estimated to be 13,582 gigawatt-hours, a 20 percent increase from 2017. The strong growth in solar photovoltaic has had a measurable impact to utility served load and, consequently, on the total system electric generation summary (CEC 2020a).

Energy needs in Santa Clara County are served primarily by Pacific Gas and Electric Company (PG&E), while the City of Santa Clara operates municipally owned utilities (Silicon Valley Economic Development Alliance 2018). PG&E provides natural gas and electricity for residential, commercial, and industrial customers. PG&E's sources of electricity include hydroelectric, nuclear, renewable, natural gas, and coal facilities. In 2019, 29 percent of PG&E's energy was generated from renewable sources such as solar, geothermal, and biomass facilities; 44 percent was generated from nuclear plants; and 27 percent was generated from large hydroelectric operations (PG&E 2021).

According to CEC, the total amount of electricity use in Santa Clara County in 2019 was approximately 16,664 million kilowatt-hours, approximately 12,619 million kilowatt-hours of which was from nonresidential sources (CEC 2020b). The region consumed approximately 460 million therms of gas in 2019, approximately 216 million therms of which were consumed by nonresidential users (CEC 2020c).

3.13.2 Regulatory Setting

This section summarizes the federal and state laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to GHG and energy resources.

3.13.2.1 Federal

Greenhouse Gas Emissions and Fuel Economy Standards

The authority of the USEPA to regulate GHG emissions stems from the Supreme Court decision in *Massachusetts v. Environmental Protection Agency* (2007) 549 U.S. 497. USEPA, in conjunction with the National Highway Traffic Safety Administration, issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010 and significantly increased the fuel economy of all new passenger cars and light trucks sold in the United States. Under the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule, the National Highway Traffic Safety Administration and USEPA have proposed establishing new standards covering model years 2021 through 2026 by maintaining the current standards through 2026. The National Highway Traffic Safety Administration and USEPA also issued a regulation revoking the CCAA waiver, which allows California to set its own emissions standards (84 Federal Register 51310). SAFE Rule Part Two was finalized on March 31, 2020. At the time of EIR preparation, the SAFE Rule was the subject of litigation, and was also under review by the new Administration, so its implementation prospects are uncertain.

Also, USEPA and National Highway Traffic Safety Administration in 2016 adopted fuel economy and GHG standards for medium- and heavy-duty trucks (81 Federal Register 73478).

3.13.2.2 State

Executive Order S-3-05 – Statewide Greenhouse Gas Emission Targets

On June 1, 2005, Governor Arnold Schwarzenegger issued EO S-3-05, which set the following GHG emission reduction targets:

- By 2010, reduce GHG emissions to 2000 levels
- By 2020, reduce GHG emissions to 1990 levels
- By 2050, reduce GHG emissions to 80 percent below 1990 levels

This EO also directed the secretary of CalEPA to oversee the efforts made to reach these targets and to prepare biannual reports on the progress made toward meeting the targets and on the impacts to California related to global warming. The first such Climate Action Team Assessment Report was produced in March 2006 and has been updated every 2 years thereafter.

California Global Warming Solutions Act (Assembly Bill 32)

In 2006, the California State Legislature enacted the California Global Warming Solutions Act of 2006, also known as AB 32 (Chapter 488, Statutes of 2006). AB 32 sets a target that GHGs emitted in California be reduced to 1990 levels by 2020. ARB is the state agency charged with monitoring and regulating sources of emissions of GHGs that cause global warming to reduce emissions of GHGs. On December 6, 2007, in its Staff Report, ARB approved a 1990 GHG emissions level of 427 million MT of CO_2e. Therefore, in 2020, emissions in California are required to be at or below 427 million MT of CO_2e.

Climate Change Scoping Plan and SB 32

The Scoping Plan released by ARB in 2008 and updated in 2014 and 2017 (ARB 2008, 2014, 2017a) outlines the State's strategy to achieve the AB 32 goals. The Scoping Plan included measures to address GHG emission-reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (for example, the low carbon fuel standard, advanced clean car standards, and cap-and-trade) have been adopted since approval of the Scoping Plan.

In 2016, the Legislature passed SB 32, which codifies a 2030 GHG emissions reduction target of 40 percent below 1990 levels. In 2017, ARB updated the Scoping Plan (ARB 2017a) to reflect the 2030 target set by EO B-30-15 and codified by SB 32. According to the 2017 Scoping Plan, the 2030 target of 260 million MT of CO_2e requires the reduction of 129 million MT of CO_2e, or approximately 33.2 percent, from the state's projected 2030 emissions level of 389 million MT of CO_2e. The 2017 Scoping Plan notes that additional effort will be needed to maintain and continue GHG reductions to meet the 2050 EO S-3-05 GHG reduction target.

Executive Order B-30-15

On April 20, 2015, Governor Edmund G. Brown, Jr., signed EO B-30-15 to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. This emissions reduction target puts California on the trajectory to reach the ultimate EO S-3-05 goal of reducing emissions 80 percent below 1990 levels by 2050.

Senate Bill 32

SB 32 (Chapter 429, Statutes of 2016) was signed into law on September 8, 2016, and expands on AB 32 to reduce GHG emissions. SB 32 sets into law the mandated GHG emissions target of 40 percent below 1990 levels by 2030 written into EO B-30-15.

Light-duty Vehicle Greenhouse Gas Emissions Standards and Advanced Clean Cars Program

AB 1493 (Pavley) (Chapter 200, Statutes of 2002) requires ARB to develop and adopt regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state." On September 24, 2009, ARB adopted amendments to the Pavley regulations that intend to reduce GHG emissions in new passenger vehicles from 2009 through 2016. The amendments bind the State of California's enforcement of AB 1493 (starting in 2009) while providing vehicle manufacturers with new compliance flexibility. The amendments also prepare the State of California to merge its rules with the federal Corporate Average Fuel Economy rules for passenger vehicles. In January 2012, ARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single packet of standards called Advanced Clean Cars.

The Advanced Clean Cars Program includes the Zero Emission Vehicle Program, which is designed to achieve California's long-term emission reduction goals by requiring manufacturers to offer for sale specific numbers of zero-emission vehicles, which include battery electric, fuel cell, and plug-in hybrid electric vehicles. Although, the SAFE Vehicle Rule Part One (discussed above) revokes California's authority to set its own GHG emissions standards and establish zero-emission vehicle mandates in the state, its implementation prospects are uncertain.

Also, California has adopted fuel economy and GHG standards for medium and heavy-duty trucks that are parallel to the federal standards.

Low Carbon Fuel Standard

EO S-01-07 signed by Governor Arnold Schwarzenegger on January 18, 2007, directs that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. It orders that a low carbon fuel standard for transportation fuels be established for California and directs ARB to determine whether such a standard can be adopted as a discrete early action measure pursuant to AB 32. ARB approved the low carbon fuel standard as a discrete early action item with a regulation adopted and implemented in April 2010.

Senate Bill 350

SB 350 (Chapter 547, Statutes of 2015) was signed into law in September 2015. SB 350 establishes tiered increases to the Renewables Portfolio Standard of 40 percent by 2024, 45 percent by 2027, and 50 percent by 2030. The former target was 33 percent by 2020. SB 350 also set a new goal to double the electricity and natural gas savings for existing buildings through energy efficiency and conservation measures.

Senate Bill 100

SB 100 (Chapter 312, Statutes of 2018) establishes a state goal of 100 percent clean electricity goal by 2045 and advances the Renewables Portfolio Standard to 50 percent by 2025 and 60 percent by 2030.

Executive Order B-55-18

EO B-55-18 (2018) directs the state to achieve carbon neutrality no later than 2045 and achieve and maintain net negative emissions thereafter.

Short-lived Climate Pollutant Reduction Strategy

Short-lived climate pollutants are powerful climate forcers that remain in the atmosphere for a much shorter period than do longer-lived climate pollutants such as CO_2. They include CH_4, fluorinated gases including hydrofluorocarbons, and black carbon.

SB 605 (Chapter 523, Statutes of 2014) directed ARB to develop a comprehensive short-lived climate pollutant strategy, in coordination with other state agencies and local air quality management and air pollution control districts, to reduce emissions of such pollutants. SB 1383 (Chapter 395, Statutes of 2016) directed ARB to approve and begin implementing the plan by January 1, 2018, and set statewide 2030 emission reduction targets for CH_4, hydrofluorocarbons, and anthropogenic black carbon. The short-lived climate pollutant reduction strategy was approved by ARB in March 2017 (ARB 2017b). SB 1383 also included a number of directives for addressing dairy- and livestock-sector CH_4 emissions and landfill CH_4 emissions via diversion of organic material from the waste stream.

3.13.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies the other regional and local regulations relevant to GHG emissions and energy.

Bay Area Air Quality Management District

In May 2017, BAAQMD released its 2017 update to its CEQA Guidelines (BAAQMD 2017a), which contain thresholds of significance for the consideration of lead agencies in assessing air quality and GHG impacts. The BAAQMD thresholds are presented in Table 3.13-1. As shown, BAAQMD has not proposed GHG thresholds for construction emissions. Because the Proposed Project would not be a stationary source of emissions, the BAAQMD GHG threshold for non-stationary sources of 1,100 MT of CO_2e per year is used for this EIR.

Table 3.13-1. BAAQMD Greenhouse Gas Thresholds of Significance

Pollutant/Precursor	Construction-related	Operational-related
GHGs – projects other than stationary sources	None	Compliance with qualified GHG reduction strategy or 1,100 MT of CO_2e per year or 4.6 MT of CO_2e/service population/year
GHGs – stationary sources	None	10,000 MT of CO_2e per year

Source: BAAQMD (2017a)

Also, the BAAQMD 2017 Clean Air Plan (BAAQMD 2017b) contains a number of strategies that would reduce regional GHG emissions. These include stationary source measures, mobile-source measures, transportation measures, land use measures, and energy and climate measures.

3.13.3 Methodology

This evaluation considered the effects of the Proposed Project's GHG emissions and energy compared to the current baseline conditions.

3.13.3.1 Flow Measures Impact Analysis Methodology

Implementation of the flow measures would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to affect GHG emissions and energy. Because such activities are not proposed as part of the Proposed Project's flow measures, effects on GHG emissions and energy, as well as effects of monitoring, would be no impact or less-than-significant impacts and are not further evaluated.

3.13.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure as introduced in Section 3.1.4.2 was considered in this analysis as it pertains to GHG emissions and energy.

Fish Passage Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation could affect air quality. The primary adverse impacts to GHG emissions and energy of the Proposed Project would be a result of the heavy equipment and haul truck trips.

Spawning and Rearing Habitat Improvements

Instream habitat improvement projects that could affect GHG emissions and energy include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bankfull channel. Six representative gravel or LWD augmentation project sites have been identified, as noted on Table 2.4-5, on which to base this programmatic analysis. The primary adverse impacts to GHG emissions and energy of the Proposed Project would be a result of the heavy equipment and haul truck trips.

Watershed-specific Improvements

Stevens Creek Watershed-specific Improvements: Portable Multiport Outlet

Construction of a portable multiport outlet would allow for cooler water flow releases during the summer from Stevens Creek Reservoir while meeting instream water temperature objectives and improve cold-water pool management in the reservoir. The primary adverse impacts to GHG emissions and energy of the Proposed Project would be a result of the heavy equipment and haul truck trips

Guadalupe River Watershed-specific Improvements: Geomorphic Function Enhancement Pilot Projects

Measures to enhance geomorphic function would involve construction-related ground disturbance, such as the removal of culverts and structures, and installation activities. The primary adverse impact to GHG emissions and energy of the Proposed Project would be a result of the heavy equipment and haul truck trips.

3.13.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed flow measures. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed non-flow measures. Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Monitoring does not include activities that could impact GHG emissions, aside from occasional vehicle travel. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. During maintenance, the primary adverse impact to GHG emissions would be a result of heavy equipment and haul truck trips. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.13.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to GHG emissions if it would:

- **GHG-1:** Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on BAAQMD significance thresholds
- **GHG-2:** Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs

For the purposes of this EIR, the Proposed Project would result in a significant impact to energy resources if it would:

- **GHG-3:** Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation
- **GHG-4:** Conflict with or obstruct a state or local plan for renewable energy or energy efficiency

3.13.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs to avoid and minimize undesired adverse effects on the environment that could result from Proposed Project measures. Valley Water BMPs applicable to the Proposed

Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and applicable VHP conditions are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions.

BMPs relevant to this analysis of GHG and energy resources (along with a brief discussion of their effects on Project activities) include the following:

- **GEN-30:** Vehicle and Equipment Maintenance – Would reduce impacts associated with buildup of oil and fluids

3.13.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur during implementation. This section evaluates the effects of Proposed Project measures on GHG and energy resources, as compared to current baseline conditions.

3.13.4.1 Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment (less than significant)

Flow Measures Impact Analysis

Flow measures would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to generate GHG emissions. As a result, proposed flow measures would have no impact to the environment from GHG emissions.

Non-flow Measures Impact Analysis

Project construction activities have the potential to generate emissions from equipment used during construction as well as to generate dust.

Construction activities at individual sites in the study area would result in short-term increases in emissions associated with the operation of construction equipment. The exact required equipment and timing of the construction activities are currently unknown. Therefore, GHG impacts were assessed using the types of equipment typically required to complete the construction activities associated with the non-flow measures.

The construction emissions for the typical construction equipment and activities for a typical barrier-removal project were calculated using the CalEEMod model (version 2016.3.2). Detailed model results are included in Appendix Q, *CalEEMod Air Quality Monitoring*. The total exhaust emissions generated during the entire construction period of one construction event are listed in Table 3.13-2. As discussed in Section 3.13.3.2, BAAQMD has not proposed GHG thresholds for construction emissions; therefore, the operational threshold of 1,100 MT of CO_2e per year is used for this analysis. Although the emissions listed in Table 3.13-2 represent the total exhaust emissions generated during the entire period of one construction event, more than 30 such events would have to occur within a single calendar year before the BAAQMD threshold would be exceeded, which is highly unlikely. Therefore, the GHG impact of the Project’s construction activities would be less than significant.

Table 3.13-2. Construction Greenhouse Gas Emissions (metric tons/year)

Period	CO2	CH4	N2O	CO2e
Annual	33.0	0.006	0.0	33.2

Source: Appendix Q

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect GHG emissions. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. GHG emissions associated with monitoring would be isolated to those of crew vehicles accessing the Valley Water facilities and gathering data. These emissions would be minimal but within the range of those listed in on Table 3.13-2 spread over subsequent years. As a result, the GHG impact from monitoring would be less than significant.

Maintenance activities and regular stockpiling of materials would be required over the lifetime of the Proposed Project. These activities can be completed with less equipment and fewer haul truck trips than what would be required for the construction activities discussed above. As a result, these activities would generate emissions similar to or lower than those listed in Table 3.13-2. As shown, the emissions are far less than BAAQMD's threshold of 1,100 MT of CO_2e per year. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

Although the emissions listed in Table 3.13-2 represent the total exhaust emissions generated during the entire period of one construction or maintenance event, more than 30 such events would have to occur within a single calendar year before the BAAQMD threshold would be exceeded, which is highly unlikely. Therefore, the GHG impact from Project monitoring, maintenance, and adaptive management would be less than significant.

Significance Conclusion Summary

Because the Proposed Project would not generate GHG emissions in excess of BAAQMD's threshold, the impact from non-flow measures would be **less than significant**. There would be **no impact** from proposed flow measures.

Mitigation

No mitigation would be required for Impact GHG-1.

3.13.4.2 Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs (no impact)

Flow Measures Impact Analysis

Flow measures would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to generate GHG emissions. As a result, flow measures would not conflict with any plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs and there would be no impact from proposed flow measures under Impact GHG-2.

Non-flow Measures Impact Analysis

As indicated under Impact GHG-1, the Proposed Project's short-term construction and long-term maintenance would not exceed BAAQMD's significance thresholds. BAAQMD's CEQA Guidelines state that "BAAQMD's approach to developing a threshold of significance for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions needed to move us towards climate stabilization." Therefore, the Proposed Project would not conflict with the 2017 Clean Air Plan or the state's ability to achieve the GHG reduction targets of AB 32, SB 32, or EO S-3-05. As a result, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

GHG emissions resulting from monitoring would be minimal and would not exceed BAAQMD's significance thresholds. Maintenance activities would generate GHG emissions similar to or lower than those listed in Table 3.12-2. As shown, the GHG emissions are far less than BAAQMD's threshold of 1,100 MT of CO_2e per year. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. Therefore, the monitoring, maintenance, and adaptive management would not conflict with the GHG reduction targets of AB 32, SB 32 or EO S-3-05 and there would be no impact.

Significance Conclusion Summary

The Proposed Project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and therefore, there would be **no impact** from proposed flow or non-flow measures.

Mitigation

No mitigation would be required for Impact GHG-2.

3.13.4.3 Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation (less than significant)

Flow Measures Impact Analysis

Flow measures would not involve activities likely to cause wasteful, inefficient, or unnecessary consumption of energy. As a result, flow measures would not result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources. The proposed flow measures would have no impact under Impact GHG-3.

Non-flow Measures Impact Analysis

Construction activities at individual sites in the study area would result in minor, short-term increases in energy consumption.

Specifically, these construction activities would require the use of gasoline, diesel fuel, other fuels, and electricity. Energy use during construction typically involves the use of motor vehicles, both for transportation of workers and equipment but also for construction equipment such as cranes, loaders, and dozers. Additional energy use would occur as power for tools and equipment used on site, including but not limited to gas generators, air compressors, air handlers and filters, and other typical direct construction energy uses.

Construction of the Proposed Project non-flow measures would use electricity and fuel in the short term. Fuel and electricity would be used to power construction equipment. The Proposed Project would be located within the service area of PG&E, and services are available for the Project site. Gas and diesel fuel are available in the community through a network of existing private distributors. The power and energy system is adequate to handle the demand during construction. Because of the high cost of fuel and increasingly stringent motor vehicle fuel economy and emissions standards, construction and maintenance activities would not result in wasteful, inefficient, or unnecessary use of energy, as construction contractors would purchase fuel from local suppliers and would conserve the use of their supplies to minimize the cost of constructing the Project's non-flow measures. Energy use from construction equipment would be minimized through the implementation of BMP GEN-30. Therefore, this impact would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Maintenance activities at individual sites in the study area would result in minor, short-term increases in energy consumption. Monitoring activities would be isolated to the use of gasoline, diesel fuel, other fuels, and electricity needed to gather data from Valley Water facilities and otherwise to access improvements and monitoring stations along the watersheds. The proposed monitoring requirements are in line with the existing power and energy system. Because of the high cost of fuel and increasingly stringent motor vehicle fuel economy and emissions standards, maintenance activities would not result in wasteful, inefficient, or unnecessary use of energy, as contractors would purchase fuel from local suppliers and would conserve the use of their supplies to minimize the cost of maintenance activities. Energy use from maintenance equipment would be minimized through the implementation of BMP GEN-30. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. As a result, impacts would be less than significant.

Significance Conclusion Summary

The Proposed Project's energy use during construction and maintenance of non-flow measures would be **less than significant** because the Project would not result in wasteful, inefficient, or unnecessary consumption of energy resources. There would be **no impact** from proposed flow measures.

Mitigation

No mitigation would be required for Impact GHG-3.

3.13.4.4 Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency (less than significant)

Flow Measures Impact Analysis

Flow measures would not involve activities that would affect energy efficiency. As a result, flow measures would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency and there would be no impact from proposed flow measures under Impact GHG-4.

Non-flow Measures Impact Analysis

Other than minor amounts of electricity and fuel consumption associated with proposed non-flow measures construction, the Proposed Project would not consume electricity or natural gas or generate vehicle trips. Therefore, the Project would have a negligible effect on local energy consumption and would not conflict with or obstruct any state or local plan for renewable energy or energy efficiency. This impact would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Maintenance and monitoring activities would consume minor amounts of electricity and fuel over a short period of time. Therefore, maintenance and monitoring would have a negligible effect on local energy consumption and would not conflict with or obstruct any state or local plan for renewable energy or energy efficiency. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. This impact would be less than significant.

Significance Conclusion Summary

The Proposed Project's impact from non-flow measures would be **less than significant** because it would not conflict with any state or local plan for renewable energy or energy efficiency. There would be **no impact** from proposed flow measures.

Mitigation

No mitigation measures would be required for Impact GHG-4.

3.13.4.5 Greenhouse Gas Emissions and Energy Impacts Summary

Table 3.13-3 summarizes the GHG emissions and energy impacts of the Proposed Project.

Table 3.13-3. Greenhouse Gas Emissions and Energy Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
GHG-1	Flow Measures	NI	N/A	NI	N/A
GHG-1	Non-flow Measures	LTS	N/A	LTS	N/A
GHG-2	Flow Measures	NI	N/A	NI	N/A
GHG-2	Non-flow Measures	NI	N/A	NI	N/A
GHG-3	Flow Measures	NI	N/A	NI	N/A
GHG-3	Non-flow Measures	LTS	N/A	LTS	N/A
GHG-4	Flow Measures	NI	N/A	NI	N/A
GHG-4	Non-flow Measures	LTS	N/A	LTS	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A = not applicable, NI = no impact

3.14 Noise

This section describes the noise levels in the study area and factors contributing to ground vibration. In addition, this section discusses the Proposed Project's impacts to noise and vibration in the study area. The study area used to assess the impacts of the Proposed Project to noise levels is consistent with the Project area described in Chapter 2, *Project Description*.

3.14.1 Environmental Setting

The environmental setting represents the existing conditions of noise in the study area. This setting is also referred to as the current (2020) baseline conditions, although some environmental setting information is based on older studies or data that are nevertheless representative of 2020 conditions. It forms the basis for comparison of Proposed Project impacts.

3.14.1.1 Acoustic Terminology

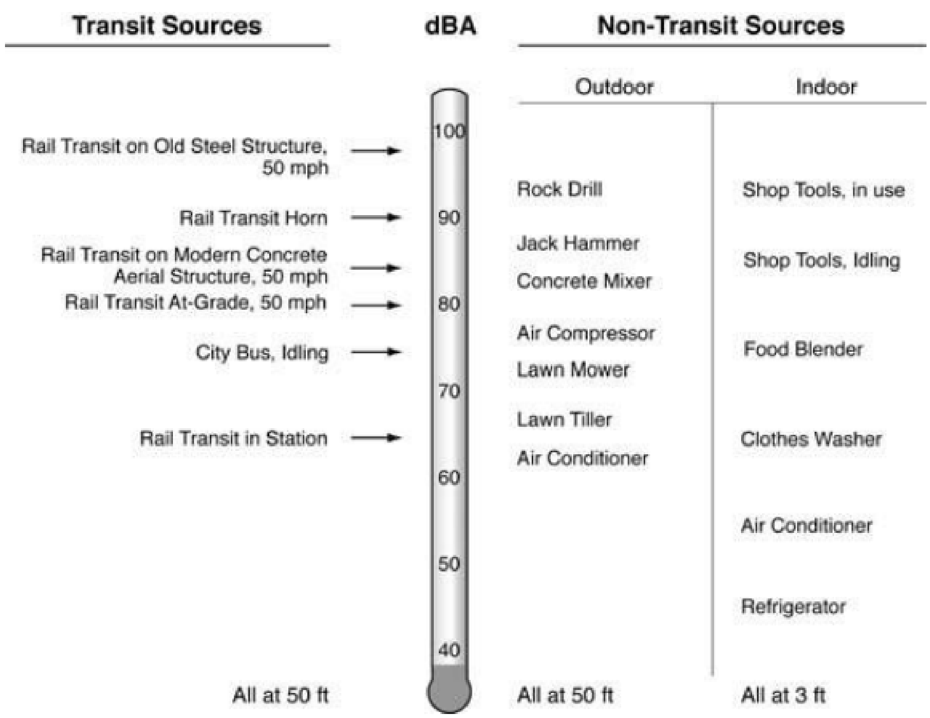
Noise levels are presented on a logarithmic scale to account for the large pressure response range of the human ear and are expressed in units of decibels (dB). A decibel is defined as the ratio between a measured value and a reference value usually corresponding to the lower threshold of human hearing defined as 20 micropascals. Because the human ear does not perceive every frequency with equal loudness, sounds are often adjusted with a weighting filter. The A-weighted filter is applied to compensate for the frequency response of the human auditory system, known as dBA. An inherent property of the logarithmic decibel scale is that the sound pressure levels of two separate sources are not directly additive. For example, if a sound of 50 dBA is added to another sound of 50 dBA in the proximity, the result is a 3-decibel increase (or 53 dBA), not an arithmetic doubling to 100 dBA.

With respect to how the human ear perceives changes in sound pressure level relative to changes in "loudness," scientific research demonstrates the following general relationships between sound level and human perception for two sound levels with the same or very similar frequency characteristics:

- One dBA is the practical limit of accuracy for sound measurement systems and corresponds to an approximate 10 percent variation in the sound pressure level. A 1 dBA increase or decrease is an imperceptible change in sound.
- A 3 dBA increase or decrease is a doubling (or halving) of acoustic pressure level, and it corresponds to the threshold of change in loudness perceptible in a laboratory environment. In practice, the average person is not able to distinguish a 3 dBA difference in environmental sound outdoors.
- A 5 dBA increase or decrease is described as a perceptible change in sound level and is a discernible change in an outdoor environment.
- A 10 dBA increase or decrease is a tenfold increase or decrease in acoustic pressure level but is perceived as a doubling or halving in loudness (that is, the average person will judge a 10 dBA change in sound level to be twice or half as loud).

Figure 3.14-1 presents estimations of the relative loudness of common noise sources.

Figure 3.14-1. Relative Loudness



Source: Federal Transit Administration (FTA) (2018)

Noise levels can be measured, modeled, and presented in various formats. The noise metrics that were used in this analysis have the following definitions:

- **L_{eq}:** Conventionally expressed in dBA, the L_{eq} is the energy-averaged, A-weighted sound level over a specified period. It is defined as the steady, continuous sound level over a specified period that has the same acoustic energy as the actual varying sound levels over the specified period. It is a mean average sound level.
- **L_{max}:** The L_{max} is the maximum A-weighted sound level as determined during a specified measurement period. It can also be described as the maximum instantaneous sound pressure level generated by a piece of equipment or during a construction activity.
- **L_{dn}:** The L_{dn} is the average hourly A-weighted L_{eq} for a 24-hour period with a 10 dB penalty added to sound levels occurring during the evening hours (7 p.m. to 10 p.m.) to account for people's increased sensitivity to noise levels during nighttime hours.
- **CNEL:** The community noise equivalent level is another average A-weighted L_{eq} sound level measured over a 24-hour period; however, this noise scale is adjusted to account for some people's increased sensitivity to noise levels during the evening and nighttime hours. A CNEL noise measurement is obtained after adding 5 dB to sound levels occurring during evening hours (7 p.m. to 10 p.m.) and 10 dB to noise levels occurring during nighttime hours (10 p.m. to 7 a.m.).

3.14.1.2 Vibration Terminology

Activities such as pile driving and operation of heavy equipment may cause ground-borne vibration while constructing the Proposed Project's non-flow measures. Vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration (FTA 2018). Velocity or acceleration is typically used to describe vibration. Two descriptors are frequently used when discussing quantification of vibration, the peak particle velocity (PPV) and the root mean square (RMS):

- **PPV:** The maximum instantaneous positive or negative peak of the vibration signal (FTA 2018). The potential for damage to buildings as a result of construction-related vibration is evaluated using PPV.
- **RMS:** The square root of the average of the squared amplitude of the vibration signal, typically calculated over a 1-second period (FTA 2018). The potential to annoy humans as a result of construction-related vibration is evaluated using RMS.

3.14.1.3 Noise Sensitive Land Uses

Certain land uses are considered more sensitive to noise than others. Examples of these types of land uses include residential areas, educational facilities, hospitals, childcare facilities, and senior housing. The study area is located in rural and suburban areas. Sensitive receptors (recreational areas and homes) are located within the vicinity of the study area, as shown on Figure 3.12-1. The sensitive land uses located within the vicinity of the fish barrier-remediation locations include single-family and multifamily residences, day care centers, and open space.

3.14.2 Regulatory Setting

This section summarizes the federal and state laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to noise.

3.14.2.1 Federal

Occupational Safety and Health Administration

The Occupational Safety and Health Administration established standards for occupational noise exposure under 29 CFR 1910.95. These regulations protect employees from excessive noise exposure and require a Hearing Conservation Program when routine exposure to high noise levels would occur. The regulations identify permissible daily noise exposures and stipulate that personal protection against the effects of noise exposure must be provided if those levels are exceeded.

Vibration Guidelines

Because the County has no established vibration regulations, the criteria in FTA's *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) were used for the Proposed Project.

Vibration Annoyance

Ground-borne noise is the vibration of floors and walls that may cause rattling of items such as windows or dishes on shelves, or a rumbling noise. The rumbling is created by the motion of the room surfaces, which act like a giant loudspeaker. FTA provides criteria for acceptable levels of ground-borne vibration based on the relative perception of a vibration event for vibration-sensitive land uses (Table 3.14-1).

Vibration-related Structural Damage

The level at which ground-borne vibration is strong enough to cause structural damage has not been determined conclusively. The most conservative estimates are reflected in the FTA standards, shown in Table 3.14-2. Vibration-related problems generally occur because of resonances in the structural components of a building. The maximum vibration amplitudes of the floors and walls of a building will often be at the resonance frequencies of various components of the building. That is, structures amplify ground-borne vibration. Wood-frame buildings, such as typical residential structures, are more easily excited by ground-borne vibration than heavier buildings.

Table 3.14-1. FTA Ground-borne Vibration and Noise Impact Criteria – Human Annoyance

Land Use Category	Maximum Level (VdB)[a]	Description
Workshop	90	Distinctly felt vibration. Appropriate to workshops and non-sensitive areas.
Office	84	Felt vibration. Appropriate to offices and non-sensitive areas.
Residential – daytime	78	Barely felt vibration. Adequate for computer equipment.
Residential – nighttime	72	Vibration not felt, but ground-borne noise may be audible inside quiet rooms.

Source: FTA (2018)
[a] as measured in 1/3-octave bands of frequency over the frequency ranges of 8 to 80 Hertz

Table 3.14-2. FTA Ground-borne Vibration and Noise Impact Criteria – Structural Damage

Building Category	PPV (in/sec)[a]	VdB
I. Reinforced concrete, steel, or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Nonengineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Source: FTA (2018)
[a] RMS velocity calculated from vibration level (VdB) using the reference of 1 microinch/second.

3.14.2.2 State

California Noise Regulations

California noise regulations (24 California Code of Regulations Part 2) establish an interior noise standard of 45 CNEL or 45 dBA for residences, schools, and other sensitive receptors. The regulations require that acoustical studies be prepared whenever a residential building or structure is proposed to be located near an existing or adopted freeway route, expressway, parkway, major street, thoroughfare, rail line, rapid transit line, or industrial noise source, where this source creates an exterior CNEL of 60 dBA or greater. The acoustical analysis must demonstrate that the residence has been designed to limit interior noise CNEL to 45 dBA.

Noise Compatibility Guidelines

The Noise Element Guidelines (Appendix D) of the Governor's Office of Planning and Research's *General Plan 2017 Guidelines* provides a basis for local programs to control and abate environmental noise and to protect residents from excessive exposure (Governor's Office of Planning and

Research 2017). These guidelines include a noise level/land use compatibility chart that categorizes various outdoor L_{dn} ranges into up to four compatibility categories (normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable), depending on land use.

These normally and conditionally acceptable L_{dn} ranges are intended to indicate that local conditions (existing noise levels and community attitudes toward dominant noise sources) should be considered in evaluating land use compatibility at specific locations. These guidelines are used by many agencies, environmental planners, and acoustical specialists as a starting point to evaluate the potential for noise impacts on and by a project. The guidelines are also used to evaluate methods for achieving noise compatibility with respect to nearby existing uses. Table 3.14-3 summarizes these guidelines for the normally and conditionally acceptable L_{dn} exposures.

Table 3.14-3. California Noise Guidelines

Land Use Category	Community Noise Exposure (Ldn or CNEL, dBA): Normally Acceptable	Community Noise Exposure (Ldn or CNEL, dBA): Conditionally Acceptable
Residential – low density	50–60	60–70
Residential – high density	50–65	65–70
Transient lodging – motels, hotels	50–65	65–70
Schools, libraries, churches, hospitals, nursing homes	50–60	60–65
Auditoriums, concert halls, amphitheaters	NA	50–70
Sports arenas, outdoor spectator sports	NA	50–75
Playgrounds, neighborhood parks	50–67.5	NA
Golf courses, riding stables, water recreation, cemeteries	50–70	NA
Office buildings, business commercial and professional	50–67.5	67.5–77.5
Industrial, manufacturing, utilities, agriculture	50–70	70–80

Source: Governor's Office of Planning and Research (2017)

3.14.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies those relevant to noise.

Local Plans and Ordinances in General

Santa Clara County and each of the Cities in the County have established policies and guidelines that aim to minimize the effects of noise on people through prescriptive construction standards, zoning restrictions, hours of operation, and suppression techniques. Noise-level goals are defined that are assumed to be compatible with various land use types within each jurisdiction. However, all jurisdictions recognize that higher-than-standard noise levels will be generated from time to time by heavy equipment engaged in construction or maintenance activities. Because heavy equipment noise is an unavoidable necessity, particularly for public works projects, jurisdictions typically include wording in noise ordinances and elements exempting these short-term, temporary, higher noise levels from compliance with the overall standards for land uses. Table 3.14-4 summarizes the noise standards and policies established by the County and incorporated Cities in the study area.

Table 3.14-4. General Plan and Noise Ordinance Specifications

Jurisdiction	Noise Criteria
Santa Clara County	Operation of tools or construction equipment on weekdays and Saturdays is not allowed between 7 p.m. and 7 a.m. No operation is allowed on Sundays or holidays except for emergency work. Mobile equipment must not result in a noise level in excess of 75 dBA for single- or two-family residential, 80 dBA for multifamily residential, or 85 dBA for commercial areas. Operating or permitting the operation of any device that creates a vibrating or quivering effect that endangers or injures the safety or health of human beings or animals, annoys or disturbs a person of normal sensitivities, or endangers or injures personal or real properties is prohibited.
City of Mountain View	Construction activities are limited to 7 a.m. to 6 p.m. on weekdays. No work is permitted on weekends or holidays without prior approval.
City of Sunnyvale	Construction activities are permitted only between 7 a.m. and 6 p.m. on weekdays and between 8 a.m. and 5 p.m. on Saturdays. Construction is not permitted on Sundays or national holidays.
City of Cupertino	Construction activities are limited to daytime hours (7 a.m. to 8 p.m. Monday through Friday, and 9 a.m. and 6 p.m. Saturdays and Sundays). High-quality noise muffler and abatement devices must be installed and in good condition on all construction equipment, and no single device may produce a noise in excess of 87 dBA at a distance of 25 feet *or* noise levels at nearby properties must not exceed 80 dBA. However, special exemptions may be granted by the noise control officer, which would include notification to nearby properties.
Town of Los Gatos	Construction activities are limited to 8 a.m. to 6 p.m. on weekdays and 9 a.m. to 4 p.m. on Saturdays. Construction is prohibited outside those hours and on Sundays and legal holidays. No single device may produce a noise in excess of 85 dBA at a distance of 25 feet, and the noise levels at nearby properties must not exceed 85 dBA. Use of powered equipment is not time-limited in commercial, industrial, or public spaces.
City of Campbell	Powered equipment is limited to the hours of 8 a.m. and 7 p.m. Monday through Friday and between the hours of 9 a.m. and 4 p.m. Saturday. There shall be no construction on Sundays or national holidays. However, noise from public works and maintenance construction projects may be exempted by the city manager.
City of San José	Construction occurring within 500 feet of a residential unit is limited to the hours of 7 a.m. to 7 p.m. on weekdays and is prohibited at any time on weekends. However, these time restrictions are limited only to construction activities requiring a permit from the City.
City of Santa Clara	Construction occurring within 300 feet of a residential area is generally limited to the hours of 7 a.m. to 6 p.m. on weekdays and 9 a.m. to 6 p.m. on Saturdays. Construction is not permitted on Sundays or holidays.

Jurisdiction	Noise Criteria
City of Los Altos	Construction activities within single-family zoning districts are prohibited before 7 a.m. and after 5:30 p.m. on weekdays, before 9 a.m. or after 3 p.m. on Saturdays, and any time on Sundays or City-observed holidays. Construction activities within all other zoning districts are prohibited before 7 a.m. and after 7 p.m. on weekdays, before 9 a.m. or after 6 p.m. on Saturdays, and any time on Sundays or City-observed holidays.

Sources: Santa Clara County (2018b), City of Mountain View (2021), City of Sunnyvale (2021), City of Cupertino (2021), Town of Los Gatos (2021), City of Campbell (2020), City of San José (2021a), City of Santa Clara (2021), City of Los Altos (2021)

3.14.3 Methodology

3.14.3.1 Flow Measures Impact Analysis Methodology

Implementation of the flow measures would not include activities that could cause noise and vibration. Because such activities are not proposed as part of the flow measures, effects on noise and vibration levels would be no impact or less than significant and are not further evaluated.

3.14.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure as introduced in Section 3.1.4.2 was considered in this analysis as it pertains to noise.

Fish Passage Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation could affect noise and vibration. The primary adverse impacts to noise and vibration of the Proposed Project would be a result of the heavy equipment and haul truck trips.

Spawning and Rearing Habitat Improvements

Instream habitat improvement projects that could affect noise and vibration include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bankfull channel. Six representative gravel or LWD augmentation project sites have been identified, as noted on Table 2.4-5, on which to base this programmatic analysis. The primary adverse impacts to noise and vibration of the Proposed Project would be a result of the heavy equipment and haul truck trips.

Watershed-specific Improvements

Stevens Creek Watershed-specific Improvements: Portable Multiport Outlet

Construction of a portable multiport outlet would allow for cooler water flow releases during the summer from Stevens Creek Reservoir while meeting instream water temperature objectives and improve cold-water pool management in the reservoir. The primary adverse impacts to noise and vibration of the Proposed Project would be a result of the heavy equipment and haul truck trips

Guadalupe River Watershed-specific Improvements: Geomorphic Function Enhancement Pilot Projects

Measures to enhance geomorphic function would involve construction-related ground disturbance, such as the removal of culverts and structures, and installation activities. The primary adverse impact to noise and vibration of the Proposed Project would be a result of the heavy equipment and haul truck trips.

3.14.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed flow measures. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed non-flow measures. Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Monitoring does not include activities that could affect noise and vibration, aside from occasional vehicle travel. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. During maintenance, the primary adverse impact to noise and vibration would be a result of heavy equipment and haul truck trips. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.14.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant noise impact if it would:

- **NOISE-1:** Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels
- **NOISE-2:** Cause excessive ground-borne vibration or ground-borne noise levels

3.14.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs to avoid and minimize undesired adverse effects on the environment that could result from Proposed Project measures. Valley Water BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and applicable VHP conditions are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions.

BMPs relevant to this analysis of noise levels (along with a brief discussion of their effects on Project activities) include the following:

- **GEN-38:** Minimize Noise Disturbances to Residential Areas – Would minimize disturbances to residential areas surrounding work sites.

3.14.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the noise and vibration impacts of Proposed Project measures that would occur during implementation. This section evaluates the effects of Proposed Project measures on noise and vibration levels, as compared to current baseline conditions.

3.14.4.1 Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies, or cause a substantial incremental increase in noise levels (significant and unavoidable)[26]

Flow Measures Impact Analysis

Flow measures would not require construction, ground disturbance, installations, vegetation removal, or other activities likely to generate noise. As a result, flow measures would not cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. There would be no impact from proposed flow measures under Impact NOISE-1.

Non-flow Measures Impact Analysis

Construction noise, although temporary, could affect nearby sensitive receptors, such as residences closest to the Project site. Project-related construction would require the use of heavy equipment that could be periodically audible at offsite locations. Received noise levels would fluctuate depending on the construction activity, equipment type, and distance between noise source and receiver. Additionally, noise from construction equipment would vary depending on the construction phase and the number and type of equipment at a location at any given time. The exact project footprint, required equipment, and timing of the construction activities for each non-flow measure would be determined at the time specific projects are proposed. Therefore, noise impacts were assessed using the types of equipment typically required to complete the following activities:

- construction and removal of temporary cofferdams
- installation and/or removal of culverts
- stockpiling of materials
- installation of riprap
- channel enhancements
- barrier removal to eliminate remaining major passage barriers in Stevens Creek and Guadalupe River watersheds

Construction equipment noise levels are usually measured 50 feet from the source, and some typical noise levels are listed in Table 3.14-5. Construction equipment noise levels decrease by about 6 dBA per doubling of distance from the source because of geometric divergence (that is, the spreading of noise from a source) alone, provided there is a clear line of sight to the equipment. For example, the noise level of a bulldozer creating 80 dBA at 50 feet would be 74 dBA at 100 feet and 68 dBA at 200 feet.

Table 3.14-5. Typical Construction Equipment Noise (dBA)

Types of Equipment	Typical Noise Levels at 50 Feet
Dozer	85
Forklift	85
Loader	85
Bucket truck	84

[26] Impact conclusion provided after consideration of mitigation.

Types of Equipment	Typical Noise Levels at 50 Feet
Dump truck	84
Crane, mobile	83
Air compressor	81
Drill	81
Excavator	81
Portable generator	81
Backhoe	80
Pick-up truck	75
Flat-bed trailer	74

Source: Federal Highway Administration (2006)

As shown above in Table 3.14-5, typical construction equipment would generate noise levels of up to 85 dBA at a distance of 50 feet. Sensitive land uses are located within 100 feet of the barrier remediation and CWMZ sites. At this distance, the sensitive land uses would be exposed to noise levels of up to 79 dBA L_{max}. Although construction activities are exempted from the standards in most of the jurisdictions in the study area (Table 3.14-4), the Cities of Cupertino and Los Gatos and the County have established specific noise thresholds for construction and maintenance activities.

Compliance with the local noise ordinances and implementation of BMP GEN-38 would reduce construction noise impacts by restricting construction activity and maintaining daytime-only construction periods. However, as discussed above, the construction activities would exceed the daytime noise limits within certain jurisdictions. Therefore, it may not be technically and economically feasible to achieve compliance with exterior noise standards for construction of each non-flow measure, so this impact would be significant.

As noted in the Project's *Initial Study* (Appendix F), traffic noise associated with construction of the Project would not be a significant source of noise. Traffic noise is not greatly influenced by lower levels of traffic, such as those associated with Project construction. For example, traffic levels would need to double for traffic noise on adjacent roads to increase by 3 dBA. The Project's construction traffic on adjacent roads would increase hourly traffic volumes by much less than a factor of 2; therefore, the increase in construction-related traffic noise would be less than 3 dBA and would not be significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect noise conditions. The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. Monitoring could involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility.

Monitoring would require vehicle travel but would not generate substantial temporary or permanent increases in ambient noise levels in the vicinity of the Project.

Maintenance of non-flow measures in the two watersheds would involve equipment similar to that required for Project construction. Although construction activities are exempted from the standards in most of the jurisdictions in the study area (Table 3.14-4), the Cities of Cupertino and Los Gatos and the County have established specific noise thresholds for construction and maintenance activities.

Adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed for the existing Phase 1 measures.

Restricting non-flow measure maintenance and adaptive management activities, and maintaining daytime-only periods, would reduce the maintenance activity noise. However, it may not be technically and economically feasible to achieve compliance with exterior noise standards for maintenance of each non-flow measure, so this impact could be significant.

Significance Conclusion Summary

Because noise generation would exceed local noise standards, the noise from the construction and maintenance activities would be **significant**.

Mitigation

To reduce the impacts of Impact NOISE-1, Valley Water would implement MM NOISE-1, as described below.

Mitigation Measure NOISE-1: Implement Construction Noise Mitigation Measures

Valley Water will implement the following measures to reduce potential construction and maintenance noise impacts to nearby sensitive receptors:

- During all site excavation and grading, the Project contractors will equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The Project contractor will place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- During all Project construction, the construction contractor will locate equipment staging in areas that would create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site.
- The Project contractors will prohibit all unnecessary idling of internal combustion engines.

Significance after Mitigation

Implementation of MM NOISE-1 would reduce the construction and maintenance noise impacts to the extent feasible. However, because this EIR evaluates impacts at the programmatic level, all project circumstances are not foreseeable, and, therefore, even with implementation of MM NOISE-1, noise levels may exceed the local noise standards or otherwise be substantial, Impact NOISE-1 remains **significant and unavoidable**.

3.14.4.2 Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels (less than significant)

Flow Measures Impact Analysis

Flow measures would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to generate ground-borne vibration or noise. As a result, flow measures would not cause excessive ground-borne vibration or ground-borne noise levels and would result in no impact under Impact NOISE-2.

Non-flow Measures Impact Analysis

The exact Project footprint, required equipment, and timing of the non-flow measure construction activities are currently unknown. Therefore, the vibration impacts were assessed using the types of equipment typically required to complete the construction activities.

Ground-borne vibration would occur when heavy equipment travels over unpaved surfaces or when it is moving soil. The effects of ground-borne vibration include discernable movement of building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. Vibration-related problems are specific to resonances in the structural components of a building because structures amplify ground-borne vibration.

Table 3.14-6 lists the vibration source amplitudes for construction equipment. As sonic pile driving may be required for the construction of temporary cofferdams, the highest reference PPV for the Proposed Project would be 0.170 inch per second (in/sec).

Table 3.14-6. Vibration Source Amplitudes for Construction Equipment

Equipment	PPV at 25 feet (in/sec)	Approximate Level at 25 feet (VdB)
Pile driver (impact) – upper range	1.518	112
Pile driver (impact) – typical	0.644	104
Pile driver (sonic) – upper range	0.734	105
Pile driver (sonic) – typical	0.170	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall) – in soil	0.008	66
Hydromill (slurry wall) – in rock	0.017	75
Vibratory roller	0.210	94
Hoe ram	0.089	87
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: FTA, *Transit Noise and Vibration Impact Assessment Manual*, September 2018, Table 7-4
Note: RMS velocity in decibels (VdB) re 1 micro-inch/second

Because the cofferdams would be constructed within waterways, the closest off-site structures would be located at least 100 feet from Proposed Project construction sites. The FTA vibration guidance provides the following equation to calculate PPV at sensitive receptors:

$$PPV_{equipment} = PPV_{Ref}\ (25/D)^n\ \text{(in/sec)}$$

Where:

PPV_{Ref} = reference PPV at 25 feet

D = distance from equipment to the receiver in feet

n = 1.5, a value related to the vibration attenuation rate through ground

Using this formula, distance attenuation would reduce the construction vibration levels from the Proposed Project to 0.02 in/sec. This level is much lower than the 0.12 in/sec threshold listed in Table 3.14-2 for buildings extremely susceptible to vibration damage.

For consideration of annoyance or interference with vibration-sensitive activities, the vibration level at any distance is calculated using the following formula:

$$L_v(D) = L_v(25\ \text{ft}) - 30\log(D/25)$$

Where:

$L_v(D)$ = vibration level at distance D

D = distance from equipment to the receiver in feet

$L_v(25\ \text{ft})$ = reference vibration level at 25 feet from source

Using this formula, at 100 feet, the vibration pile-driving vibration level would be reduced from 93 to 75 VdB. This level is less than FTA's daytime annoyance threshold of 78 VdB listed above in Table 3.14-1.

By limiting pile driving to daytime hours, compliance with the local noise ordinances and BMP GEN-38 would reduce the vibration impacts to a less-than-significant level.

Monitoring, Maintenance, and Adaptive Management

Monitoring would require vehicle travel but would not generate excessive ground-borne vibration or ground-borne noise levels. The equipment required for maintenance of non-flow measures in the Stevens Creek and Guadalupe River watersheds would generate lower vibration levels than those required for Project construction. Adaptive management would likely have impacts similar to those discussed for the existing Phase 1 measures. Restricting activities to daytime hours would help ensure the vibration levels would be less than significant.

Significance Conclusion Summary

Vibration impacts would not be excessive, and therefore would be **less than significant**.

Mitigation

No mitigation measures would be required for Impact NOISE-2.

3.14.4.3 Noise Impacts Summary

Table 3.14-7 summarizes the noise impacts of the Proposed Project.

Table 3.14-7. Noise Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
NOISE-1	Flow Measures	NI	N/A	NI	N/A
NOISE-1	Non-flow Measures	SI	NOISE-1	S/U	N/A
NOISE-2	Flow Measures	NI	N/A	NI	N/A
NOISE-2	Non-flow Measures	LTS	N/A	LTS	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A = not applicable, NI = no impact, SI = significant impact, S/U = significant and unavoidable

3.15 Utilities

This section describes solid waste generation and disposal in the study area. In addition, this section discusses the Proposed Project's impacts to solid waste generation and disposal in the study area. The study area used to assess the impacts of the Proposed Project to solid waste generation and disposal is defined as the Project area described in Chapter 2, *Project Description*.

Based on the preliminary analysis performed for the *Initial Study* (Appendix F), the Proposed Project would not require new wastewater or stormwater facilities, nor would it change existing facilities. The Project could, however, potentially affect water facilities, as determined by the *Initial Study*. Impacts to water facilities and other water-supply-related impacts are evaluated in Section 3.4, *Water Supply*.

3.15.1 Environmental Setting

The environmental setting represents the existing conditions of solid waste generation and disposal in the study area. This setting is also referred to as the current (2020) baseline conditions although some environmental setting information is based on older studies or data that are nevertheless representative of 2020 conditions. It forms the basis for comparison of Proposed Project impacts.

The County has prepared an *Integrated Waste Management Plan*, which was approved by the California Integrated Waste Management Board in 1995 (Santa Clara County 1995b). According to the 2004 *Five-Year California Integrated Waste Management Plan/Regional Agency Integrated Waste Management Plan (CIWMP/RAIWMP) Review Report*, the County is able to support the county's solid waste needs beyond 2022 (Santa Clara County 2004). There are four active permitted Class III landfills located in Santa Clara County, as listed in Table 3.15-1. The table also provides information regarding the maximum permitted throughput, maximum permitted capacity, remaining capacity, and estimated ceased operation date for each of these landfills.

Table 3.15-1. Permitted Solid Waste Facilities in Santa Clara County

Landfill	Maximum Permitted Throughput (tons per day)	Maximum Permitted Capacity (cubic yards)	Remaining Capacity (cubic yards) as of (date)	Estimated Ceased Operation Date
Newby Island Sanitary Landfill (43-AN-0003)	4,000	57,500,000	21,200,000 (10/31/2014)	01/01/2041
Kirby Canyon Recycling and Disposal Facility (43-AN-0008)	2,600	36,400,000	16,191,600 (7/31/2015)	12/31/2059
Guadalupe Sanitary Landfill (43-AN-0015)	1,300	28,600,000	11,055,000 (1/1/2011)	01/01/2048
Zanker Material Processing Facility (43-AN-0001)	350	640,000	640,000 (8/22/2012)	11/01/2025

Sources: Cal Recycle (2019)

Based on the remaining capacities and estimated ceased operation dates provided above in Table 3.15-1, Newby Island Sanitary Landfill, Kirby Canyon Recycling and Disposal Facility, and

Guadalupe Sanitary Landfill would still have capacity to accept waste past 2035, while Zanker Material Processing Facility would not (Cal Recycle 2019).

3.15.2 Regulatory Setting

This section summarizes the federal, state, and county laws, regulations, policies, and plans pertinent to evaluation of the Proposed Project's impacts to solid waste.

3.15.2.1 Federal

Resource Conservation and Recovery Act of 1976

The Resource Conservation and Recovery Act was enacted in 1976 and amended the Solid Waste Disposal Act of 1965. The Act is a federal law that governs the proper management and disposal of hazardous and nonhazardous solid waste. The law describes the waste management program mandated by Congress and gave USEPA the authority to develop the Resource Conservation and Recovery Act program.

3.15.2.2 State

California Integrated Waste Management Act of 1989 (AB 939)

AB 939 established the former California Integrated Waste Management Board, now known as CalRecycle, to promote the reduction of waste whenever possible, to manage all materials to their highest and best use, and to protect public health and safety and the environment.

3.15.2.3 Regional and Local

Implementation of Proposed Project measures would comply with applicable local plans and ordinances as adopted in the Cities of Mountain View, Sunnyvale, Cupertino, Los Gatos, Campbell, San José, Santa Clara, and Los Altos, as well as Santa Clara County. This section specifies the other regional and local regulations relevant to utilities.

Santa Clara County Integrated Waste Management Plan

In 1995, the California Integrated Waste Management Board approved the Santa Clara County *Integrated Waste Management Plan*. The plan was established to reduce waste in the county, ensure that new disposal facilities are designed for effective and efficient operation, avoid environmental degradation and unnecessary expenditure, and ensure that the integrated waste management needs of the county are being met (Santa Clara County 1995b).

3.15.3 Methodology

The approach taken to evaluate impacts to solid waste in this analysis is:

- Assess qualitatively the types of impacts to solid waste facilities and the generation of solid waste that could occur as a result of the Proposed Project measures.
- Estimate the locations and potential magnitude of potential impacts based on the Proposed Project activities.
- Assess impacts of monitoring as described in Section 2.6, *Adaptive Management Program*, of this EIR.

3.15.3.1 Flow Measures Impact Analysis Methodology

Implementation of the flow measures would not involve ground disturbance, excavations, installations, or other activities that could generate solid waste. Because such activities are not proposed as part of the flow measures, there would be no impact to solid waste generation.

3.15.3.2 Non-flow Measures Impact Analysis Methodology

This section describes how each type of non-flow measure as introduced in Section 3.1.4.2 was considered in this analysis as it pertains to utilities.

Fish Passage Barrier Remediation

Impacts from fish passage barrier remediation were assessed based on the amount of solid waste and construction debris that would be generated during construction activities and continued maintenance, and whether local landfills would have the capacity to accommodate project-related waste. Activities evaluated based on their potential to generate waste during fish passage barrier remediation include pruning or removal of riparian vegetation to access the work area, disturbance to the bed and bank, concrete or asphalt demolition and removal, and installation of new concrete.

Spawning and Rearing Habitat Improvements

Improvement to spawning and rearing habitat would involve instream work, including stream dewatering, installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravel within the limits of the bankfull channel. These Project elements were assessed to determine whether solid waste generated from these Project activities would be in excess of solid waste regulations or capacities of local facilities. Six representative gravel or LWD augmentation project sites have been identified, as noted on Table 2.4-5, on which to base this programmatic analysis. The analysis also focuses on project activities that would generate solid waste at the six project sites and is considered at a programmatic level.

Watershed-specific Improvements

Stevens Creek Watershed-specific Improvements: Portable Multiport Outlet

Construction of a portable multiport outlet would allow for cooler water flow releases during the summer from Stevens Creek Reservoir while meeting instream water temperature objectives and improve cold-water pool management in the reservoir. These Project elements were assessed to determine whether solid waste generated from these Project activities would be in excess of solid waste regulations or capacities of local facilities.

Guadalupe River Watershed-specific Improvements: Geomorphic Function Enhancement Pilot Projects

The Guadalupe River watershed-specific improvements include proposed geomorphic function enhancement pilot projects. Channel enhancements could include the modification of channel dimensions for the purpose of carrying bankfull flow; varying the meander shape; planting riparian vegetation; removing culverts, riprap, and other structures; and stabilizing the area with the use of bioengineering techniques. Impacts of these activities were determined based on the extent to which these activities would result in the generation of solid waste.

3.15.3.3 Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation for the AMP on the proposed flow measures. The monitoring program indicators that could then trigger adaptive management actions would relate to the effects of seasonal flow regimes or pulse flows on fish habitat. These activities would not generate solid waste and are therefore not evaluated further in the utilities section.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for the proposed non-flow measures. Monitoring would involve such activities as pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. These activities would not generate solid waste. Maintenance would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility. The utilities analysis evaluates the extent that these activities would generate solid waste, and whether existing landfills have the capacity to accommodate waste from maintenance activities. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

3.15.3.4 Thresholds of Significance

For the purposes of this EIR, the Proposed Project would result in a significant impact to solid waste and disposal if it would:

- **UTIL-1:** Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure

3.15.3.5 Project Best Management Practices

As noted in Chapter 2, *Project Description*, during Project implementation, Valley Water would incorporate a range of BMPs to avoid and minimize undesired adverse effects on the environment that could result from Proposed Project. Valley Water BMPs applicable to the Proposed Project are included in detail in Appendix D, *District Best Management Practices*. BMPs and applicable VHP conditions are included in the Proposed Project description, and the impact analyses were conducted assuming application of these practices and conditions.

BMPs relevant to this analysis of utilities (along with a brief discussion of their effects on Project activities) include the following:

- General Maintenance Practices
  - **GEN-3:** Avoid Exposing Soils with High Mercury Levels – Would require treatment, remediation, and proper disposal of contaminated soils, as necessary.

3.15.4 Impact Analysis

Both the project-level and programmatic-level impact analyses in this section focus on the impacts of Proposed Project measures that would occur during implementation. This section evaluates the effects of Proposed Project measures on solid waste and disposal, as compared to current baseline conditions.

3.15.4.1 Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure (less than significant)

Flow Measures Impact Analysis

Flow measures and associated maintenance would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to generate solid waste. As a result, there would be no impact to solid waste from flow measures.

Non-flow Measures Impact Analysis

Project activities that could generate solid waste, construction debris, and/or green waste include removal of fish barriers, vegetation removal, installation of root wads and LWD, installation of rock or log weirs, removal of culverts, and installation of riprap or other structures.

Landfills serving the study area include Newby Island Sanitary Landfill, Kirby Canyon Recycling and Disposal Facility, Guadalupe Sanitary Landfill, and Zanker Material Processing Facility. These landfills have the capacity to receive the relatively small volumes of solid waste that would be generated by the Proposed Project. Furthermore, the Proposed Project would comply with federal, state, and local laws and regulations for solid and hazardous waste.

Ground-disturbing activities described above also have the potential to disturb soils with high mercury levels. See Section 3.5, *Water Quality* for a discussion of mercury and other pollutants in the Stevens Creek and Guadalupe River watersheds. Hazardous waste would be handled and disposed of in accordance with federal, state, and local regulations regulating the proper disposal of hazardous waste. Additionally, the Proposed Project would implement BMP GEN-3 (Avoid Exposing Soils with High Mercury Levels) which involves the treatment, remediation, and proper disposal of contaminated soil at a Class I landfill following established work practices and hazard control measures. With the implementation of BMP GEN-3, impacts to solid waste generation for non-flow measures would be less than significant.

Monitoring, Maintenance, and Adaptive Management

The Proposed Project would include monitoring and implementation of the AMP for the proposed Phase 1 flow measures. The monitoring program indicators could then trigger adaptive management actions that could affect hydrology.

The Proposed Project would also include monitoring, maintenance, and implementation of the AMP for proposed Phase 1 non-flow measures. The monitoring program indicators could then trigger subsequent maintenance or adaptive management actions that would relate to habitat qualities affected by Valley Water facilities and operations. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures.

Implementation of monitoring protocols would require pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. These activities would not result in the generation of solid waste. Maintenance activities and adaptive measures, however, would involve similar activities as laid out in the non-flow measure itself with additional riprap, restoration, or operational repair of a facility and would generate limited amounts of solid waste that could be supported by existing landfills. Impacts would be less than significant.

Significance Conclusion Summary

Impacts would be **less than significant** for non-flow measures because Project-generated solid waste would not exceed local landfill capacity, and because the Proposed Project would comply with federal, state, and local laws and regulations for solid waste.

Mitigation

No mitigation would be required for IMPACT UTIL-1.

3.15.4.2 Utilities Impacts Summary

Table 3.15-2 summarizes the utilities impacts of the Proposed Project as pertaining to solid waste and disposal.

Table 3.15-2. Utilities Impacts Summary

Impact	Flow/Non-flow Measures	Level of Significance before Mitigation	Applicable Mitigation Measures	Level of Significance with Mitigation Incorporated	Beneficial Impacts Included?
UTIL-1	Flow Measures	NI	N/A	NI	N/A
UTIL-1	Non-flow Measures	LTS	N/A	LTS	N/A

Notes: Both flow and non-flow measures conclusions include consideration of maintenance and monitoring.
LTS = less-than-significant impact, N/A = not applicable, NI = no impact

Chapter 4 – Alternatives

4 Alternatives

4.1 Introduction

Section 15126.6 of the CEQA Guidelines requires that an EIR “describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives.” Additionally, the CEQA Guidelines state the following:

- The specific alternative of “no project” shall also be evaluated along with its impact. If the environmentally superior alternative is the “no project” alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives [CEQA Guidelines Section 15126.6(e)(1)(2)].
- An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. An EIR is not required to consider alternatives that are infeasible. The range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. The EIR should briefly discuss the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency’s determination. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts [CEQA Guidelines Section 15126.6(a)(c)].
- The “range of alternatives” is governed by the “rule of reason,” which requires the EIR to describe and consider only those alternatives necessary to permit informed public participation, and an informed and reasoned choice by the decision-making body [CEQA Guidelines Section 15126.6(a) and (f)]. The description or evaluation of alternatives does not need to be exhaustive, and an EIR need not consider alternatives for which the effects cannot be reasonably determined and for which implementation is remote or speculative. An EIR need not describe or evaluate the environmental effects of alternatives in the same level of detail as the proposed project, but must include enough information to allow meaningful evaluation, analysis, and comparison with the proposed project [CEQA Guidelines Section 15126.6(d)].

Regarding the feasibility of alternatives, *feasible* means “capable of being accomplished in a reasonable period of time taking into account economic, environmental, legal, social and technological factors” (CEQA Guidelines Section 15364). The concept of feasibility also encompasses whether a particular alternative promotes the project’s underlying goals and objectives, and whether an alternative is impractical or undesirable from a policy standpoint. (See *City of Del Mar v. City of San Diego* [1982] 133 Cal. App. 3d 410 and *California Native Plant Society v. City of Santa Cruz* [2009] 177 Cal. App. 4th 957.)

Also, CEQA does not require EIRs to include multiple variations of the alternatives it considers in detail (*Village Laguna of Laguna Beach v. Board of Supervisors* [1982] 134 Cal. App. 3d 1022). Further, EIRs must discuss a reasonable range of alternatives to the project as a whole and are not required to consider alternatives to particular components of a project (*California Native Plant Society v. City of Santa Cruz* [2009] 177 Cal. App. 4th 957).

Chapter 4 – Alternatives

The following sections present the Proposed Project objectives; summarize the significant effects of the Proposed Project, including those that cannot be avoided or reduced to a less-than-significant level; and describe the methodologies used to develop alternatives and analyze their impacts. Later sections in this chapter describe the alternative measures that were considered but dismissed from further evaluation, and the alternatives that were evaluated in detail. The chapter then evaluates the impacts of each of the alternatives evaluated in detail relative to those of the Proposed Project and evaluates the relationship of the alternatives to the project objectives. An environmentally superior alternative is identified at the end of this chapter.

4.1.1 Project Objectives

The Project objectives are presented in Section 2.3, *Project Objectives*, and repeated here. The FAHCE Settlement Agreement management objectives (Settlement Agreement Section 6.2.2; see Appendix B) provided guidance to Valley Water for the framing of the Proposed Project objectives. As the underlying Project purpose, implementation of the FHRP measures is intended to:

> … restore and maintain healthy steelhead trout and salmon populations as appropriate in each of the Three Creeks by providing (A) suitable spawning and rearing habitat within each watershed, and (B) adequate passage for adult steelhead trout and salmon to reach suitable spawning and rearing habitat and for out-migration of juveniles.

"As appropriate" in the agreement means that Valley Water's implementation of restoration measures must be consistent with the purpose of the District Act, including providing sufficient water for all beneficial uses in the county.

The fundamental Project objectives are listed below and are intended to be implemented together in a balanced manner. Project objectives 1 and 3 are subject to Phase 1, 2, and 3 funding obligations and limitations specified in Settlement Agreement Article VIII, Appendices C and D. Objective 3 is fundamental to Valley Water and consistent with the District Act.

Objective 1: Restore and maintain a healthy steelhead population in the Stevens Creek watershed, by providing:

- Suitable spawning and rearing habitat below Stevens Creek Dam within a CWMZ determined on an annual basis through the development of an operations plan (Settlement Agreement Section 6.5.1.1).
- Adequate passage for adult steelhead to reach suitable spawning and rearing habitat and for outmigration of juveniles (Settlement Agreement Section 6.5.1.1).
- Extended distribution of suitable habitat in Phases 2 and 3, if needed, to satisfy overall management objectives as determined through the AMP (Settlement Agreement Section 6.5.1.2 and Section 6.5.1.3).

Objective 2: Restore and maintain healthy steelhead and Chinook salmon populations in the Guadalupe River watershed, by providing:

- Suitable spawning and rearing habitat for steelhead and Chinook salmon in Guadalupe Creek from below Guadalupe Dam to its confluence with the Guadalupe River (Settlement Agreement Section 6.6.1.1).
- Suitable spawning and rearing habitat for Chinook salmon below Calero and Almaden Dams to their confluence with Lake Almaden (Settlement Agreement Section 6.6.1.1).
- Suitable spawning and rearing habitat for Chinook salmon in Los Gatos Creek from Camden Avenue to its confluence with the Guadalupe River (Settlement Agreement Section 6.6.1.1).

- Adequate passage for adult steelhead and Chinook salmon to reach suitable spawning and rearing habitat and for outmigration of juveniles (Settlement Agreement Section 6.6.1.1).
- Extended distribution of suitable habitat in Phases 2 and 3, if needed, to satisfy overall management objectives as determined through the AMP (Settlement Agreement Section 6.6.1.2 and Section 6.6.1.3).

Objective 3: Maintain flexible and reliable groundwater recharge to support current and future water supply and water deliveries for municipalities, industries, agriculture, and the environment in a practical, cost-effective, and environmentally sensitive manner so that sufficient water is available for any present or future beneficial use, including, but not limited to, the acquisition, storage (including surface and underground storage), and distribution of water for irrigation, domestic, fire protection, land subsidence prevention, reduced reliance on Delta imported water supplies, municipal, commercial, industrial, and environmental purposes.

4.1.2 Significant Environmental Impacts of the Proposed Project

Table 4.1-1 summarizes those resource topic areas found to have significant impacts resulting from the Proposed Project as analyzed in Chapter 3, *Environmental Setting and Impact Analysis*.

Table 4.1-1. Significant Impacts from the Proposed Project

Resource Topic Area	Significant Impacts from Proposed Project	Mitigated to Less than Significant	Significant and Unavoidable Impact
Terrestrial Biological Resources	See below	See below	See below
Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modifications, on an identified candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USACE	Yes	Yes	No
Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS	Yes	Yes	No
Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means	Yes	Yes	No
Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance	Yes	Yes	No
Cultural Resources	See below	See below	See below
Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built-Environment Resources	Yes	No	Yes

Resource Topic Area	Significant Impacts from Proposed Project	Mitigated to Less than Significant	Significant and Unavoidable Impact
Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources	Yes	No	Yes
Tribal Cultural Resources	See below	See below	See below
Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant	Yes	No	Yes
Geology and Soils	See below	See below	See below
Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site	Yes	Yes	No
Noise	See below	See below	See below
Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels	Yes	No	Yes

As noted in Table 4.1-1 and described in detail in Chapter 3, *Environmental Setting and Impact Analysis*, significant impacts were identified resulting from the Proposed Project on the following environmental resources: water quality, terrestrial biological resources, cultural resources, tribal cultural resources, geology and soils, and noise. Some of the significant impacts could be reduced to a less-than-significant level by applying the mitigation described in Chapter 3. However, as shown in Table 4.1-1, impacts could not be mitigated to less than significant for all or some thresholds of water quality, cultural resources, tribal cultural resources, and noise. Therefore, the Proposed Project would result in significant and unavoidable impacts on those resources.

4.2 Alternatives and Measures Considered and Eliminated from Detailed Consideration

The following sections describe the alternatives development and screening processes used by Valley Water, then describe the flow and non-flow measures that were identified in the alternatives development process but, based on preliminary analysis, were eliminated from detailed consideration in this EIR.

4.2.1 Alternatives Development and Screening

Following determination of the Proposed Project, which was originally largely documented in the 2003 Settlement Agreement (see Chapter 1, *Introduction*), an alternatives development process was initiated by Valley Water. In addition to the No Project Alternative required by CEQA, Valley Water considered alternatives to the Proposed Project and individual measures based on input from the Initialing Parties, the FAHCE TWG, and public scoping comments. This input included alternative measures that, either alone or grouped with other measures to form a complete alternative to the Proposed Project, could feasibly meet the Project objectives and avoid or substantially lessen one or more of the adverse environmental impacts identified in the analysis of the Proposed Project. The process for identifying alternatives included:

1. Reviewing ideas and alternative measures suggested during EIR scoping and from input from the Initialing Parties and FAHCE TWG.
2. Determining whether identified strategies and alternative concepts meet Project objectives or could reduce impacts.
3. Reviewing feasibility issues with respect to technical, institutional, and regulatory concerns. If an identified strategy or alternative concept was determined to be infeasible, it was eliminated from further consideration.
4. Developing and refining alternatives for detailed CEQA analysis in Section 4.3, *Alternatives Evaluated in the Draft EIR*.

Those alternative measures or projects that were considered and eliminated from further consideration are discussed in Sections 4.2.2 through 4.2.3 below. Elimination of alternative measures or projects resulted from one of the following conditions:

- The alternative failed to meet most of the basic Project objectives;
- The alternative would be infeasible to implement or operate;
- The alternative would not avoid or lessen significant environmental impacts; or
- The alternative was limited to specific components of the Proposed Project and did not provide an alternative to the Proposed Project as a whole.

Those alternatives carried forward for detailed evaluation are described in Section 4.3, *Alternatives Evaluated in the Draft EIR*.

4.2.2 Alternative Measures Submitted during EIR Scoping

Participants in the scoping process presented alternative suggestions for Project measures. Table 4.2-1 summarizes the alternative concepts raised during the public scoping process and provides the reason for their elimination from detailed consideration or, as appropriate, states how they were integrated into other alternatives. In some cases, proposed non-flow-measure alternatives were considered but were not included in the Proposed Project for the first phase of implementation; however, they have been incorporated into potential measures for adaptive management, generally because more monitoring or studies are required to assess whether they could be feasibly implemented or meet Project objectives. Table 4.2-1 notes where individual measures have been retained as potential adaptive management measures pending further evaluation.

Table 4.2-1. Measures Proposed during Scoping

Proposed Alternative Measure	Disposition
Flow Measure Alternatives	
Remove the Permanente-Stevens diversion channel.	Infeasible; alternative to a single component, not Proposed Project as whole.
Assess set of alternative rule curves developed by GCRCD, NMFS, and CDFW ("Scenario 4").	Does not meet Project objectives or provide substantial fisheries benefits compared to Proposed Project; full discussion of eliminated alternative in Section 4.2.3.
Compare "cold-water flow" versus the "extended flow length" strategy for managing water.	Incorporated into FAHCE-plus Alternative described in Section 4.3.3.
Evaluate alternative management practices that might enhance temperature refugia for steelhead in the Guadalupe River.	To be considered during adaptive management; measure is also alternative to single component, not Proposed Project as whole.
Releases for summer/fall rearing should optimize balance between providing a fast-water feeding habitat and control of water temperature through mid-September, when reservoirs destratify.	Part of the Proposed Project; temperature stratification in the reservoir was considered as part of rule curves development.
Non-flow Measure Alternatives	
Consider Upper Permanente Creek as a potential location for steelhead habitat.	Range expansions at multiple creeks to be considered during adaptive management; measure is also alternative to a single component, not the Proposed Project as whole.
Consider alternative strategies for preserving steelhead during drought in the recovery period, including rescue and relocation of fish.	To be considered during adaptive management; measure is also alternative to a single component, not the Proposed Project as whole.
Include an alternative that analyzes fish ladders or equivalent fish passage measures and needed temperature mitigations for all in-stream diversions.	Fish passage improvements (such as fish ladders) are part of the non-flow measures being evaluated in accordance with the Settlement Agreement. Temperature mitigation is contemplated in the proposed and alternative flow-based rule curves.
In Stevens Creek, actions should be taken, including potential dredging near the outlet, to reduce turbidity of reservoir releases.	A multiport outlet is part of the Proposed Project, which would reduce turbidity at outlet.

4.2.3 Scenario 4 Alternative Reservoir Re-operation Rules

As noted in Table 4.2-1, one set of alternative rule curves (also referred to as Scenario 4) was developed by members of the TWG but was eliminated prior to detailed consideration in this EIR. Members of the TWG developed alternative reservoir re-operation rules for Stevens, Guadalupe, Alamitos, and Calero Creeks. The alternative rule sets were intended to increase passage opportunities for migrating adult steelhead and Chinook salmon based on the historical frequency of suitable storm events while also providing for sufficient reservoir releases throughout the year to provide passage and habitat for other fish lifestages.

The Scenario 4 rule sets:

- Identified target numbers of adult passage events by WY type for each creek;
- Attempted to provide the calculated frequency of adult passage events for steelhead and Chinook salmon in each year of the simulation period; and
- Triggered an adult passage flow event when storage was anticipated to be sufficient to provide the adult passage flow event and a percentage of the specified lifestage-specific flows for the remainder of the year.

The Scenario 4 rule sets were modeled using the WEAP Model platform (described in Section 3.1, *Introduction*) to simulate daily reservoir storage, flow, water temperature, and fisheries habitat and passage metrics over the entire simulation period. Although Scenario 4 provided improved fisheries conditions for some lifestages in some creeks, Valley Water's modeling team conducted analysis of Scenario 4, and it was eliminated for the following reasons:

- This scenario appears to provide little to no habitat during portions of some years, thereby increasing the risk of catastrophic impact to *O. mykiss* populations.
- This scenario appears to run reservoirs to dead pool or emergency levels, particularly during consecutive dry years, thereby failing to address the water supply objective in dry years.
- This scenario appears to increase risk to steelhead extinction (that is, failing at another Project objective).
- This scenario results in less suitable fisheries conditions for some lifestages in some creeks.
- This scenario appears to require Valley Water to determine each WY type during the fall or early winter of each WY. However, the WY types are not known until late winter or early spring of that WY.

Although Scenario 4 was not carried forward for detailed evaluation in this EIR, evaluation of modeling results for Scenario 4 and the Proposed Project facilitated the creation of a new alternative, the FAHCE-plus Alternative, which was developed to improve on concepts included in the Proposed Project and Scenario 4 and, therefore, was carried forward for detailed review in this EIR. The FAHCE-plus Alternative is introduced in Section 4.3.3.

4.3 Alternatives Evaluated in the Draft EIR

In addition to the Proposed Project analyzed in Chapter 3, *Environmental Setting and Impact Analysis*, the No Project Alternative and two action alternatives were carried forward for detailed analysis. Each of these alternatives is introduced below; Table 4.3-1 summarizes the elements in the Proposed Project and alternatives for comparison.

Table 4.3-1. General Summary of Elements Included in Proposed Project and Alternatives

Project or Alternative	FAHCE Non-flow Measures	Water Rights Petitions Granted	Operations Rule Curves: FAHCE	Operations Rule Curves: FAHCE-plus
Proposed Project	Yes	Yes	Yes	No
No Project Alternative	No	No	No	No
Non-flow Measures Only Alternative	Yes	No	No	No
FAHCE-plus Alternative	Yes	Yes	No	Yes

4.3.1 No Project Alternative

Under the No Project Alternative, the Proposed Project (FAHCE) would not proceed, and existing environmental conditions and Valley Water operations would be maintained.

Under the No Project Alternative, assumptions include the following:

- The completion of safety upgrades at Almaden, Calero, and Guadalupe Reservoirs would occur as separate Valley Water projects (that is, not as part of the Proposed Project).
- There would be no changes to drainage patterns or runoff during high-flow events other than what would otherwise have occurred under the current baseline conditions.
- The stream habitat restoration measures included in this Project would not be implemented.
- The average monthly water supply delivery would remain similar. Accordingly, reductions or increases in service area deliveries would not occur other than what would otherwise have occurred without the Proposed Project.
- Water demand would increase by 2035 as projected in Valley Water's UWMP.
- Water rights petitions for change would not be granted.

The No Project Alternative would not meet the first two Proposed Project objectives (Section 4.1.1) that were developed during FAHCE collaboration and are focused on restoration of fisheries habitat. The No Project Alternative was retained because it is required by CEQA. This alternative also informs the decision makers and public of the impacts of the No Project Alternative compared to impacts of the Proposed Project and action alternatives. It should be noted, however, that by definition, no mitigation is proposed to reduce impacts under the No Project Alternative.

4.3.2 Non-flow Measures Only Alternative

Under the Non-flow Measures Only Alternative, the flow measures and related monitoring proposed under the Proposed Project would not be implemented, and only the non-flow measures and related maintenance and monitoring included in the Proposed Project would be implemented. This alternative was included to determine the extent to which certain adverse impacts of the Proposed Project's flow measures could be reduced. The non-flow measures that would be implemented under this alternative are the same as for the Proposed Project, and include:

- Fish passage barrier remediation
- Spawning and rearing habitat improvements
- Bank stabilization guidelines
- Completion of the Advanced Recycled and Other Urban Water Plan
- Other non-flow measures specific to both the Stevens Creek and Guadalupe River watersheds

For the same reasons stated in Section 3.1.3, these measures are analyzed at a programmatic level. Additional environmental documentation under CEQA would be completed, as necessary, as site-specific projects are developed, and the footprints of disturbance are defined.

Under this alternative, Proposed Project significant impacts on hydrology, groundwater, water supply, water quality, and aquatic biological resources would be avoided because there would be no change to flow resulting from implementation of the Proposed Project rule curves; however, those impacts on terrestrial biological resources, cultural resources, tribal cultural resources, and noise would be the same as from the Proposed Project, since they correspond to ground disturbance that would result from the non-flow measures (Section 4.1.2).

4.3.3 FAHCE-plus Alternative

The FAHCE-plus Alternative is intended to increase the benefit of reservoir releases during key salmonid lifestages. Based on hydrologic modeling outputs, an update of the FAHCE rule curves was developed that combined concepts of the Proposed Project flow measures with an additional set of rules designed to maximize fish migration (as recommended by the TWG). This revised scenario is known as the FAHCE-plus Alternative. This alternative was developed to determine the extent to which the fisheries benefits of the Proposed Project's rule curves could be further enhanced.

This alternative includes the following elements:

- Pulse Flow Revisions, which include both adjustment of the FAHCE-plus flows in magnitude, duration, and frequency based on model outputs and prioritization of multipurpose pulse flows to aid in both up- and outmigration of steelhead.
- Winter Base Flow Adjustments, which include conservation of reservoir storage in the winter for pulse flows; this would make summer rearing flows more reliable by reducing winter base flows.
- Summer Base Flow Adjustments, which include a slight increase in temperature limits of summer cold water releases, still within the normal temperature range for steelhead rearing, to enhance summer rearing habitat. This allows a greater portion of the reservoir volume to be used to provide summer flows.

FAHCE-plus flow measure changes relative to the Proposed Project are as follows:

- **Pulse Flow Revisions:** Review of the hydrologic model results showed that additional migration opportunities could be provided if adjustments were made to the Proposed Project pulse flow design. New safeguard pulse flows were developed for FAHCE-plus specific to each watershed. In addition to changes in magnitude and duration, the timing of pulse flows was expanded to include pulse checks throughout the adult salmonid upstream migration period. To produce connection flows in the maximum years possible, a safeguard pulse flow was added in March with a lower threshold than standard pulse flows. The safeguard pulse flow would be activated if upstream steelhead migration flows were not available by March 1 of any given WY. In addition, a regular outmigration pulse flow was added in mid-April of each year. Safeguard and outmigration pulse releases would occur in years when storage is available to support summer rearing and still enable a minimum reservoir carryover.

- **Winter Base Flow Adjustments:** The Proposed Project rule curves include multiple flow levels for winter base flows based on a tiered system of reservoir storage. The flow tiers were reviewed for the FAHCE-plus Alternative based on updated understandings of adequate depths for spawning and incubation. Tiers that supported incubation in the critical spawning areas (for example, FAHCE CWMZs) were retained for the FAHCE-plus Alternative. Tiers that did not provide additional benefit to the spawning reaches downstream were considered for removal. The reserved water in the FAHCE-plus Alternative enables additional pulse flows.
- **Summer Base Flow Adjustments:** Summer base flows under the Proposed Project would be more reliable and cooler. To enhance summer rearing habitat with the FAHCE-plus Alternative, temperature limits were raised but were kept within the normal temperature range for steelhead rearing. This raise in temperature allows a greater portion of the reservoir volume to be used to provide summer flows and provide additional rearing habitat downstream, according to the model.

Figure 4.3-1 through Figure 4.3-6 illustrate the rule curves by reservoir for the FAHCE-plus Alternative. For comparison to the Proposed Project, see Section 2.4.1.

Figure 4.3-1. Stevens Creek Reservoir FAHCE-plus Operation Rule Curves

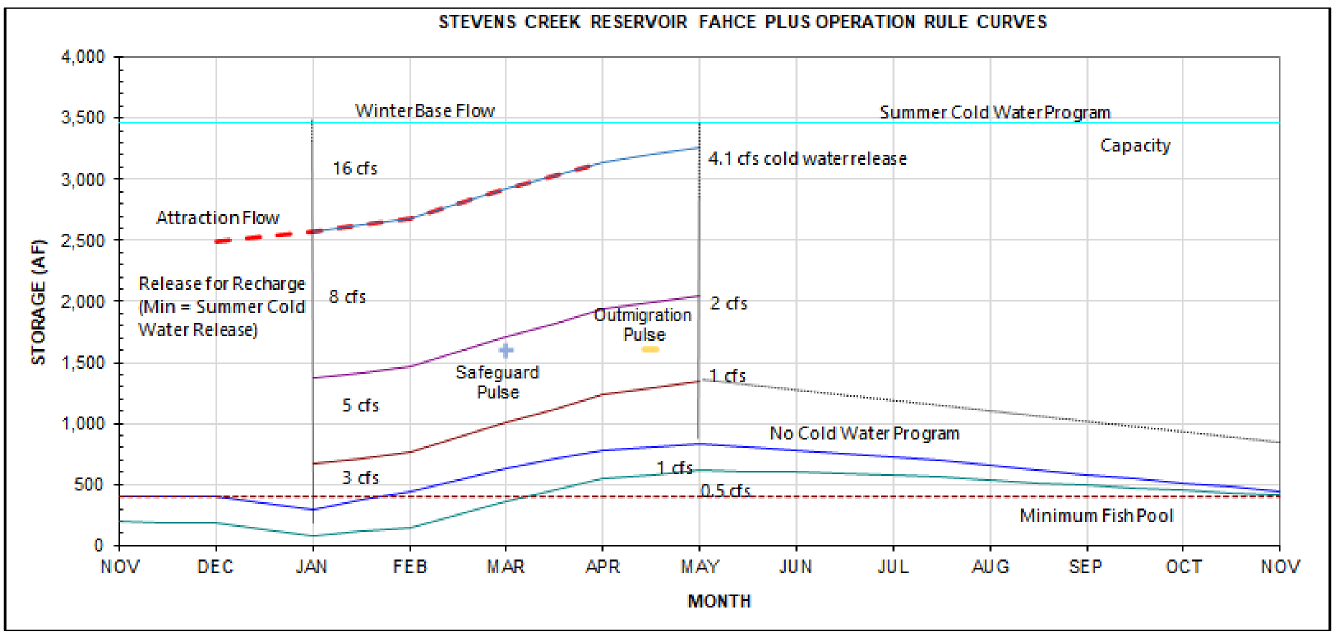


Figure 4.3-2. Guadalupe Reservoir FAHCE-plus Operation Rule Curves

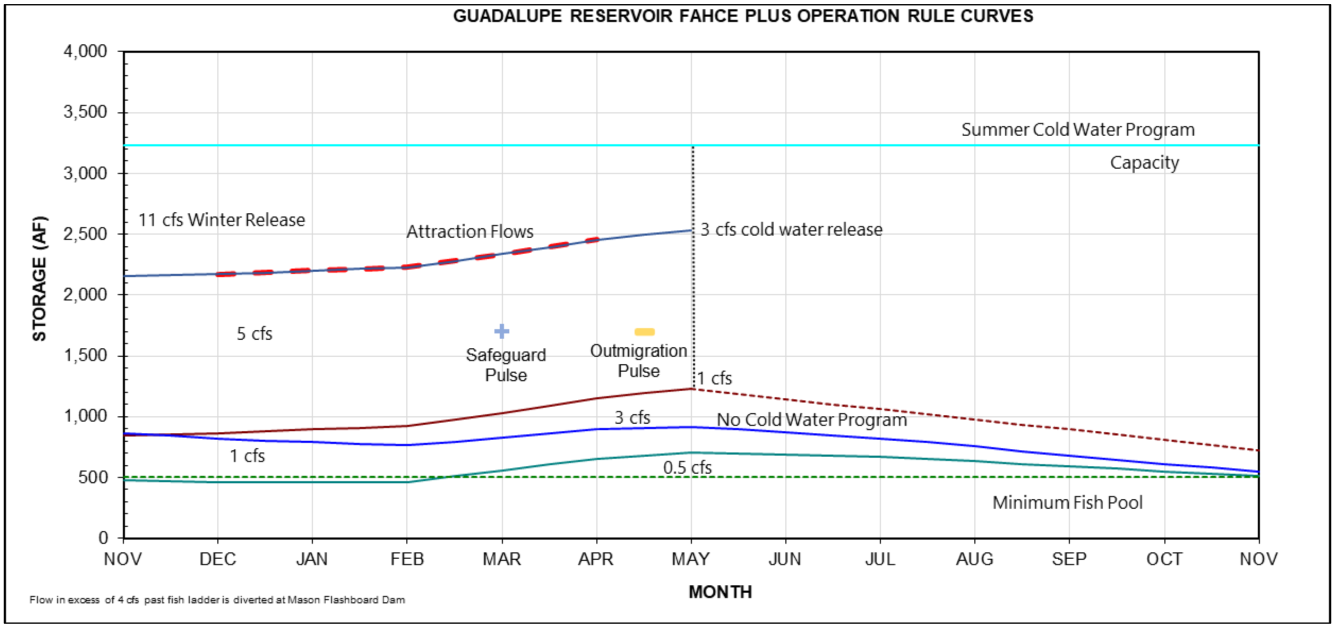


Figure 4.3-3. Almaden Reservoir FAHCE-plus Operation Rule Curves

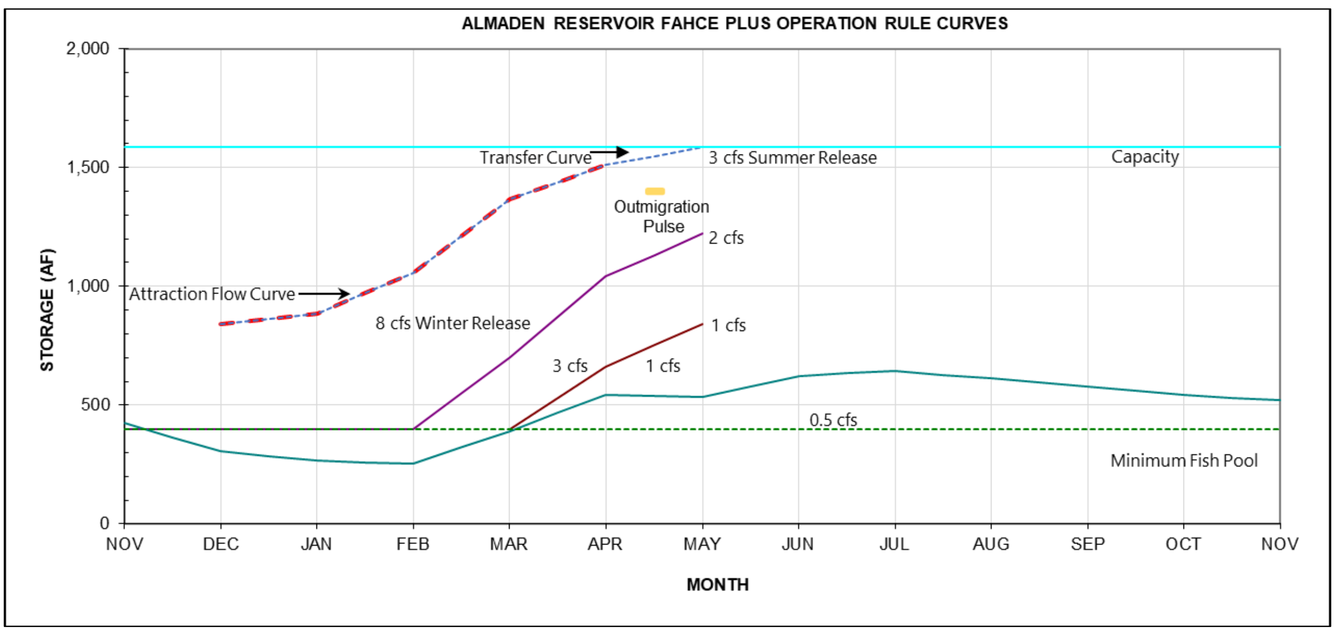


Figure 4.3-4. Calero Reservoir FAHCE-plus Operation Rule Curves

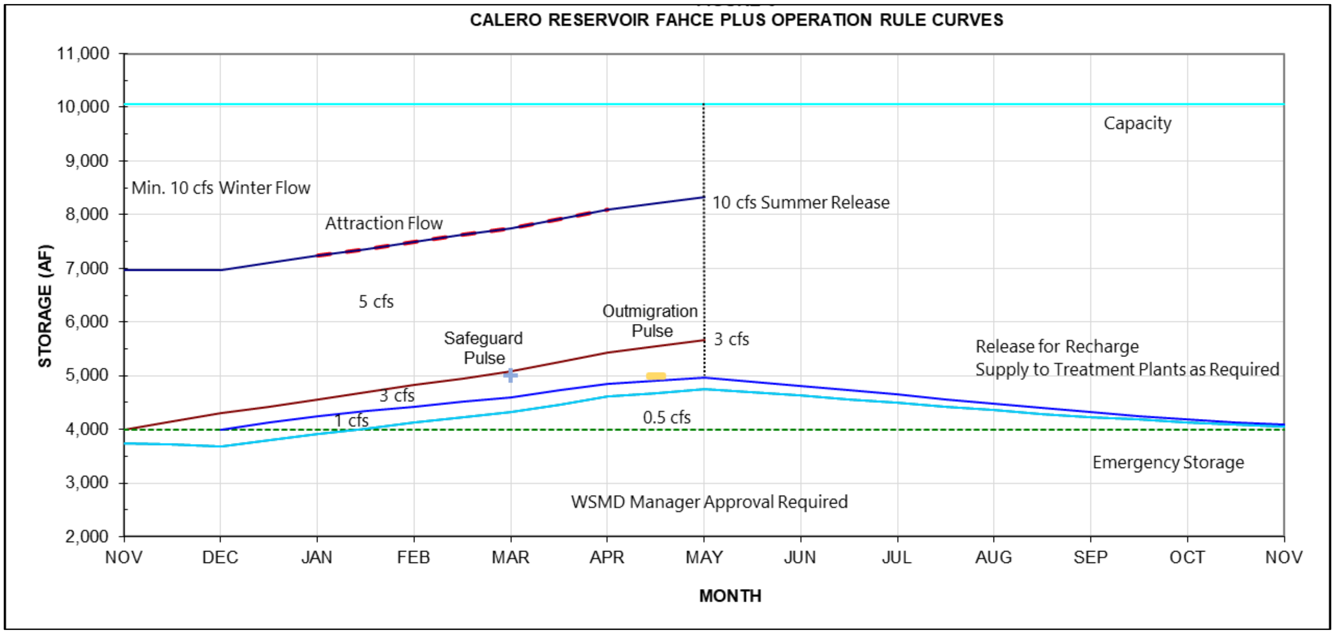


Figure 4.3-5. Lexington Reservoir FAHCE-plus Operation Rule Curves

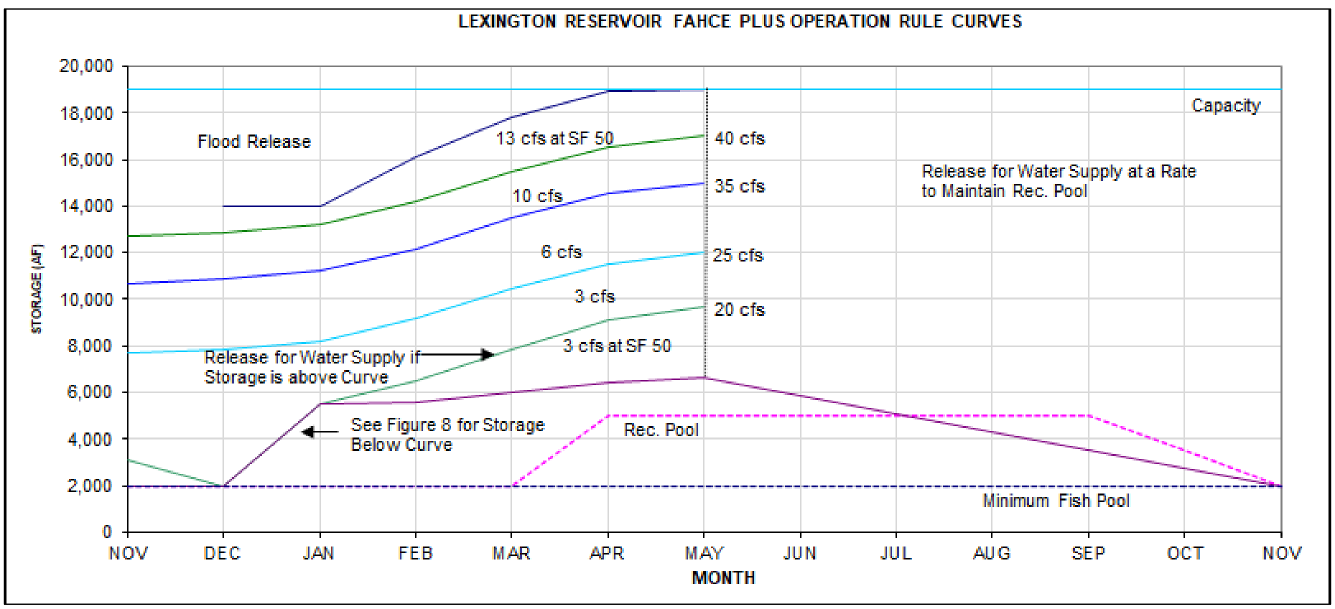
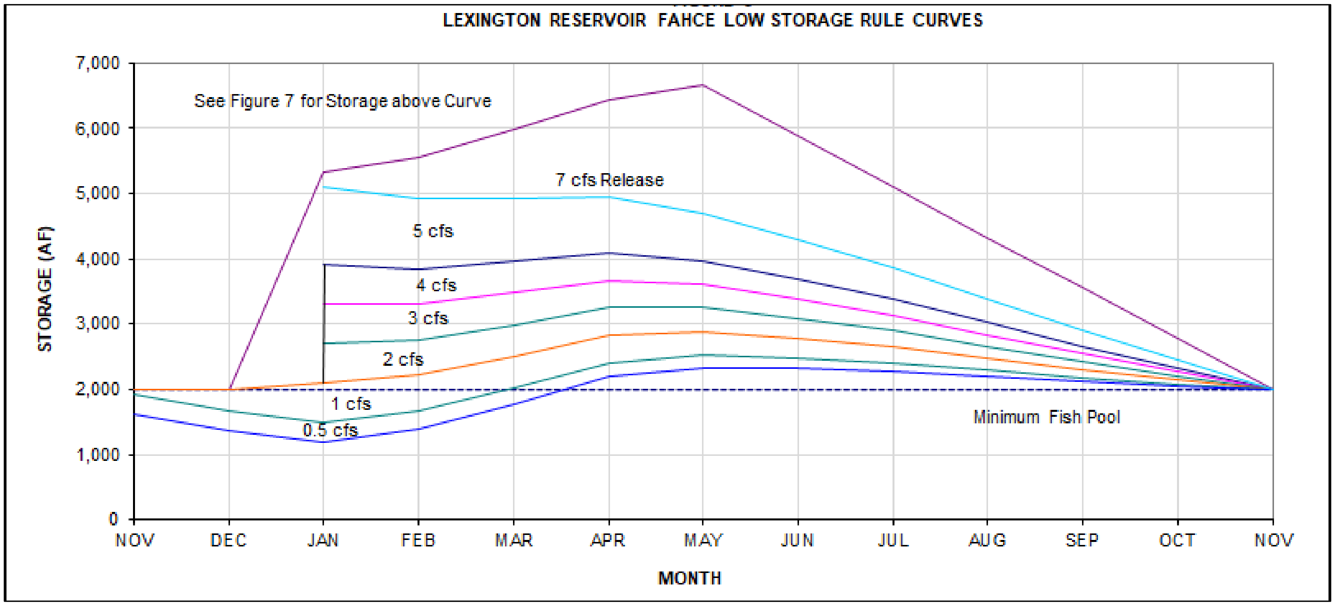


Figure 4.3-6. Lexington Reservoir FAHCE Low Storage Rule Curves



4.4 Methodology and Organization for Evaluating Alternatives

4.4.1 Method for Evaluating Alternatives

For the two action alternatives, consistent with the methodology for assessing impacts from the Proposed Project, both flow measure and non-flow measure impact analyses are presented. To capture the range of impacts associated with the FAHCE-plus Alternative, additional hydrologic simulations were developed for 2015 and 2035. For the Non-flow Measures Only Alternative, no additional hydrologic modeling was required, since the alternative does not include any changes to flow operations but is limited to non-flow measures. Similarly, for the No Project Alternative, no additional hydrologic modeling was required, since the alternative does not include any changes to flow operations.

Each of the three alternatives was evaluated using the same methodology as described in Chapter 3, *Environmental Setting and Impact Analysis,* for the Proposed Project, with an impact comparison for each resource to the current baseline conditions. In addition, for model-dependent resource evaluations (for example, aquatic biological resources), the impacts of the alternatives with flow measures in 2035 were compared with the future baseline conditions. Appendices J and K include detailed descriptions of each of these modeling scenarios with detailed model output.

Likewise, in addition to the required CEQA comparisons to the current baseline conditions, for model-dependent resources, the impacts of the Proposed Project and alternatives were also evaluated relative to the future baseline conditions. These additional comparisons relative to a future baseline allow evaluation of impacts under the alternatives under future conditions with projected future water demands and supplies—and with the lifting of the reservoir storage safety restrictions imposed on Project-area reservoirs.

4.4.2 Organization for Alternatives Impact Analysis

This section is organized first by resource and then by alternative: No Project Alternative, Non-flow Measures Only Alternative, and FAHCE-plus Alternative. Under each alternative, each resource topic area follows the same order as the Proposed Project analysis in Chapter 3, *Environmental Setting and Impact Analysis*. Alternatives are organized and evaluated as follows:

- The No Project Alternative analysis provides a discussion of not implementing the Proposed Project's flow and non-flow measures. The impacts of this alternative are compared to Proposed Project impacts using the current baseline conditions. Under this alternative, to determine impacts related to changes in flow, the current baseline conditions provided in Chapter 3 are compared to the future baseline conditions.
- The Non-flow Measures Only Alternative analysis provides a discussion of not implementing the Proposed Project's flow measures and implementing the non-flow measures. The impacts of this alternative are compared to Proposed Project impacts using current baseline conditions. As with the No Project Alternative, to determine the impacts on model-related resources, the current baseline conditions provided in Chapter 3 are compared to the future baseline conditions.
- The FAHCE-plus Alternative analysis analyzes both the flow measures and non-flow measures impacts at an equivalent level of analysis as for Proposed Project impacts (Chapter 3). The impacts of this alternative on model-related resources are compared to Proposed Project impacts using both the current baseline conditions and the future baseline conditions.

BMPs and VHP implementation are considered part of each alternative's impact analysis, consistent with the Proposed Project analysis in Chapter 3. Descriptions of the BMPs and VHP conditions are provided in Table 2.7-1. When impacts are found to be significant, mitigation measures are proposed, and a post-mitigation significance conclusion is provided. Impacts and mitigation measures follow the same naming and numbering structure as in Chapter 3.

4.5 Impact Analysis for Hydrology

This section assesses the impacts from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. This alternatives analysis follows the same methodology as laid out in Section 3.2.3.

Table 4.5-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.2, *Hydrology*.

Table 4.5-1. Alternative Impacts Comparison Summary for Hydrology

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site	Flow Measures	LTS	S/U (+)	NI (-)	LTS (=)
Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)
Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream runoff, in a manner that would result in flooding on or off site	Flow Measures	LTS	S/U (+)	NI (-)	LTS (=)
Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream runoff, in a manner that would result in flooding on or off site	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)
Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff	Flow Measures	LTS	S/U (+)	NI (-)	LTS (=)

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)

Notes: LTS = less-than-significant impact, NI = no impact, SI = significant impact, S/M = significant but mitigable to less-than-significant impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.5.1 No Project Alternative

The No Project Alternative would not alter flows released from Valley Water reservoirs in the Stevens Creek and Guadalupe River watersheds because the Proposed Project would not be implemented. This section evaluates the impacts on hydrology associated with no new flow measures, changes in hydrology between the current and future baseline conditions, and no new non-flow measures.

4.5.1.1 Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site (significant and unavoidable)

Flow Measures Impact Analysis

This section discusses the impacts on hydrology resources that would result from implementation of the No Project Alternative. For flow measures, the No Project Alternative is assessed by comparing current baseline conditions to future baseline conditions.

Stevens Creek Watershed

Stevens Creek downstream of Stevens Creek Reservoir was assessed for this impact analysis. Peak daily flows change by less than 1 cfs between the current baseline and future baseline (Table 4.5-2). Therefore, there would be a less-than-significant impact in terms of channel alteration.

Guadalupe River Watershed

For the Guadalupe River watershed, each of the four tributaries discussed in the environmental setting was assessed to determine impacts. According to the WEAP Model output, future baseline peak daily flows for Los Gatos Creek exceed the current baseline peak daily flows by 10 cfs for 21 days. Peak daily flows for Los Gatos Creek decreased from the future baseline by 10 cfs for 3 days. For Guadalupe Creek the future baseline daily peak flows exceed the current baseline daily peak flows by 25 cfs for 2 days. Peak daily flows for Guadalupe Creek decreased from the future baseline by 25 cfs for 109 days. On Alamitos Creek, the future baseline daily peak flows exceed the current baseline daily peak flows by 25 cfs for 43 days. Peak daily flows for Alamitos Creek decreased from the future baseline by 25 cfs for 375 days. For Calero Creek the future baseline did not increase nor decrease from the current baseline, daily peak flows by 250 cfs. Maximum daily peak flow for Los Gatos, Guadalupe, and Alamitos Creeks are significantly under the estimated channel capacity (Table 4.5-2; Xu 2021). Channel alteration impacts would be less than significant for Los Gatos, Guadalupe, and Alamitos Creeks.

The daily peak current baseline flow (231 cfs) exceeds the channel capacity (200 cfs) in Calero Creek. The daily peak discharge under the future baseline of 402 cfs also exceeds the channel capacity by a greater amount than the current baseline. Because the future baseline increases the peak flow compared to the current baseline, impacts would be significant downstream of Calero Reservoir in terms of alteration in the course of the channel.

Table 4.5-2. Number of Days Daily Peak Flow in the Current Baseline Conditions Would Be Exceeded by the Future Baseline Conditions and Number of Days the Daily Peak Flow in the Current Baseline Conditions Would Be Decreased Compared to the Future Baseline Conditions

Creek	Channel Capacity (cfs)	Flow Threshold (cfs)	Days of Increase in Peak Daily Flows Current Baseline to Future Baseline	Days of Decrease in Peak Daily Flows Current Baseline to Future Baseline	Current Baseline: Max. Peak Daily Flow (cfs)	Future Baseline: Max. Peak Daily Flow (cfs)
Stevens	5,000	1	0	0	550	550
Los Gatos	5,000	10	21	3	1,804	1,804
Guadalupe	5,000	25	2	109	314	455
Alamitos	5,000	25	49	375	940	850
Calero	200	250	0	0	231	402

Source: WEAP Model Output, Xu 2021

Non-flow Measures Impact Analysis

There would be no impacts from the non-flow measures for Impact HYD-1 because the measures would not be implemented under the No Project Alternative.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would have no impacts on hydrology. Since the maintenance and AMP measures would be similar in nature to the proposed flow measures, impacts to hydrology would be less than significant. There would be no impacts from maintenance or monitoring for proposed non-flow measures.

Significance Conclusion Summary

There would be **less-than-significant** impacts on Stevens Creek from existing reservoir flows under the No Project Alternative for Impact HYD-1. Additionally, for Los Gatos, Guadalupe, and Alamitos Creeks in the Guadalupe River watershed, the impacts would be **less than significant** from the existing reservoir flows under the No Project Alternative for Impact HYD-1. The peak flows in Calero Creek under the future baseline would still exceed the channel capacity, but would increase channel alteration, flooding, and polluted runoff in comparison to the current baseline condition because of higher peak flows, and channel alteration impacts would be **significant and unavoidable**.

4.5.1.2 Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream runoff, in a manner that would result in flooding on or off site (significant and unavoidable)

Flow Measures Impact Analysis

Stevens Creek Watershed

The impact analysis for Stevens Creek for this impact is assessed in Impact HYD-1. Impacts that increase flooding or increase additional sources of polluted runoff would be less than significant.

Guadalupe River Watershed

The impact analysis for the Guadalupe River watershed for this impact is assessed in Impact HYD-1. Flooding impacts would be less than significant for Los Gatos, Guadalupe, and Alamitos Creeks. Impacts for Calero Creek for the future baseline compared to the current baseline would be significant downstream of Calero Reservoir in terms of flooding.

Non-flow Measures Impact Analysis

There would be no impacts from the non-flow measures for Impact HYD-2 because the measures would not be implemented under the No Project Alternative.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would have no impacts on hydrology. Since the maintenance and AMP measures would be similar in nature to the proposed flow measures, impacts to hydrology would be less than significant. There would be no impacts from maintenance or monitoring for proposed non-flow measures.

Significance Conclusion Summary

There would **less-than-significant** impacts on Stevens Creek from the existing reservoir flows under the No Project Alternative for Impact HYD-2. Additionally, for Los Gatos, Guadalupe, and Alamitos Creeks in the Guadalupe River watershed, the impacts would be **less than significant** from the existing reservoir flows under the No Project Alternative for Impact HYD-2. The increase in maximum peak flows in Calero Creek under the future baseline would exceed the channel capacity and would increase flooding in comparison to the current baseline condition, resulting in **significant and unavoidable** impacts.

4.5.1.3 Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (significant and unavoidable)

Flow Measures Impact Analysis

Stevens Creek Watershed

Stevens Creek downstream of Stevens Creek Reservoir was assessed for this impact analysis. Peak daily flows change by less than 1 cfs between the current baseline and future baseline (Table 4.5-3). Therefore, there would be less-than-significant impacts in terms of flooding or increases in polluted runoff.

Guadalupe River Watershed

The impact analysis for the Guadalupe River watershed for this impact is assessed in Impact HYD-1. Impacts would be less than significant for Los Gatos, Guadalupe, and Alamitos Creeks in terms of increase in flooding and polluted runoff. The increased peak flow on Calero Creek under the future baseline relative to the current baseline would result in a significant impact for increased flooding and polluted runoff.

Non-flow Measures Impact Analysis

There would be no impacts from the non-flow measures for Impact HYD-3 because the measures would not be implemented under the No Project Alternative.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would have no impacts on hydrology. Since maintenance and AMP measures would be similar in nature to the proposed flow measures, impacts to hydrology would be less than significant. There would no impacts from maintenance or monitoring for proposed non-flow measures.

Significance Conclusion Summary

There would be a **less-than-significant** impact to Stevens Creek from the existing reservoir flows under the No Project Alternative for Impact HYD-3. Additionally, for Los Gatos, Guadalupe, and Alamitos Creeks in the Guadalupe River watershed, the impacts would be **less than significant** from the existing reservoir flows under the No Project Alternative for Impact HYD-3. The increase in peak flows in Calero Creek under the future baseline would exceed the channel capacity and could increase flooding and polluted runoff in comparison to the current baseline condition. Impacts would be **significant and unavoidable**.

4.5.2 Non-flow Measures Only Alternative

For flow measures, the Non-flow Measures Only Alternative is assessed by comparing current baseline conditions to future baseline conditions. For non-flow measures, impacts on hydrology under the Non-flow Measures Only Alternative would be same as the non-flow measures impacts identified in the Section 3.2, *Hydrology*, impact analysis of the Proposed Project.

4.5.2.1 Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, flow measures would not change current and future baseline conditions, and therefore there would be no flow measure impacts on hydrology.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. For the reasons discussed in Section 3.2, *Hydrology*, under the Non-flow Measures Only Alternative, there would be significant direct impacts on streamflows from the non-flow measures because the non-flow measures would not measurably increase or decrease flows in either the Stevens Creek or Guadalupe River watersheds.

Non-flow measures could affect erosion and siltation or drainage patterns from fish barrier removal and fish habitat enhancement from construction activities and short-term channel modification. However, non-flow measures would not impact the course of the channel from evulsion or breaching of the channel banks. The design process for non-flow measures would ensure that channel impacts are minimized. Implementation of BMPs and VHP conditions, including WQ-8, WQ-10, VHP-3, GEN-1, SED-3, SED-2, and VEG-1, would reduce impacts related to the construction measures for enhancement of spawning and rearing habitat. Implementation of these BMPs and VHP conditions would further ensure that impacts are less than significant. Valley Water would also add comparable restrictions or requirements as conditions of funding agreements for those project measures to be implemented by others.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect hydrology. Since the maintenance and AMP measures would be similar in nature to the proposed non-flow measures, impacts to hydrology would be less than significant.

Significance Conclusion Summary

With the implementation of the BMPs and VHP conditions listed in Section 3.2.3.4 and above, the Non-flow Measures Only Alternative would not substantially alter drainage patterns, increase flooding, or result in significant impacts on stormwater or polluted runoff; therefore, impacts would be **less than significant**.

Mitigation

No mitigation would be required for Impact HYD-1.

4.5.2.2 Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream runoff, in a manner that would result in flooding on or off site (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, flow measures would not change current and future baseline conditions, and therefore there would be no flow measure impacts on hydrology.

Non-flow Measures Impact Analysis

The hydrology effects of the non-flow measures relative to baseline conditions were described in Impact HYD-1. Implementation of the BMPs and VHP conditions as described under Impact HYD-1 would further ensure that impacts associated with flooding on or off site are less than significant.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect hydrology. Since the maintenance and AMP measures would be similar in nature to the non-flow measures, impacts to hydrology would be less than significant.

Significance Conclusion Summary

With the implementation of the BMPs and VHP conditions listed in Section 3.2.3.4 and above, the Non-flow Measures Only Alternative would not substantially alter drainage patterns, increase flooding, or result in significant impacts on stormwater or polluted runoff; therefore, impacts would be **less than significant**.

Mitigation

No mitigation would be required for Impact HYD-2.

4.5.2.3 Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, flow measures would not change current and future baseline conditions, and therefore there would be no flow measure impacts on hydrology.

Non-flow Measures Impact Analysis

The hydrology effects of the non-flow measures relative to baseline conditions were described in Impact HYD-1. Implementation of the BMPs and VHP conditions as described under Impact HYD-1, would further ensure that impacts associated with the capacity of the stormwater drainage system or runoff are less than significant.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect hydrology. Since the maintenance and AMP measures would be similar in nature to the non-flow measures, impacts to hydrology would be less than significant.

Significance Conclusion Summary

With the implementation of the BMPs and VHP conditions listed in Section 3.2.3.4 and above, the Non-flow Measures Only Alternative would not substantially alter drainage patterns, increase flooding, or result in significant impacts on stormwater or polluted runoff; therefore, impacts would be **less than significant**.

Mitigation

No mitigation would be required for Impact HYD-3.

4.5.3 FAHCE-plus Alternative

The non-flow measures under this alternative would be consistent with those in the Proposed Project. This section evaluates the impacts associated with changes in Valley Water operations on hydrology and makes reference to the WEAP Model scenarios described in Section 3.1, *Introduction*, including the 2015 model scenario, which assumes existing reservoir seismic safety constraints, and the 2035 model scenario, which assumes reservoir safety constraints have been resolved.

As noted in Section 3.2.3.1 and in the *Valley Water Daily WEAP Model Technical Memorandum* (Appendix G), WEAP Model output is reported in average daily discharge downstream of each Project reservoir. Daily average flows in urban streams understate the peak discharge observed in the channel that cause the greatest impact. To convert the daily average flows reported in the WEAP Model to daily peak flows, a regression analysis, as discussed in Section 3.2.4, was conducted using historical daily average and daily peak discharge data for each of the Project creeks. Daily average and peak discharge data were developed by Valley Water downstream of Valley Water reservoirs for the period of record from July 1, 1990, to December 31, 2019. The resulting regression equation coefficients developed for each creek, shown in Table 3.2-6, were applied to the WEAP daily average discharge to calculate daily peak discharge.

The daily peak discharge was calculated from the WEAP output for the current and future baseline and modeled 2015 and 2035 FAHCE-plus Alternative scenario. Daily peak flows that significantly exceeded the baseline daily peak flows were then compared to the channel capacity provided by Valley Water and included in the environmental setting (Section 3.2.1). FAHCE-plus Alternative flows were determined to significantly exceed the baseline daily peak flows by selecting a natural break in the histogram of the differences between FAHCE-plus Alternative flows daily peak flows (Table 4.5-3). The majority of the differences between the baseline and Proposed Project or FAHCE-plus Alternative fell within a range of 0 to 100 cfs for Alamitos Creek; 0 to 70 cfs for Stevens Creek; and 0 to 30 cfs for Calero, Guadalupe, and Los Gatos Creeks. The differences between the baseline and the FAHCE-plus Alternative that occurred outside of the ranges above were investigated further. The differences between the baseline and the FAHCE-plus Alternative outside of this range were counted to determine the number of days that the baseline daily peak flow was exceeded by the FAHCE-plus Alternative daily peak flow (distribution of differences in the histogram).

4.5.3.1 Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site (less than significant)

Flow Measures Impact Analysis

The impacts for flow measures have been separated out by watershed for clarity.

Stevens Creek Watershed

Stevens Creek downstream of Stevens Creek Reservoir was assessed for this impact analysis. Peak daily flows that exceed the baseline conditions are unlikely to alter the course of Stevens Creek unless the channel capacity is exceeded and the channel banks are breached. According to the WEAP Model output converted to daily peak flows (Section 3.2.3.1), the FAHCE-plus Alternative would exceed the baseline conditions daily peak flows by greater than 70 cfs for 4 days over the 20-year period when compared to the corresponding current and future baseline scenarios. Table 4.5-3 shows the number of days that the peak flow associated with the current and future baseline conditions would be exceeded by the modeled 2015 and 2035 FAHCE-plus Alternative scenarios. The range of daily peak flows that exceed the current and future baselines are significantly below the channel capacity of 5,000 cfs (Xu 2021). The increase in daily peak flows that are well below the channel capacity are unlikely to result in the alteration of the course of Stevens Creek and would not result in substantial erosion or siltation on or off site. The 2015 and 2035 maximum FAHCE-plus Alternative modeled peak flow as compared to current and future baseline conditions would increase to 929 cfs. However, the highest daily peak flow of 929 cfs is significantly below the estimated channel capacity of 5,000 cfs; therefore, impacts would be less than significant in terms of channel alteration.

Table 4.5-3. Number of Days the Current and Future Baseline Conditions Modeling Peak Flows Are Exceeded by the 2015 and 2035 FAHCE-plus Alternative

Creek	Channel Capacity (cfs)	Flow Threshold (cfs)	Current Baseline to 2015 FAHCE-plus Alternative Model Scenario			Future Baseline to 2035 FAHCE-plus Alternative Model Scenario		
			Days of Increase in Peak Daily Flows Over Threshold	Max. Peak Daily Flow (cfs)		Days of Increase in Peak Daily Flows Over Threshold	Max. Peak Daily Flow (cfs)	
				Current Baseline	2015 FAHCE-plus Altern-ative		Future Baseline	2035 FAHCE-plus Alter-native
Stevens	5,000	70	2	550	550	2	550	550
Los Gatos	5,000	30	13	1,804	1,804	16	1,804	1,804
Guadalupe	5,000	30	27	314	314	61	455	314
Alamitos	5,000	100	3	940	940	35	850	850
Calero	200	30	19	231	231	0	402	231

Source: Xu (2021)

Guadalupe River Watershed

For the Guadalupe River watershed, each of the four tributaries discussed in the environmental setting was assessed to determine impacts. According to the calculated WEAP Model, peak daily flows under the modeled 2015 FAHCE-plus Alternative for Los Gatos Creek exceed the current baseline peak daily flows by 30 cfs for 13 days and 16 days for the modeled 2035 FAHCE-plus Alternative compared to the future baseline. For Guadalupe Creek, the modeled 2015 FAHCE-plus Alternative daily peak flows exceed the current baseline daily peak flows by 30 cfs for 27 days and 61 days for the modeled 2035 FAHCE-plus Alternative compared to the future baseline. At Alamitos Creek, the modeled 2015 FAHCE-plus Alternative daily peak flows exceed the current baseline daily peak flows by 100 cfs for 3 days and 35 days for the modeled 2035 FAHCE-plus Alternative compared to the future baseline. For Calero Creek, the modeled 2015 FAHCE-plus Alternative daily peak flows exceed the current baseline daily peak flows by 30 cfs for 19 days and never exceeded the modeled 2035 FAHCE-plus Alternative compared to the future baseline (Table 4.5-2). Maximum daily peak flow for Los Gatos, Guadalupe, and Alamitos Creeks are significantly under the estimated channel capacity (Table 4.5-2; Xu 2021). Impacts would be less than significant for Los Gatos, Guadalupe, and Alamitos Creeks for the modeled 2015 and 2035 FAHCE-plus Alternative.

For Calero Creek, daily peak flows exceed the channel capacity for an additional 4 days for the modeled 2015 FAHCE-plus Alternative compared to the current baseline. Peak flows for the modeled 2035 FAHCE-plus Alternative reduces number of days flows in Calero Creek exceed channel capacity by 2 days. The increase in number of days of peak flows exceeding the channel capacity under the modeled 2015 FAHCE-plus Alternative, relative to the current baseline condition, would not substantially increase the potential for a change in the course of the channel as the banks are exceeded during flood conditions: there is no increase in the peak flows; the peak flow overall and on the 4 days in question only exceeds the channel capacity by 31 cfs; and the peak flow calculation is based on a regression comparing historical peaks to historical daily average flows, a 4-day increase in the number of days the channel capacity would not be considered substantial. Therefore, impacts for the modeled 2015 FAHCE-plus Alternative would be less than significant downstream of Calero Reservoir in terms of alteration in the course of the channel.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. For the reasons discussed in Section 3.2, *Hydrology*, under the FAHCE-plus Alternative, there would be no significant direct impacts on streamflows from the non-flow measures because the non-flow measures would not measurably increase or decrease flows in the Project creeks to a level that would change the course of the channels. The design process for non-flow measures would ensure that channel impacts are minimized. Implementation of BMPs and VHP conditions, including WQ-8, WQ-10, VHP-3, GEN-1, SED-3, SED-2, and VEG-1, would reduce impacts related to the construction measures for enhancement of spawning and rearing habitat. Implementation of these BMPs and VHP conditions would further ensure that impacts under the FAHCE-plus Alternative are less than significant.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect hydrology. Since the maintenance and AMP measures would be similar in nature to the flow and non-flow measures, impacts to hydrology would be less than significant.

Significance Conclusion Summary

The modeled 2015 and 2035 FAHCE-plus Alternative scenario would increase daily peak flows in all channels in the study area (except for Calero Creek for the modeled 2015 FAHCE-plus Alternative scenario) relative to the current and future baseline conditions, but these increases in daily peak flows are substantially under the channel capacities for Stevens, Los Gatos, Guadalupe, and Alamitos Creeks and therefore would not result in flooding that could cause a change in channel course. While peak flows on Calero Creek under both current and future baseline conditions and modeled 2015 and 2035 FAHCE-plus Alternative would exceed the channel capacity, the changes in peak flows would not be at a magnitude or frequency to result in flooding that could cause a change in channel course, Accordingly, the impact to Stevens, Los Gatos, Guadalupe, Alamitos, and Calero Creeks would be **less than significant.**

Mitigation

No mitigation would be required for Impact HYD-1.

4.5.3.2 Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream runoff, in a manner that would result in flooding on or off site (less than significant)

Flow Measures Impact Analysis

Stevens Creek Watershed

The impact analysis for Stevens Creek for this impact is assessed in Impact HYD-1. Increases in the modeled 2015 and 2035 FAHCE-plus Alternative daily peak flows would be significantly below the estimated channel capacity, and impacts to increase flooding would be less than significant.

Guadalupe River Watershed

The impact analysis for the Guadalupe River watershed for this impact is assessed in Impact HYD-1. Impacts would be less than significant for Los Gatos, Guadalupe, Alamitos, and Calero Creeks in terms of increase in flooding.

Non-flow Measures Impact Analysis

There would be no significant direct impacts on streamflows from the non-flow measures because the non-flow measures would not measurably increase or decrease flows in the Project creeks. The design process for non-flow measures would ensure that channel impacts are minimized for impacts on drainage patterns or flooding from fish barrier removal and fish habitat enhancement. Implementation of BMPs and VHP conditions, including WQ-8, WQ-10, VHP-3, GEN-1, SED-3, SED-2, and VEG-1, would reduce impacts related to the construction measures for enhancement of spawning and rearing habitat. Implementation of these BMPs and VHP conditions would further ensure that impacts are less than significant.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect hydrology. Since the maintenance and AMP measures would be similar in nature to the flow and non-flow measures, impacts to hydrology would be less than significant.

Significance Conclusion Summary

In line with the analysis provided for Impact HYD-1, the impact to Stevens, Los Gatos, Guadalupe, Alamitos, and Calero Creeks would be **less than significant.**

Mitigation

No mitigation would be required for Impact HYD-2.

4.5.3.3 Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (less than significant)

Flow Measures Impact Analysis

Stevens Creek Watershed

The potential for implementation of flow measures to affect flooding or increase runoff in the study area is assessed in Impact HYD-1. Impacts from increased flooding or increased additional sources of polluted runoff would be less than significant.

Guadalupe River Watershed

The potential for implementation of flow measures to affect flooding or increase runoff in the study area is assessed in Impact HYD-1. Flooding or additional sources of polluted runoff impacts would be less than significant for Los Gatos, Guadalupe, Alamitos, and Calero Creeks for the modeled 2015 and 2035 FAHCE-plus Alternative scenarios relative to the current and future baselines.

Non-flow Measures Impact Analysis

The Non-flow Measure Alternative would not result in significant direct impacts on streamflows from the non-flow measures because the non-flow measures would not measurably increase or decrease flows in the Project creeks. The design process for non-flow measures would ensure that channel impacts are minimized with respect to flooding and polluted runoff from fish barrier removal and fish habitat enhancement. Implementation of BMPs and VHP conditions from HYD-1 and HYD-2 in addition to WQ-6, WQ-15, and WQ-16 would reduce impacts related to the construction measures for enhancement of spawning and rearing habitat. Implementation of these BMPs and VHP conditions would further ensure that impacts are less than significant.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect hydrology. Since the maintenance and AMP measures would be similar in nature to the flow and non-flow measures, impacts to hydrology would be less than significant.

Significance Conclusion Summary

In line with the analysis provided for Impact HYD-1, the impact to Stevens, Los Gatos, Guadalupe, Alamitos, and Calero Creeks would be **less than significant.**

Mitigation

No mitigation would be required for Impact HYD-3.

4.6 Impact Analysis on Groundwater Resources

This section assesses the impacts from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. Appendix M, the water supply technical memorandum, includes a corresponding discussion of the analysis of groundwater resources. This alternatives analysis follows the same methodology as laid out in Section 3.3.3.

Table 4.6-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.3, *Groundwater Resources*.

Table 4.6-1. Alternative Impacts Comparison Summary for Groundwater

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin	Flow Measures	LTS	NI (-)	NI (-)	LTS (=)
Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin	Non-flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality	Flow Measures	LTS	NI (-)	NI (-)	LTS (=)
Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality	Non-flow Measures	NI	NI (=)	NI (=)	NI (=)

Notes: LTS = less-than-significant impact, NI = no impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.6.1 No Project Alternative

The No Project Alternative would not alter flows released from Valley Water reservoirs in the Stevens Creek and Guadalupe River watersheds because operations would remain unchanged. This section evaluates the impacts on groundwater resources associated with no flow release changes in Valley Water operations and no Project-associated non-flow measures. For flow measures, the No Project Alternative is assessed by comparing current baseline conditions to future baseline conditions.

4.6.1.1 Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin (no impact)

Flow Measures Impact Analysis

As shown in Table 4.6-2, under the current baseline conditions, the modeled average monthly Santa Clara Plain groundwater storage would be 317,937 AF. Under the future baseline condition, total modeled average monthly groundwater storage would be slightly higher, 337,084 AF, representing an increase of 19,106 AF relative to the current baseline conditions.

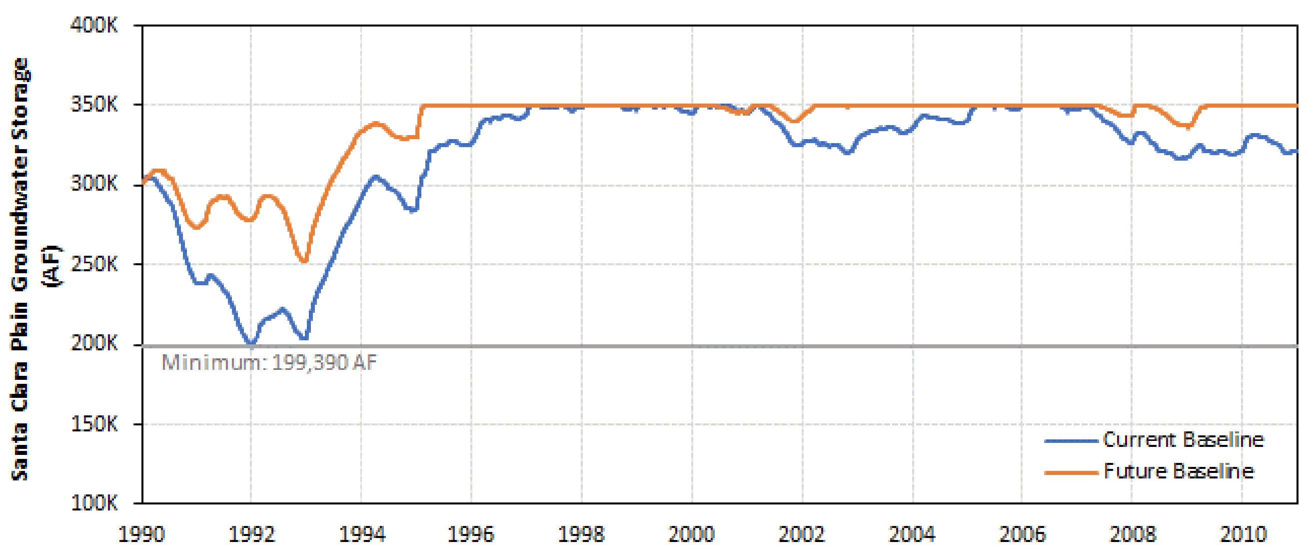
Table 4.6-2. Comparison of Current and Future Baseline Conditions Monthly Average Groundwater Storage (1990 to 2010) for the Santa Clara Plain Groundwater Basin

Groundwater Basin	Current Baseline Conditions	Future Baseline Conditions	Difference (2035–2015)
Santa Clara Plain	317,978	337,084	19,106

Source: WEAP Model Output

The future conditions follow a similar pattern to the corresponding current conditions with an initial 6-year drought from 1987 to 1992, dominating the early years of the same modeled period, 1990–2010. Future baseline conditions also recover to higher average monthly storage levels of 336,021 AF through the later 2000–2010 period, indicating full recovery from drought operations (Figure 4.6-1).

Figure 4.6-1. Simulated Monthly Average Groundwater Storage under Current and Future Baseline Conditions



Source: WEAP Model Output

The future baseline condition results in nearly universal increases in simulated average monthly groundwater storage relative to the current baseline conditions, generally attributable to improvements in reservoir storage capacity in the future from seismic upgrades and from the addition of 24,000 AF of planned indirect potable reuse water. Therefore, there would be no negative impacts on groundwater supplies under the No Project Alternative, as the change would be slightly beneficial compared to the current baseline conditions.

Non-flow Measures Impact Analysis

There would be no non-flow measures under the No Project Alternative, and therefore no resulting direct or indirect groundwater storage or recharge impacts.

Monitoring, Maintenance, and Adaptive Management

Since there would be no monitoring, maintenance, or AMP measures under the No Project Alternative, impacts to groundwater would be no impact.

Significance Conclusion Summary

Under the No Project Alternative, there would be **no impact** to groundwater supplies based on current reservoir flows, with some beneficial improvements under the future baseline. The No Project Alternative would have **no impact** to groundwater supplies as a result of non-flow measures.

4.6.1.2 Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality (no impact)

Flow Measures Impact Analysis

Since the future baseline conditions would result in generally increased groundwater levels compared to the current baseline condition, there would be no impact to groundwater quality under the future baseline conditions.

Non-flow Measures Impact Analysis

There would be no non-flow measures under the future baseline conditions, and therefore no resulting direct or indirect groundwater quality impacts.

Monitoring, Maintenance, and Adaptive Management

Since there would be no monitoring, maintenance, or AMP measures under the No Project Alternative, impacts to groundwater would be no impact.

Significance Conclusion Summary

Under the future baseline conditions, there would be **no impact** to groundwater quality. Likewise, the future baseline conditions would have **no impact** to groundwater quality as a result of non-flow measures.

4.6.2 Non-flow Measures Only Alternative

Impacts on groundwater resources under the Non-flow Measures Only Alternative would be consistent with the non-flow measures impacts identified in the Section 3.3, *Groundwater Resources*, impact analysis of the Proposed Project.

4.6.2.1 Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin (no impact)

Flow Measures Impact Analysis

There would be no flow measures implemented under the Non-flow Measures Only Alternative, and flow measures would not change current and future baseline conditions; therefore, there would be no resulting direct or indirect groundwater storage or recharge impacts.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project, and the Non-flow Measures Only Alternative would not affect groundwater supplies or interfere with recharge such that the Project would impede sustainable groundwater management of the basin; therefore, no impacts would occur.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect groundwater. Since the maintenance and AMP measures would be similar in nature to the non-flow measures, impacts to groundwater would be less than significant.

Significance Conclusion Summary

The Non-flow Measures Only Alternative would have **no impact** to groundwater supply as a result of flow measures. Since there would be no changes in groundwater extraction or recharge operations, the Non-flow Measures Only Alternative would have **no impact** to Valley Water's ability to sustainably manage the local groundwater basins, nor would it conflict with Valley Water's GWMPs or requirements.

Mitigation

No mitigation would be required for Impact GW-1.

4.6.2.2 Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality (no impact)

Flow Measures Impact Analysis

There would be no flow measures implemented under the Non-flow Measures Only Alternative, and flow measures would not change current and future baseline conditions; therefore, there would be no resulting direct or indirect groundwater quality impacts.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project, and the Non-flow Measures Only Alternative would not violate any groundwater quality standards or otherwise degrade groundwater quality because it would not change groundwater management in the basin; therefore, no impacts would occur.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect groundwater. Since the maintenance and AMP measures would be similar in nature to the non-flow measures, impacts to groundwater would be less than significant.

Significance Conclusion Summary

The Non-flow Measures Only Alternative would have **no impact** to groundwater quality as a result of flow measures. Since there would be no changes in groundwater extraction or recharge operations, the Non-flow Measures Only Alternative would have **no impact** to Valley Water's ability to sustainably manage the local groundwater basins, nor would it degrade Valley Water's groundwater quality or conflict with Valley Water's GWMPs or requirements.

Mitigation

No mitigation would be required for Impact GW-2.

4.6.3 FAHCE-plus Alternative

4.6.3.1 Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin (less than significant)

Flow Measures Impact Analysis

As shown in Table 4.6-3, under the current baseline, the simulated average monthly Santa Clara Plain groundwater storage would be 317,978 AF, compared to 316,854 AF under the modeled 2015 FAHCE-plus Alternative, a 1,124 AF reduction, representing a reduction of approximately 0.35 percent.

Under the 2035 FAHCE-plus Alternative model results, the simulated average monthly Santa Clara Plain groundwater storage of 338,110 AF would be slightly greater than the corresponding future baseline condition storage of 337,084 AF, which would represent an increase of 1,026 AF, or about 0.30 percent.

Table 4.6-3. Comparison of Santa Clara Plain Groundwater Conditions

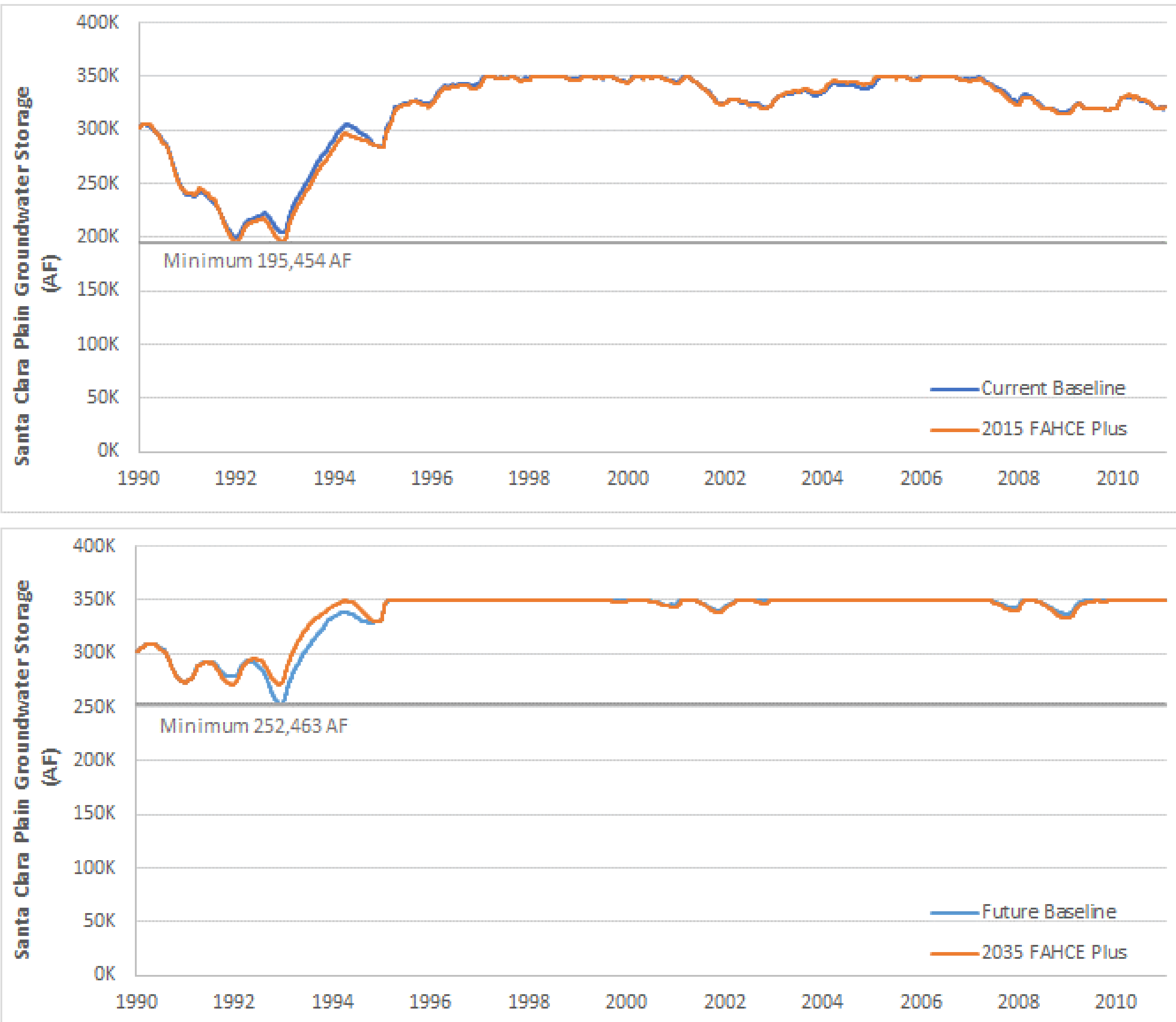
Level of Development	Baseline (AF)	FAHCE-plus (AF)	Difference (FAHCE-plus – Baseline) (AF)
Current	317,978	316,854	-1,124
Future	337,084	338,110	1,026

Source: WEAP Model Output

Because the modeled period (1990 to 2010) begins in the middle of a notable 6-year drought (1987 to 1992), under 2035 FAHCE-plus Alternative model results, the total groundwater basin storage decreases until 1992, then increases to higher levels. During the initial drought operations, reductions in simulated daily groundwater storage under the modeled 2015 FAHCE-plus Alternative relative to the current baseline conditions occur between 1992 and 1995, with the modeled 2015 FAHCE-plus Alternative reaching a minimum storage of 195,454 AF in December 1991, compared to a low storage of 199,389 AF under the current baseline conditions in the same month (representing a 2 percent reduction in minimum storage). By 1995, however, groundwater levels between the two alternatives are generally the same and remain similar throughout the remainder of the simulation period of record.

Under the modeled 2035 FAHCE-plus Alternative, the simulated minimum storage of 271,125 AF is 7 percent higher than the minimum storage of 252,464 AF under the future baseline conditions, both of which occur in November of 1992. As the drought ends, the groundwater basin recovers from low recharge. Between 2000 and 2010, Santa Clara Plain groundwater storage for the current baseline condition averages 336,021 AF, and 335,997 AF for the modeled 2015 FAHCE-plus Alternative, a 44 AF difference, representing a reduction of approximately 0.01 percent. Similarly, the simulated average groundwater storage for the 2035 FAHCE-plus Alternative for 2000 through 2010is 347,904 AF, compared to a simulated average monthly storage for the future baseline condition of 647,904 AF, representing a 619 AF (or 0.178 percent) reduction under the modeled 2035 FAHCE-plus Alternative. Considering the simulated storage capacity of the Santa Clara Plain groundwater basin is 350,000 AF, the simulated storages during 2000 through 2010 for all scenarios under the FAHCE-plus Alternative represent full recovery from drought operations (see Figure 4.6-2).

Figure 4.6-2. Simulated Monthly Average Groundwater Storage under Baseline Conditions and FAHCE-plus Alternative for 2015 (top) and 2035 (bottom)



As a result of the very small differences between simulated Santa Clara Plain groundwater storages for the baseline and FAHCE-plus Alternative, impacts on groundwater supplies or recharge for the groundwater basin would be less than significant when comparing simulated results of the modeled 2015 and 2035 FAHCE-plus Alternative with the current and future baseline conditions.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project, and there would be no groundwater supply or recharge impacts from the non-flow measures under the FAHCE-plus Alternative. Implementation of the non-flow elements of the FAHCE-plus Alternative would not substantially decrease groundwater supplies nor impede groundwater recharge such that sustainable groundwater management would be at risk; therefore, no impact would occur.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect groundwater. Since the maintenance and AMP measures would be similar in nature to the flow and non-flow measures, impacts to groundwater would be less than significant.

Significance Conclusion Summary

Under the FAHCE-plus Alternative, the reduction of monthly average Santa Clara Plain groundwater storage would be less than 1 percent of the total average monthly storage in Valley Water's service under both current and future baseline conditions. Valley Water-wide impacts would be **less than significant**, and similar to the Proposed Project's impacts.

There would be **no impact** to groundwater supplies or recharge as a result of the non-flow measures under the FAHCE-plus Alternative.

Mitigation

No mitigation would be required for Impact GW-1.

4.6.3.2 Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality (less than significant)

Flow Measures Impact Analysis

As noted above for Impact GW-1, simulated groundwater storage under the modeled 2015 FAHCE-plus Alternative would be similar to the current baseline condition throughout the period of record, with a reduction in simulated monthly average Santa Clara Plain groundwater storage of less than one percent. Conversely, simulated Santa Clara Plain groundwater storage for the modeled 2035 FAHCE-plus Alternative would slightly increase compared to the future baseline condition by less than 1 percent.

The small reductions in both simulated average monthly and absolute minimum groundwater levels under the modeled 2015 FAHCE-plus Alternative, relative to the current baseline condition, are within the WEAP Model's reasonable representation of groundwater storage and therefore are not sufficient to indicate an increase in concentration of any groundwater quality constituents. Therefore, under the comparison of the modeled 2015 FAHCE-plus Alternative model results with corresponding modeled current baseline conditions, impacts on groundwater quality would be less than significant.

The modeled 2035 FAHCE-plus Alternative would increase simulated monthly average groundwater supplies in Santa Clara Plain groundwater basin, relative to the future baseline condition, providing a potential beneficial impact to groundwater conditions.

Non-flow Measures Impact Analysis

Consistent with the Proposed Project impact assessment and as noted under Impact GW-1, there would be no groundwater quality impacts from the non-flow measures under the FAHCE-plus Alternative.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect groundwater. Since the maintenance and AMP measures would be similar in nature to the flow and non-flow measures, impacts to groundwater would be less than significant.

Significance Conclusion Summary

The impacts from implementing the FAHCE-plus Alternative on groundwater quality would be **less than significant**, and similar to the Proposed Project impacts.

There would be no impact to groundwater quality as a result of the non-flow measures.

Mitigation

No mitigation would be required for Impact GW-2.

4.7 Impact Analysis on Water Supply

This section assesses the impacts from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. This alternatives analysis follows the same methodology as laid out in Section 3.4.3.

Table 4.7-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.4, *Water Supply*.

Table 4.7-1. Alternative Impacts Comparison Summary for Water Supply

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact WS-1: Substantially alter or reduce Valley Water's ability to have sufficient water supplies available to serve its retailers from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years	Flow Measures	LTS	NI (-)	NI (-)	LTS (=)
Impact WS-1: Substantially alter or reduce Valley Water's ability to have sufficient water supplies available to serve its retailers from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years	Non-flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects	Non-flow Measures	NI	NI (=)	NI (=)	NI (=)

Notes: LTS = less-than-significant impact, NI = no impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.7.1 No Project Alternative

The No Project Alternative would not alter flows released from Valley Water reservoirs in the Stevens Creek and Guadalupe River watersheds because the Proposed Project would not be implemented. This section evaluates the impacts on water supply associated with no flow release changes in Valley Water operations and no Project-associated non-flow measures. The primary differences affecting water supply between the current baseline conditions and the No Project Alternative (future baseline conditions) are the improvements to seismic compliance at reservoirs, an additional local supply of

24,000 AF of recycled water, and the implementation of the California Water Fix, which could increase the amount of imported water supplies. A summary of water supply conditions is shown in Table 4.7-2.

Table 4.7-2. Water Supply Conditions

Demand Reductions	Current Baseline Conditions	No Project (Future)
Years with reductions (maximum)	3 (20%)	2 (10%)
Number of years in Stage 2 (10%)	1	2
Number of years in Stage 3 (20%)	2	0

4.7.1.1 Impact WS-1: Substantially alter or reduce Valley Water's ability to have sufficient water supplies available to serve its retailers from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, there would be no changes to the current flow volumes required for fishery releases in the two watersheds. Overall, the frequency and severity of demand reductions would be reduced from 3 years with reductions under the current baseline (3 years total: 1 during Stage 2 and 2 during Stage 3) to 2 years under the No Project (2 years total: 2 during Stage 2; 0 during Stage 3). Therefore, there would be a beneficial impact for WS-1 under the No Project Alternative as a result of additional operational flexibility in the reservoirs and additional water available from new local recycled water projects.

Non-flow Measures Impact Analysis

Under the No Project Alternative, there would be no non-flow measure improvements. Therefore, there would be no impact from the non-flow measures for Impact WS-1.

Monitoring, Maintenance, and Adaptive Management

Since there would be no monitoring, maintenance, or AMP measures under the No Project Alternative, impacts to water supply would be no impact.

Significance Conclusion Summary

There would be **no impact** to water supply as a result of reservoir flows with the potential for benefits associated with operational flexibility, and **no impact** from not implementing non-flow measures under the No Project Alternative for Impact WS-1.

4.7.1.2 Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects (no impact)

Flow Measures Impact Analysis

The No Project Alternative would not result in the need for additional water supply facilities; therefore, no impact would occur.

Non-flow Measures Impact Analysis

The No Project Alternative would not result in the need for additional water supply facilities; therefore, no impact would occur.

Monitoring, Maintenance, and Adaptive Management

Since there would be no monitoring, maintenance, or AMP measures under the No Project Alternative, impacts to water supply would be no impact.

Significance Conclusion Summary

There would be **no impact** from implementation of reservoir flows and non-flow measures under the No Project Alternative for Impact WS-2.

4.7.2 Non-flow Measures Only Alternative

The Non-flow Measures Only Alternative would not result in any flow-related changes within the system, and there would be no effects to the Valley Water's water supply operations under the Non-flow Measures Only Alternative. The changes from the current to future baseline conditions would be the same as under the No Project Alternative, resulting in slight improvements to water supply.

4.7.2.1 Impact WS-1: Substantially alter or reduce Valley Water's ability to have sufficient water supplies available to serve its retailers from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years (no impact)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to water supply from flow measures.

Non-flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, as under the No Project Alternative, implementation of non-flow measures would not affect water supply deliveries; therefore, there would be no impact to water supply resources.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect water supply. Since the maintenance and AMP measures would be similar in nature to the non-flow measures, there would be no impact to water supply.

Significance Conclusion Summary

Under the Non-flow Measures Only Alternative, flow measures would not be implemented and therefore would not change current and future baseline conditions. The non-flow measure would not affect water supply deliveries and therefore there would be **no impact** to water supply resources.

Mitigation

No mitigation would be required for Impact WS-1.

4.7.2.2 Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects (no impact)

Flow Measures Impact Analysis

The Non-flow Measures Only Alternative would not result in the need for additional water supply facilities because there would be no change in flow releases resulting from implementation of flow measures; therefore, no impact would occur.

Non-flow Measures Impact Analysis

As discussed for Impact WS-1, since there would be no changes to water supply delivery operations under this alternative, the Non-flow Measures Only Alternative would not result in the need for additional water supply facilities; therefore, no impact would occur.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect water supply. Since the maintenance and AMP measures would be similar in nature to the non-flow measures, there would be no impact to water supply.

Significance Conclusion Summary

The Non-flow Measures Only Alternative would not result in the need for additional water supply facilities; therefore, **no impact** would occur.

Mitigation

No mitigation would be required for Impact WS-2.

4.7.3 FAHCE-plus Alternative

This section provides a discussion of the impacts of implementation of the FAHCE-plus Alternative relative to the current and future baseline conditions. Table 4.7-3 presents modeling results from the FAHCE-plus Alternative compared to the current and future baseline conditions. Overall, the change to instream release rules under FAHCE-plus results in slightly more efficient recharge of groundwater than under the Proposed Project as discussed in Section 4.6, *Impact Analysis on Groundwater Resources*; however, the implementation of FAHCE-plus results in an additional year of demand reductions in the 2035 scenario.

Table 4.7-3. Simulated Water Supply Demand Reduction for Current and Future Baseline Conditions and FAHCE-plus Alternative

Scenario	Current Baseline	2015 FAHCE Plus	2015 Difference	Future Baseline	2035 FAHCE Plus	2035 Difference
Total years with designated water use reductions	3	3	0	2	3	1
Number of years in Stage 2 (10%)	1	1	0	2	3	1
Number of years in Stage 3 (20%)	2	2	0	0	0	0

Source: WEAP Model Output

4.7.3.1 Impact WS-1: Substantially alter or reduce Valley Water's ability to have sufficient water supplies available to serve its retailers from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years (less than significant)

Flow Measures Impact Analysis

Simulated water supply demand reductions under the modeled 2015 FAHCE-plus Alternative and current baseline conditions would occur at similar frequencies and severities, but there would be an additional year of shortages under the modeled 2035 FAHCE-plus Alternative, relative to the future baseline condition. Since the additional year of shortage would be at the Stage 2, or 10 percent shortage contingency level, there would not be a significant reduction in water supply reliability as this would meet Valley Water's level of storage goal. The FAHCE-plus Alternative flow measures impacts would have a less-than-significant impact as compared to both the current and future baseline conditions. This is the same as under the Proposed Project.

Non-flow Measures Impact Analysis

Similar to the Proposed Project, there would be no direct or indirect water supply impacts from the non-flow measures being implemented under the FAHCE-plus Alternative.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect water supply. Since the maintenance and AMP measures would be similar in nature to the flow and non-flow measures, impacts to water supply would be less than significant.

Significance Conclusion Summary

There would be a **less-than-significant** impact from implementation of flow measures under the FAHCE-plus Alternative for Impact WS-1 because implementation of the alternative would not substantially affect water supply deliveries or reduce water supply availability compared to the current and future baselines. This would be similar to the Proposed Project for Impact WS-1.

Consistent with the impact discussion for the Proposed Project, there would be **no impact** from implementation of non-flow measures under the FAHCE-plus Alternative for Impact WS-1 because implementation of the alternative would not affect water supply deliveries or reduce water supply availability compared to the current and future baseline conditions.

Mitigation

No mitigation would be required for Impact WS-1.

4.7.3.2 Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects (no impact)

Flow Measures Impact Analysis

The FAHCE-plus Alternative would not significantly affect water supply deliveries compared to the current and future baseline conditions; therefore, the Project does not create the need for additional water supply facilities. The FAHCE-plus Alternative would result in no impact to construction of new, unplanned water supply facilities, because none are needed. This is similar to Impact WS-2 under the Proposed Project.

Non-flow Measures Impact Analysis

As stated in the findings for Impact WS-1, there would be no direct or indirect water supply impacts from the non-flow measures. Since there would be no direct or indirect water supply impacts from the non-flow measures, no new or expanded water supply facilities would be necessary.

Monitoring, Maintenance, and Adaptive Management

Monitoring would not affect water supply. Since the maintenance and AMP measures would be similar in nature to the flow and non-flow measures, impacts to water supply would be less than significant.

Significance Conclusion Summary

There would be **no impact** from implementation of flow measures under the FAHCE-plus Alternative for Impact WS-2 because implementation of the alternative would not affect water supply deliveries or reduce water supply availability compared to the current and future baseline.

Consistent with the impact discussion for the Proposed Project, there would be **no impact** from implementation of non-flow measures under the FAHCE-plus Alternative for Impact WS-2 because implementation of the alternative would not affect water supply deliveries or reduce water supply availability compared to the current and future baseline conditions.

Mitigation

No mitigation would be required for Impact WS-2.

4.8 Impact Analysis on Water Quality

This section assesses the impacts on water quality from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. The analyses of impacts on water quality were limited to those effects that are not associated with aquatic or terrestrial biological resources; refer to Section 4.10, *Impact Analysis on Aquatic Biological Resources*, for a discussion of effects to aquatic biological resources for each alternative, and Section 4.11, *Impact Analysis on Terrestrial Biological Resources*, for a discussion of effects to terrestrial biological resources for each alternative. Impacts to warm water fish species in terms of the WARM beneficial use are discussed below. This alternatives analysis follows the same methodology as laid out in Section 3.5.3.

Table 4.8-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.5, *Water Quality*.

Table 4.8-1. Alternative Impacts Comparison Summary for Water Quality

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact WQ-1: Impair beneficial uses of surface waters	Flow Measures	LTS (beneficial)	NI (-)	NI (-)	LTS (beneficial) (=)
Impact WQ-1: Impair beneficial uses of surface waters	Non-flow Measures	LTS (beneficial)	NI (-)	LTS (beneficial) (=)	LTS (beneficial) (=)
Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality	Flow Measures	LTS (beneficial)	NI (-)	NI (-)	LTS (beneficial) (=)
Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality	Non-flow Measures	LTS (beneficial)	NI (-)	LTS (beneficial) (=)	LTS (beneficial) (=)

Notes: LTS = less-than-significant impact, NI = no impact, S/U = significant and unavoidable; S/M = significant but mitigable to less-than-significant impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

Table 4.8-2 summarizes alternative impacts related to water quality beneficial uses.

Table 4.8-2. Alternative Impacts Comparison Summary for Water Quality Beneficial Uses

Designated Beneficial Use	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
COLD	LTS	NI (-)	LTS (=)	LTS (=)
WARM	NI	NI (=)	NI (=)	NI (=)
MIGR	LTS	NI (-)	LTS (=)	LTS (=)
RARE	LTS	NI (-)	LTS (=)	LTS (=)
SPWN	LTS	NI (-)	LTS (=)	LTS (=)
WILD	LTS	NI (-)	LTS (=)	LTS (=)
MUN	LTS	NI (-)	NI (-)	LTS (=)
GWR	LTS	NI (-)	NI (-)	LTS (=)
FRSH	LTS	NI (-)	NI (-)	LTS (=)
REC 1	LTS	NI (-)	LTS (=)	LTS (=)
REC 2	LTS	NI (-)	LTS (=)	LTS (=)

Notes: LTS = less than significant, NI = no impact, TBD = to be determined

4.8.1 No Project Alternative

Under the No Project Alternative, there would be no changes to the managed flow volumes in the Stevens Creek and Guadalupe River watersheds, and the non-flow measures of the Proposed Project would not be implemented. There would be no monitoring implemented under the No Project Alternative. The future baseline conditions assume that reservoirs would be upgraded to comply with reservoir safety requirements, resulting in some limited changes to water storage operations as compared to the current baseline conditions. Elimination of the reservoir safety limitation would allow the reservoirs to store more water. This section evaluates the impacts associated with the No Project Alternative on water quality. For flow measures, the No Project Alternative is assessed by comparing current baseline conditions to future baseline conditions.

4.8.1.1 Impact WQ-1: Impair beneficial uses of surface waters (no impact)

Flow Measures Impact Analysis

Reservoir flows would affect water temperature to support fish habitat in the two watersheds consistent with beneficial uses identified in the Basin Plan (see Section 3.5.2.2).

Since no flows would be modified under the No Project Alternative, there would be no changes in flow that would further impair any other beneficial use (that is, WARM, MIGR, RARE, SPWN, WILD, MUN, GWR, FRSH, REC1, and REC2) or otherwise conflict with the Basin Plan. However, there would be differences between the current and future baselines as a result of lifting seismic restrictions and increased water demand. As a result, there would be no impact to designated beneficial uses from the No Project Alternative.

Non-flow Measures Impact Analysis

Under the No Project Alternative, the non-flow measures of the Proposed Project, such as barrier removal and spawning and rearing habitat enhancements, would not be implemented. For this reason, there would be no impacts on beneficial uses.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, there would be no monitoring, maintenance, or adaptive management as with the Proposed Project. For this reason, there would be no impacts on beneficial uses.

Significance Conclusion Summary

The No Project Alternative would not change the current beneficial uses; therefore, there would be **no impact** as a result of the No Project Alternative. Any impaired beneficial use would continue to be impaired.

There would be **no impacts** from non-flow measures under the No Project Alternative. There would also be **no impact** from monitoring, maintenance, or adaptive management.

4.8.1.2 Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality (no impact)

Flow Measures Impact Analysis

The following is an analysis of applicable water quality standards (or applicable parts thereof) that could be affected by the No Project Alternative.

Surface Water Temperature

As described in the methodology in Section 3.5.3, this surface water temperature analysis focuses on the ability for Valley Water to provide certain water temperatures in the two CWMZs. It also provides an analysis of water temperatures farther downstream from the CWMZs, as other temperature inputs (warm and cold) limit the management control of Valley Water on downstream temperatures.

Selected representative POIs for evaluation of the CWMZs on Stevens Creek was STEV4, with STEV3 representing the downstream POI outside of the CWMZ. For the Guadalupe Creek CWMZ, POI GCRK3 was analyzed. POI GUAD3 represented the downstream area of the Guadalupe River watershed. The analysis examines the wet and dry season separately and provides both monthly average daily temperatures and well as seasonal (6 month) average daily temperatures. In addition, the analysis identifies the highest and lowest average daily temperature by month and season.

Table 4.8-3 provides the No Project projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the No Project Alternative in the Stevens Creek CWMZ for both the current and future baselines.

Table 4.8-3. No Project Alternative Average Temperature Projections (°F) May 1 – October 31 in the Stevens Creek CWMZ (STEV4)

Month	Current Baseline			Future Baseline		
	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average
May	62.8	58.2	53.1	62.8	58.2	53.1
June	63.3	60.5	56.9	63.3	60.5	56.9
July	64.5	62.0	58.9	65.1	62.0	58.9
August	66.8	61.7	60.3	66.8	61.7	60.3
September	66.8	61.4	59.5	66.8	61.4	59.5
October	62.9	60.2	58.2	62.9	60.2	58.2
6-month Season	64.5	60.7	57.8	64.6	60.7	57.8

As indicated in Table 4.8-3, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F. Based on the results of the analysis of projected water temperatures in the Stevens Creek CWMZ, the No Project Alternative would have no impact to surface water temperature standards based on comparing the current and future baselines.

As indicated in Table 4.8-4, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°F. Based on the results of the analysis of projected water temperatures in the Stevens Creek CWMZ, the No Project Alternative would have no impact to surface water temperature standards based on comparing the current and future baselines.

Table 4.8-4. No Project Alternative Average Temperature Projections (°F) November 1 – April 30 in the Stevens Creek CWMZ (STEV4)

Month	Current Baseline			Future Baseline		
	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average
November	68.7	60.0	52.3	68.7	59.8	52.1
December	61.3	53.6	50.6	61.3	53.5	50.6
January	55.8	52.6	50.6	55.5	52.1	50.3
February	60.5	54.0	51.2	60.4	53.8	51.1
March	65.0	59.2	52.7	65.0	59.4	53.7
April	67.4	62.0	53.8	67.4	62.6	55.7
6-month Season	63.1	56.9	51.9	63.0	56.9	52.2

Table 4.8-5 provides the No Project Alternative projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the No Project Alternative downstream of the Stevens Creek CWMZ based on comparing the current and future baselines.

Table 4.8-5. No Project Alternative Average Temperature Projections (°F) May 1 – October 31 Downstream of the Stevens Creek CWMZ (STEV3)

Month	Current Baseline			Future Baseline		
	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average
May	64.0	58.8	53.3	64.0	58.8	53.3
June	64.9	62.0	56.9	64.9	62.0	56.9
July	67.9	64.4	60.8	67.9	64.4	60.8
August	69.5	63.1	61.1	69.5	63.1	61.1
September	69.1	62.1	60.0	69.1	62.1	60.0
October	63.0	59.6	57.0	63.0	59.6	57.0
6-month Season	66.4	61.7	58.2	66.4	61.7	58.2

As indicated in Table 4.8-5, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F. Based on the results of the analysis of projected water temperatures downstream of the Stevens Creek CWMZ, the No Project Alternative would have no impact to surface water temperature standards based on comparing the current and future baselines.

As indicated in Table 4.8-6, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°FF. Based on the results of the analysis of projected water temperatures downstream of the Stevens Creek CWMZ, the No Project Alternative would have no impact to surface water temperature standards based on comparing the current and future baselines.

Table 4.8-6. No Project Alternative Average Temperature Projections (°F) November 1 – April 30 Downstream of the Stevens Creek CWMZ (STEV3)

Month	Current Baseline			Future Baseline		
	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average
November	57.6	53.4	47.8	57.6	53.4	47.8
December	60.7	49.0	44.0	60.7	49.0	44.0
January	54.1	48.6	46.7	54.1	48.6	46.7
February	58.1	50.2	48.5	58.1	50.2	48.5
March	58.4	52.2	49.7	58.4	52.2	49.7
April	56.8	53.4	51.4	56.8	53.4	51.4
6-month Season	57.6	51.1	48.0	57.6	51.1	48.0

Table 4.8-7 provides the No Project Alternative projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the No Project Alternative in the Guadalupe Creek CWMZ for both the current and future baselines.

Table 4.8-7. No Project Alternative Average Temperature Projections (°F) May 1 – October 31 in the Guadalupe Creek CWMZ (GCRK3)

Month	Current Baseline			Future Baseline		
	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average
May	61.4	57.6	51.7	61.1	56.8	51.7
June	65.8	60.4	55.3	65.8	58.4	53.5
July	65.8	60.5	51.8	65.9	58.3	51.9
August	65.8	60.3	51.8	64.9	59.1	51.8
September	65.1	60.4	54.4	64.6	59.8	54.4
October	69.4	54.6	49.4	69.6	56.6	49.4
6-month Season	65.6	59.0	52.4	65.3	58.2	52.1

As indicated in Table 4.8-7, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F. Based on the results of the analysis of projected water temperatures in the Guadalupe Creek CWMZ, the No Project Alternative would have no impact to surface water temperature standards based on comparing the current and future baselines.

As indicated in Table 4.8-8, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°F. Based on the results of the analysis of projected water temperatures in the Guadalupe Creek CWMZ, the No Project Alternative would have no impact to surface water temperature standards based on comparing the current and future baselines.

Table 4.8-8. No Project Alternative Average Temperature Projections (°F) November 1 – April 30 in the Guadalupe Creek CWMZ (GCRK3)

Month	Current Baseline			Future Baseline		
	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average
November	58.7	54.1	50.8	58.9	54.7	50.8
December	51.8	48.6	46.6	51.9	48.6	46.7
January	54.5	48.3	44.8	55.0	48.5	45.2
February	55.4	50.2	45.1	55.3	50.1	45.1
March	54.6	52.9	50.6	54.6	52.9	50.6
April	59.3	54.0	50.5	58.9	53.7	50.5
6-month Season	**55.7**	**51.3**	**48.1**	**55.8**	**51.4**	**48.2**

Table 4.8-9 provides the No Project Alternative projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the No Project Alternative downstream of the Guadalupe Creek CWMZ based on comparing the current and future baselines.

Table 4.8-9. No Project Alternative Average Temperature Projections (°F) May 1 – October 31 Downstream of the Guadalupe Creek CWMZ (GUAD3)

Month	Current Baseline			Future Baseline		
	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average
May	73.0	66.5	60.2	72.7	66.6	61.7
June	75.3	69.9	65.0	75.3	69.6	63.5
July	74.4	69.8	66.1	74.6	69.9	65.8
August	73.9	67.7	58.7	74.0	67.6	58.7
September	70.2	65.9	59.5	70.3	66.2	59.5
October	68.1	63.9	58.2	68.1	63.8	58.3
6-month Season	72.5	67.3	61.3	72.5	67.3	61.3

As indicated in Table 4.8-9, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F. Based on the results of the analysis of projected water temperatures downstream of the Guadalupe Creek CWMZ, the No Project Alternative would have no impact to surface water temperature standards based on comparing the current and future baselines.

As indicated in Table 4.8-10, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°F. Based on the results of the analysis of projected water temperatures downstream of the Guadalupe Creek CWMZ, the No Project Alternative would have no impact to surface water temperature standards based on comparing the current and future baselines.

Table 4.8-10. No Project Alternative Average Temperature Projections (°F) November 1 – April 30 Downstream of the Guadalupe Creek CWMZ (GUAD3)

Month	Current Baseline			Future Baseline		
	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average	High Monthly Temperature Average	Average Daily Temperature Monthly	Low Monthly Temperature Average
November	68.7	60.0	52.3	68.7	59.8	52.1
December	61.3	53.6	50.6	61.3	53.5	50.6
January	55.8	52.6	50.6	55.5	52.1	50.3
February	60.5	54.0	51.2	60.4	53.8	51.1
March	65.0	59.2	52.7	65.0	59.4	53.7
April	67.4	62.0	53.8	67.4	62.6	55.7
6-month Season	**63.1**	**56.9**	**51.9**	**63.0**	**56.9**	**52.2**

Dissolved Oxygen Water Quality Standard

Although there are no proposed flow measures under the No Project Alternative, decreases in temperature are predicted based on the change in the two baseline scenarios—current and future. The changes in temperature likely reflect the lifting of seismic restrictions. Because DO saturation increases as temperature decreases, it is unlikely that the No Project Alternative would violate this water quality standard, or otherwise substantially degrade water quality. Table 4.8-11 identifies the percentage of days, modeled over a 20-year period, where decreases by more than 5°F (2.8°C) would be expected. These percentages compare the current baseline with the future baseline scenarios.

Table 4.8-11. Percentage of Days with More than 5°F (2.8°C) Temperature Decreases Under the No Project Alternative Scenario

POI	Percentage of Days with Temperature Decrease
STEV4	0
GCRK3	4.25
ALAM1	3.80
CALE1	2.64
LOSG1	0.47
GUAD4	3.68

As noted in Table 4.8-11, the percentage of days with decreases by more than 5°F (2.8°C) in temperature are expected at all POIs considered except for STEV4. Given the relationship with temperature, increases in DO levels would be expected. Based on this analysis, the No Project Alternative would not result in substantial decreases in DO levels and overall would not violate this water quality standard, or otherwise substantially degrade water quality. In fact, DO levels would slightly improve. Therefore, there would be no adverse impact to DO levels.

pH Water Quality Standard

The No Project Alternative would continue any existing impairment related to pH levels. No action or activity would alter the current hydrological inputs of surface water pollutants into the system. Therefore, there would be no impact to pH levels.

Toxicity Water Quality Standard

The No Project Alternative would continue the existing impairment related to toxic substances as described under the environmental setting. The No Project Alternative would not result in additional inputs, re-suspend and/or redistribute substantial amounts of existing toxic substances (for example, mercury, pesticides, PCBs), introduce other toxic substances that would violate this water quality standard, or otherwise substantially degrade water quality. Therefore, there would be no impact to toxicity water quality.

Population and Community Ecology Water Quality Standard

The No Project Alternative would not include any action or activity that would alter the current hydrological inputs of surface water pollutants into the system that would substantially affect population and community ecology in such a way that would violate this water quality standard, or otherwise substantially degrade water quality. Therefore, there would be no impact to this standard.

Non-flow Measures Impact Analysis

Under the No Project Alternative, the non-flow measures of the Proposed Project would not be implemented. For this reason, there would be no impact to water quality standards.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, there would be no monitoring, maintenance, or adaptive management as with the Proposed Project. For this reason, there would be no impacts to water quality standards.

Significance Conclusion Summary

There would be **no impact** to applicable water quality standards with implementation of the No Project Alternative. Water temperatures would be consistent with existing conditions. No other water quality standard impacts would occur under the No Project Alternative.

There would be **no impacts** from non-flow measures or monitoring, maintenance, or adaptive management under the No Project Alternative.

4.8.2 Non-flow Measures Only Alternative

The impacts of the Non-flow Measures Only Alternative to water quality would be the same as the non-flow measures impacts identified in Section 3.5.4; that is, impacts from the non-flow measures on water quality could result from such actions as ground disturbance; soil compaction; disturbances to channel beds and banks; weir installation; channel modification; construction staging and access; and the removal of culverts, riprap, or other structures. Any of these activities could impact water quality in a variety of ways, as described below. Impacts of flow measures on water quality under the Non-flow Measures Only Alternative would be the same as those described for the No Project Alternative.

4.8.2.1 Impact WQ-1: Impair beneficial uses of surface waters (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to designated beneficial uses.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. Non-flow measures include fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the watersheds. These activities could require placement of fill (for example, for cofferdams and temporary access roads), hydrological interruption (for example, dewatering and diversion), and alteration of bed and bank that would result in short-term degradation of water quality (for example, increased sedimentation and turbidity).

These non-flow measures would result in short-term, construction-related impacts that could temporarily impact beneficial uses. Specifically, channel dewatering or other instream construction and water diversion could affect COLD, MIGR, RARE, SPAWN, and WILD. However, project planning to avoid certain periods like SPAWN and MIGR would limit impacts. The long-term benefits of these projects would improve these same beneficial uses in the long term by improving MIGR and increasing habitat availability for COLD, RARE, and WILD. Therefore, impacts to these beneficial uses would be less than significant. Other beneficials uses (that is, WARM, MUN, GWR, FRSH, REC1, and REC2) would likely remain unaffected. Implementation of Valley Water BMPs WQ-15, WQ-16, GEN-3, GEN-21 through GEN-27, and VEG-1 for those measures implemented by Valley Water would minimize the Non-flow Measures Only Alternative's effects on water quality by limiting activities and actions that could create sources of pollutants that could impair beneficial uses.

The Non-flow Measures Only Alternative would also adhere to VHP conditions 3, 4, and 5, where applicable, which would reduce Proposed Project impacts on water quality within the covered areas by maintaining the hydrologic condition to protect water quality and avoid water quality pollution related to construction and maintenance.

Although non-flow measures relative to the current baseline conditions could result in effects on surface water quality, which are analyzed in Impact WQ-2, they would not impair designated beneficial uses of the waters in the study area, and impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys, and would have no impact to water quality standards. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or PIT tag readers using noninvasive technology, and would also have no impact to water quality standards. Impacts of maintenance and AMP implementation related to the non-flow measures would be similar to that analyzed for the proposed non-flow measures and would likewise be less than significant.

Significance Conclusion Summary

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be **no impacts** on beneficial uses. The non-flow measures, associated maintenance activities, adaptive management, and monitoring under the Non-flow Measures Only Alternative could result in temporary impacts on surface water quality in the study area; they would not impair designated beneficial uses of the waters in the study area; and impacts would be **less than significant**. Long-term benefits to beneficial uses would occur with COLD, MIGR, RARE, SPWN, and WILD designated beneficial uses.

Mitigation

No mitigation would be necessary to reduce the impact of non-flow measures to a less-than-significant level.

4.8.2.2 Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to applicable surface water quality standards.

Non-flow Measures Impact Analysis

Non-flow measures include a range of actions that would occur both in-channel and up-slope of waterways that could affect surface water quality. Construction and maintenance activities associated with non-flow measures that could affect water quality standards include removal of riparian vegetation to access the work area, use and staging of heavy equipment within the channel, channel dewatering within the limits of the active work area, modification of channel bed and bank dimensions, and installation of new structures.

These non-flow measures would result in short-term, construction-related impacts that could temporarily increase surface water temperature from removal of riparian vegetation and manipulation of the stream channel. Specifically, channel dewatering or other instream construction and water diversion could increase temperatures. Increased temperatures would result in decreased DO levels. This non-flow measure would not likely affect local pH levels.

Construction along and within the streambed could result in inadvertent releases of oils and other pollutants because of leaks from construction equipment. However, Valley Water would implement BMPs, including pre-work inspections of equipment, to reduce this risk. Therefore, impacts to water quality standards would be less than significant.

Several suites of Valley Water BMPs have been designed to avoid and minimize potential impacts, including the Bank Protection Suite, Stormwater Management Suites, and Sediment Removal and Storage Suite. Examples of these BMPs include Valley Water BMPs WQ-15, WQ-16, GEN-3, GEN-21 through GEN-27, and VEG-1. These BMPs would minimize the Project's detrimental effects on water quality by limiting activities and actions that could create sources of pollutants.

Other BMPs include VHP conditions 3, 4, and 5, which, where applicable, would avoid and reduce impacts on water quality in VHP-covered areas by maintaining the hydrologic condition to protect water quality and avoid water quality pollution related to construction and maintenance. Valley Water BMPs apply to barrier remediation measures in Stevens Creek and in all creeks for other Valley

Water-implemented instream non-flow measures. VHP conditions apply to non-flow measures being implemented within the boundaries of the VHP. As a result, impacts of the non-flow measures under the Non-flow Measures Only Alternative would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys, and would have no impact to water quality standards. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or PIT tag readers using noninvasive technology, and would also have no impact to water quality standards. Water quality impacts of maintenance of non-flow measures, and AMP adaptive management of non-flow, would be similar to those analyzed for these measures, and would likewise be less than significant.

Significance Conclusion Summary

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be **no impacts** on water quality standards.

The non-flow measures could result in temporary impacts on surface water quality in the study area and as a result of construction of non-flow measures. Implementation of Valley Water BMPs and VHP conditions in Stevens Creek locations for barrier locations and in all creeks for other non-flow measures would result in Impact WQ-2 being **less than significant** since it would not violate any applicable surface water quality standards or waste discharge requirements, or substantially degrade water quality. In the long term, the Non-flow Measures Only Alternative non-flow measures could improve water quality.

Mitigation

No mitigation would be necessary to reduce the impact of non-flow measures to a less-than-significant level.

4.8.3 FAHCE-plus Alternative

Under the FAHCE-plus Alternative, rule curves would be modified compared to the Proposed Project. The impacts of this modification on water quality are discussed below. The non-flow measures of the FAHCE-plus Alternative would be identical to those of the Proposed Project and analyzed in Section 3.5.4. Effects of monitoring and maintenance of habitat improvements are included in the analysis.

4.8.3.1 Impact WQ-1: Impair beneficial uses of surface waters (less than significant)

Flow Measures Impact Analysis

Implementation of the flow measures would affect water temperature to support fish habitat in the two watersheds consistent with beneficial uses identified in the Basin Plan (see Section 3.5.2.2). The effects of the flow measures on beneficial uses associated with the two watersheds are described below.

Cold Freshwater Habitat (COLD)

The COLD beneficial use is one that supports a cold-water ecosystem, with habitats that generally support trout and may support anadromous salmon and steelhead fisheries, among other species. A detailed analysis of the FAHCE-plus Alternative impacts on steelhead and Chinook salmon is presented in Section 4.10, *Impact Analysis on Aquatic Biological Resources*. Impacts or benefits to these cold-water fish species would represent changes to the COLD beneficial use. Based on the analysis presented in Section 4.10, when compared with the current baseline, the FAHCE-plus Alternative would benefit steelhead spawning, fry rearing, and juvenile rearing habitat, and would increase upstream passage opportunities for adult steelhead to the lower reaches of the watershed. Similarly, cold-water habitat would be maintained for Chinook salmon and other cold-water species, though some seasonal modifications may occur based on flows and species-specific life history timing. Overall, there would be beneficial impacts or no adverse impact to COLD as a result of the FAHCE-plus Alternative because the COLD beneficial use would be maintained and not impaired.

Warm Freshwater Habitat (WARM)

WARM is defined as uses of water that support warm water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats; vegetation; fish; or wildlife, including invertebrates. The warm freshwater habitats supporting bass, bluegill, perch, and other fish are generally lakes and reservoirs. To determine whether the FAHCE-plus Alternative would impair the WARM beneficial use, the impact analysis focuses on the availability of warm freshwater spawning and embryo habitat, as it relates to reservoir levels, from March to mid-June.

Table 4.8-12 describes the number of days over the 20-year modeled period for the current baseline where reservoir levels provided suitable warm water habitat for spawning and embryo development during the critical period between March and mid-July. It also describes the projected number of days based on the modeled 2015 FAHCE-plus Alternative and indicates any differences in terms of days or percent change.

Table 4.8-12. 2015 Number of Successful Daily Warm-water Fish Spawning Cohorts

Reservoir	Current Baseline[a]				2015 FAHCE-plus				Difference	
	March	April	May	June[b]	March	April	May	June[b]	Days	%[c]
Stevens Creek	649	630	651	273	649	630	651	273	0	0.0
Almaden	651	627	649	273	651	627	649	273	0	0.0
Calero	646	630	651	273	646	630	651	273	0	0.0
Guadalupe	649	629	623	238	646	530	651	273	-39	0.0
Lexington	651	626	433	91	651	626	465	108	+49	0.1

[a] modeled over a 20-year period (1990 to 2010)
[b] March 1 through June 13 was used as the warm-water fish spawning period.
[c] rounded to the nearest tenth

Based on this analysis, only Guadalupe Reservoir would see a decrease in days with suitable habitat over the modeled period (39), which would be discountable as the percent change is 0.0 percent (as rounded). There would be no change in the availability of warm water habitat for Stevens Creek, Almaden, and Calero Reservoirs from the modeled 2015 FAHCE-plus Alternative compared to the current baseline. Lexington Reservoir would see a slight increase of 49 days. However, Lexington Reservoir would show a barely discernable change of 0.1 percent (based on rounding). As described above, the literature seems to indicate that change in the number of average annual total successful spawning cohorts of 10 percent or more is used as a potential substantial change in reservoir warm-water fish populations. Based on this analysis, there would be no meaningful change in the number of total successful spawning cohorts in warm water habitat from the implementation of the modeled 2015 FAHCE-plus Alternative that would impair the WARM beneficial use.

Table 4.8-13 describes the number of days over the 20-year modeled period for the future baseline where reservoir levels provide suitable warm water habitat for spawning and embryo development during the critical period between March and mid-July. It also describes the projected number of days based on the modeled 2035 FAHCE-plus Alternative and indicates any differences in terms of days or percent change.

Table 4.8-13. 2035 Availability of Warm-water Spawning and Embryo Development Reservoir Habitat

Reservoir	Future Baseline[a]				2035 FAHCE-plus				Difference	
	March	April	May	June[b]	March	April	May	June[b]	Days	%[c]
Stevens Creek	649	630	651	273	649	630	651	273	0	0.0
Almaden	651	627	650	273	651	627	650	273	0	0.0
Calero	651	624	647	273	647	628	648	273	+1	0.0
Guadalupe	651	627	497	133	585	484	651	273	+85	0.1
Lexington	651	626	438	89	651	626	465	108	+46	0.1

[a] modeled over a 20-year period (1990 to 2010)
[b] March 1 through June 13 was used as the warm-water fish spawning period.
[c] rounded to the nearest tenth

Based on this analysis, none of the reservoirs would experience decreases in days with suitable habitat over the modeled period. There would be no change in the availability of warm-water habitat for Stevens Creek and Almaden Reservoirs from the modeled 2035 FAHCE-plus Alternative compared to the future baseline. Calero, Guadalupe, and Lexington Reservoirs would see increases in the number of days: 1, 85, and 46, respectively. However, these would only result in barely discernible changes of 0.1 percent for Guadalupe and Lexington Reservoirs, and no change in Calero Reservoir. As described above, the literature seems to indicate that change in the number of average annual total successful spawning cohorts of 10 percent or more is used as a potential substantial change in reservoir warm-water fish populations. Based on this analysis, there would be no meaningful change in the number of total successful spawning cohorts in warm-water habitat from the implementation of the modeled 2035 FAHCE-plus Alternative that would impair the WARM beneficial use.

Fish Migration (MIGR)

Many of the study area stream reaches are designated as having the beneficial use of MIGR. This beneficial use may be affected by changes in water temperature. Changes in modeled habitat suitability, including thermal suitability and migration corridors, for fish species in the study area are evaluated in Section 4.10, *Impact Analysis on Aquatic Biological Resources*, and are not evaluated in detail this section. However, the FAHCE-plus Alternative flow measures are intended to improve the MIGR beneficial use in the long term, especially for steelhead. As described Section 4.10, the FAHCE-plus Alternative would improve migration conditions for steelhead; however, given the timing of flow releases, there could be impacts to Chinook salmon. Based on this analysis, the overall impact to MIGR would be less than significant.

Preservation of Rare and Endangered Species (RARE)

Overall impacts on rare and endangered species were found to be less than significant in Section 4.10, *Impact Analysis on Aquatic Biological Resources*, while a number of benefits are realized. Section 4.11, *Impact Analysis on Terrestrial Biological Resources,* also considered impacts to rare and endangered species that could be affected by changes in flow. It is unlikely that the changes in flows would have substantial adverse effects on special-status plant and wildlife species, given the timing and ramping rates implemented. Aquatic special-status wildlife could be affected, but impacts would be less than significant. Overall, short-term impacts to RARE would be less than significant, though flow measures are intended to provide long-term benefits to the RARE beneficial use.

Fish Spawning (SPWN)

Many of the study area stream reaches are designated as having the beneficial use of SPWN. This beneficial use may be affected by changes in water temperature. Changes in modeled habitat suitability, including thermal suitability, for fish species in the study area are evaluated in Section 4.10, *Impact Analysis on Aquatic Biological Resources*, and are not evaluated in detail this section. However, the intent of the FAHCE-plus Alternative is to increase availability to spawning areas and provide long-term benefits to this beneficial use. Based on the analysis presented in Section 4.10, when compared with the current baseline, the FAHCE-plus Alternative would benefit steelhead, Pacific lamprey, Chinook salmon spawning, fry rearing, and juvenile rearing habitat. As such, the FAHCE-plus Alternative would have no impact to the SPWN beneficial use.

Wildlife Habitat (WILD)

Impacts on wildlife habitat from proposed flow measures were found to be less than significant based on the analysis described in Section 4.11, *Impact Analysis on Terrestrial Biological Resources*. The slow ramping up of flows will limit impacts to wildlife habitat as flows outside the current banks of the streams would be rare and similar to the current baseline. For those wildlife species that are reliant on water availability, the FAHCE-plus Alternative flow measures would provide benefits by providing additional water during the drier seasons. Overall, impacts to the WILD beneficial use would be less than significant.

Municipal Supply (MUN)

As discussed in Section 4.7, *Impact Analysis on Water Supply*, the FAHCE-plus Alternative's flow measures would not impair this beneficial use. FAHCE-plus Alternative conditions would not have a significant effect on overall average water supply. Potential shortages would occur with or without the FAHCE-plus Alternative. Impacts on the MUN beneficial use would be less than significant.

Groundwater Recharge (GWR)

As discussed in Section 4.6, *Impact Analysis on Groundwater Resources*, modeling indicates that impacts on groundwater resources would be less than significant or not occur with the implementation of the FAHCE-plus Alternative. Substantial reductions in groundwater supplies are not projected, including reductions that could cause undesirable results. Any reduction would be less than 5 percent and would not impair this beneficial use.

Freshwater Replenishment (FRSH)

As discussed in Section 4.5, *Impact Analysis for Hydrology*, modeling indicates that impacts on surface water resources would be less than significant or not occur with implementation of the FAHCE-plus Alternative. Similarly, as discussed in Section 4.7, *Impact Analysis on Water Supply*, the

FAHCE-plus Alternative flow measures would not impair the MUN beneficial use. The FAHCE-plus Alternative would continue to use water for the natural or artificial maintenance of surface water quantity and quality. The FAHCE-plus Alternative would provide changes in flows that would maintain or improve surface water quantity or quality while still meeting Valley Waters water supply obligations. There would be changes in the timing and quality of flows under the FAHCE-plus Alternative; however, the impacts to FRSH would be less than significant. There would be no impairment of the FRSH beneficial use.

Water Contact Recreation (REC1)

As discussed in Section 4.9, *Impact Analysis on Recreation,* the FAHCE-plus Alternative flow measures would not impair this beneficial use as neither the flow nor non-flow measures would have a significant impact to both reservoir- and stream-based water contact recreation.

Noncontact Water Recreation (REC2)

As discussed in Section 4.9, *Impact Analysis on Recreation,* the FAHCE-plus Alternative flow measures would not impair this beneficial use because impacts on noncontact water recreation and associated infrastructure would be less than significant.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures and adds to the assessment completed for Impact WQ-1. The non-flow measures included in the FAHCE-plus Alternative that could result in impacts are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the watersheds. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation that could affect water quality include removal of riparian vegetation to access the work area, use and staging of heavy equipment within the channel, channel dewatering within the limits of the active work area, modification of channel bed and bank dimensions, and installation of new structures. Other short-term impacts from construction-related activities such as staging equipment and channel dewatering would not affect the course of FAHCE-plus Alternative channels.

These fish barrier remediation projects would result in short-term, construction-related impacts that could temporarily impact beneficial uses. Specifically, channel dewatering or other instream construction and water diversion could affect COLD, MIGR, RARE, SPAWN, and WILD. However, project planning to avoid certain periods like SPAWN and MIGR would limit impacts. The long-term benefits of these projects would improve these same beneficial uses in the long term by improving MIGR and increasing habitat availability for COLD, RARE, and WILD. Therefore, impacts to these beneficial uses would be less than significant. Other beneficials uses (that is, WARM, MUN, GWR, FRSH, REC1, and REC2) would likely remain unaffected.

Implementation of Valley Water BMPs WQ-15, WQ-16, GEN-3, GEN-22, GEN-27, and VEG-1 would minimize the effects of FAHCE-plus Alternative non-flow measures on beneficial uses by limiting activities and actions that could impair beneficial uses.

The FAHCE-plus Alternative would also adhere to VHP conditions 3, 4, and 5, where applicable, which would reduce Project impacts on water quality within the covered areas by maintaining the hydrologic condition to protect water quality and to avoid water quality pollution related to construction and maintenance.

Although FAHCE-plus Alternative non-flow measures relative to the current baseline conditions could result in short-term construction effects to certain beneficial uses, they would not impair designated beneficial uses of the waters in the study area, and impacts would be less than significant.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects that could affect designated beneficial uses include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Other short-term impacts from construction-related activities such as bank modification would not affect the course of FAHCE-plus Alternative channels. Impacts to beneficial uses would be the same as described for fish barrier remediation projects described above. However, the long-term benefits would improve COLD, SPWN, RARE, MIGR, and WILD by providing improved habitat conditions. Therefore, impacts to these beneficial uses would be less than significant. Other beneficials uses (that is, WARM, MUN, GWR, FRSH, REC1, and REC2) would likely remain unaffected.

Implementation of Valley Water BMPs WQ-15, WQ-16, GEN-3, GEN-21, GEN-22, GEN-27, and VEG-1 would minimize the effects of FAHCE-plus Alternative non-flow measures on water quality by limiting activities and actions that could impair beneficial uses.

The FAHCE-plus Alternative would also adhere to VHP conditions 3, 4, and 5, where applicable, which would reduce FAHCE-plus Alternative impacts on designated beneficial uses.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects on certain designated beneficial uses, they would not impair designated beneficial uses of the waters in the study area, and impacts would be less than significant.

Other Non-flow Measures

The Stevens Creek Multiport Project would allow for additional flows during summer months from the Stevens Creek Reservoir; however, additional flows during summer months would be consistent with the flow measures analyzed above. Construction-related impacts would be similar to those described above for other non-flow measures. Overall, the impacts of the FAHCE-plus Alternative to designated beneficial uses would be less than significant.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, the geomorphic function enhancement measures would impact the same beneficial uses in the short term; however, they would not result in impairments. Similarly, impacts would be less than significant.

Implementation of Valley Water BMPs WQ-15, WQ-16, GEN-3, GEN-21, GEN-22, GEN-27, and VEG-1 would minimize the effects of FAHCE-plus Alternative non-flow measures on beneficial uses.

The FAHCE-plus Alternative would also adhere to VHP conditions 3 and 5, where applicable, which would reduce FAHCE-plus Alternative impacts designated beneficial uses within the covered areas.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects on designated beneficial uses (that is, COLD, MIGR, RARE, SPWN, and WILD), they would not impair designated beneficial uses of the waters in the study area, and impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys, and would have no impact to designated beneficial uses. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or PIT tag readers using noninvasive technology, and would also have no impact to water quality standards. Maintenance and AMP implementation related to the non-flow measures would be similar to that analyzed for the proposed non-flow measures and would likewise be less than significant. Water quality impacts of maintenance of non-flow measures, and AMP adaptive management of both flow and non-flow measures, would be similar to those analyzed for these measures, and would likewise be less than significant.

Significance Conclusion Summary

Implementation of flow measures, including monitoring and adaptive management, would at most result in **less-than-significant** impacts to beneficial uses under the FAHCE-plus Alternative.

None of the beneficial uses would be impaired. Beneficial impacts to beneficial uses in all creeks would be associated with COLD, MIGR, RARE, SPWN, and WILD.

Implementation of the FAHCE-plus Alternative non-flow measures, including maintenance, monitoring, and adaptive management, would not result in an impairment of designated beneficial uses; impacts would be **less than significant**. Long-term benefits to beneficial uses would occur with the COLD, MIGR, RARE, SPWN, and WILD designated beneficial uses.

Mitigation

No mitigation would be required for Impact WQ-1.

4.8.3.2 Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality (less than significant)

Flow Measures Impact Analysis

The following is an analysis of water quality standards (or applicable parts of the standards) that Valley Water assumes could be affected by the proposed flow measures under the FAHCE-plus Alternative.

Surface Water Temperature

As described in the methodology in Section 3.5.3, this surface water temperature analysis focuses on the ability for Valley Water to provide certain water temperatures in the two CWMZs. It also provides an analysis of water temperatures farther downstream from the CWMZs, as other temperature inputs (warm and cold) limit the control of Valley Water on downstream temperatures.

The selected representative POI for evaluation of the Stevens Creek CWMZ was STEV4, with STEV3 representing the downstream POI outside of the CWMZ. For the Guadalupe Creek CWMZ, POI GCRK3 was analyzed. POI GUAD3 represented the downstream area of the Guadalupe River watershed. The analysis examines the wet and dry seasons separately and provides both monthly average daily temperatures and seasonal (6-month) average daily temperatures. In addition, the analysis identifies the highest and lowest average daily temperatures by month and season.

Current Baseline Analysis

Table 4.8-14 provides the 2015 FAHCE-plus Alternative projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the flow measures in the Stevens Creek CWMZ as compared to the current baseline.

Table 4.8-14. 2015 FAHCE-plus Alterative Average Temperature Projections (°F) May 1 – October 31 in the Stevens Creek CWMZ (STEV4) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
May	62.8	62.8	58.5	58.2	52.5	53.1
June	63.3	63.3	60.7	60.5	56.9	56.9
July	66.5	64.5	62.3	62.0	58.9	58.9
August	67.8	66.8	62.1	61.7	60.2	60.3
September	67.7	66.8	61.5	61.4	59.0	59.5
October	61.8	62.9	59.8	60.2	56.3	58.2
6-month Season	65.0	64.5	60.8	60.7	57.3	57.8

As indicated in Table 4.8-14, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F. However, with the exception of October, all projected monthly average daily temperatures are negligibly higher than the current baseline. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season in the CWMZ.

As indicated in Table 4.8-15, all projected monthly average daily temperatures between November 1 and April 30 are below 71.6°F. All monthly daily averages would be below the current baseline as well as the Settlement Agreement objective of 66.2°F during this season.

Table 4.8-15. 2015 FAHCE-plus Alterative Average Temperature Projections (°F) November 1 – April 30 in the Stevens Creek CWMZ (STEV4) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
November	58.9	68.7	54.7	60.0	50.7	52.3
December	57.3	61.3	50.7	53.6	46.4	50.6
January	54.4	55.8	48.8	52.6	47.8	50.6
February	54.1	60.5	49.9	54.0	48.3	51.2
March	54.1	65.0	51.8	59.2	49.4	52.7
April	56.0	67.4	53.1	62.0	51.3	53.8
6-month Season	55.8	63.1	51.5	56.9	49.0	51.9

Based on the results of the analysis of projected water temperatures in the Stevens Creek CWMZ, the 2015 FAHCE-plus Alternative would have no impact to surface water temperature.

Table 4.8-16 provides the 2015 FAHCE-plus Alternative projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the flow measures downstream of the Stevens Creek CWMZ as compared to the current baseline.

Table 4.8-16. 2015 FAHCE-plus Alterative Average Temperature Projections (°F) May 1 – October 31 Downstream of Stevens Creek CWMZ (STEV3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
May	64.3	64.0	59.2	58.8	52.8	53.3
June	65.2	64.9	62.3	62.0	56.9	56.9
July	70.5	67.9	64.8	64.4	60.8	60.8
August	71.9	69.5	63.8	63.1	60.6	61.1
September	71.3	69.1	62.3	62.1	59.4	60.0
October	61.9	63.0	59.3	59.6	55.8	57.0
6-month Season	67.5	66.4	62.0	61.7	57.7	58.2

As illustrated in Table 4.8-16, all projected monthly average daily temperatures between May 1 and October 31 are below 71.6°F. However, with the exception of October, all projected monthly average daily temperatures are negligibly higher than the current baseline. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season immediately downstream of the CWMZ, though some periods may exceed that objective by 5.7°F based on the maximum (high) average monthly temperature. This analysis begins to illustrate the effects of additional temperature inputs farther downstream from the CWMZ.

Table 4.8-17 provides the 2015 FAHCE-plus Alternative projections of the monthly and seasonal (November 1 to April 30) average daily temperatures based on implementation of the flow measures in the Stevens Creek CWMZ as compared to the current baseline.

Table 4.8-17. 2015 FAHCE-plus Alterative Average Temperature Projections (°F) November 1 – April 30 Downstream of the Stevens Creek CWMZ (STEV3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
November	57.5	57.6	53.3	53.4	48.1	47.8
December	60.1	60.7	50.1	49.0	45.9	44.0
January	54.0	54.1	48.6	48.6	47.3	46.7
February	54.4	58.1	50.0	50.2	48.5	48.5
March	54.4	58.4	52.1	52.2	49.7	49.7
April	57.0	56.8	53.5	53.4	51.1	51.4
6-month Season	56.2	57.6	51.3	51.1	48.4	48.0

As indicated in Table 4.8-17, all projected monthly average daily temperature between November 1 and April 30 are below 71.6°F, and there are only negligible differences with the current baseline. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season downstream of the CWMZ.

Table 4.8-18 provides the 2015 FAHCE-plus Alternative projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the flow measures downstream of the Guadalupe Creek CWMZ as compared to the current baseline.

Table 4.8-18. 2015 FAHCE-plus Alterative Temperature Projections (°F) May 1 – October 31 in the Guadalupe Creek CWMZ (GCRK3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
May	63.6	61.4	59.2	57.6	52.4	51.7
June	68.6	65.8	64.0	60.4	56.6	55.3
July	69.0	65.8	62.0	60.5	57.3	51.8
August	67.2	65.8	62.7	60.3	56.9	51.8
September	66.9	65.1	61.8	60.4	54.8	54.4
October	63.3	69.4	51.8	54.6	49.2	49.4
6-month Season	66.5	65.6	60.2	59.0	54.5	52.4

As indicated in Table 4.8-18, all projected monthly average daily temperature between May 1 and October 31 are below 71.6°F. However, water temperatures would be higher than the current baseline except for October. All monthly daily averages would be below the Settlement Agreement objective of 64.4°F during this season in the CWMZ, though some periods may exceed that by 2.8°F based on the maximum (high) average monthly temperature.

As indicated in Table 4.8-19, all projected monthly average daily temperature between November 1 and April 30 are below 71.6°F in the Guadalupe Creek CWMZ, and there would be only negligible differences with the current baseline. All monthly daily averages would be below the Settlement Agreement objective of 64.4°F during this season.

Table 4.8-19. 2015 FAHCE-plus Alterative Temperature Projections (°F) November 1 – April 30 in the Guadalupe Creek CWMZ (GCRK3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
November	57.5	58.7	53.4	54.1	50.6	50.8
December	52.6	51.8	48.7	48.6	46.8	46.6
January	53.2	54.5	47.8	48.3	45.0	44.8
February	55.5	55.4	50.6	50.2	45.0	45.1
March	54.2	54.6	52.7	52.9	50.6	50.6
April	58.7	59.3	53.8	54.0	50.5	50.5
6-month Season	55.3	**55.7**	51.2	**51.3**	48.1	**48.1**

Based on the results of the analysis of project water temperatures in the Guadalupe Creek CWMZ, the 2015 FAHCE-plus Alternative would have a less-than-significant impact to surface water temperature, with only rare occasions of exceeding current baseline or Settlement Agreement temperatures.

Table 4.8-20 provides the 2015 FAHCE-plus Alternative projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the flow measures downstream of the Guadalupe Creek CWMZ in the Guadalupe River as compared to the current baseline.

Table 4.8-20. 2015 FAHCE-plus Alterative Average Temperature Projections (°F) May 1 – October 31 Downstream of the Guadalupe Creek CWMZ in the Guadalupe River (GUAD3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
May	73.7	73.0	66.7	66.5	60.1	60.2
June	76.0	75.3	70.4	69.9	64.6	65.0
July	74.3	74.4	70.0	69.8	66.6	66.1
August	73.9	73.9	67.9	67.7	59.7	58.7
September	70.2	70.2	65.9	65.9	60.2	59.5
October	68.0	68.1	64.0	63.9	60.2	58.2
6-month Season	72.7	72.5	67.5	67.3	61.9	61.3

As illustrated in Table 4.8-20, all projected monthly average daily temperature between May 1 and October 31 are below 71.6°F, and there are only negligible differences with the current baseline. However, monthly daily averages would exceed, during certain months, the Settlement Agreement objective of 64.4°F established for the upstream CWMZ. Based on the maximum (high) average monthly temperature, water temperature could exceed 71.6°F. This illustrates additional temperature inputs farther downstream from the CWMZ.

Table 4.8-21 provides the 2015 FAHCE-plus Alternative projections of the monthly and seasonal (November 1 to April 30) daily average downstream temperatures based on implementation of the flow measures in the Guadalupe Creek CWMZ as compared to the current baseline.

Table 4.8-21. 2015 FAHCE-plus Alterative Average Temperature Projections (°F) November 1 – April 30 Downstream of the Guadalupe Creek CWMZ in the Guadalupe River (GUAD3) as Compared to the Current Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Current Baseline	Proposed Project	Current Baseline	Proposed Project	Current Baseline
November	68.6	68.7	60.8	60.0	52.4	52.3
December	61.3	61.3	53.5	53.6	50.7	50.6
January	55.5	55.8	52.2	52.6	50.4	50.6
February	60.0	60.5	54.2	54.0	51.1	51.2
March	64.5	65.0	59.4	59.2	52.7	52.7
April	68.6	67.4	62.8	62.0	53.8	53.8
6-month Season	63.1	**63.1**	57.1	**56.9**	51.8	**51.9**

As indicated in Table 4.8-21, all projected monthly average daily temperature between November 1 and April 30 are below 71.6°F downstream of the Guadalupe Creek CWMZ, and there would be only negligible differences with the current baseline. In fact, all monthly daily averages would be below the Settlement Agreement objective of 64.4°F during this season. Based on the maximum (high) average monthly temperature, water temperature could exceed 71.6°F. This illustrates additional temperature inputs farther downstream from the CWMZ.

Future Baseline Analysis

This analysis also considers potential impacts to surface water temperature based on the 2035 FAHCE-plus Alternative compared to the future baseline using the same methods and POIs described above for the 2015 FAHCE-plus Alternative.

Table 4.8-22 provides the 2035 FAHCE-plus Alternative projections of the monthly and seasonal (May 1 to October 31) average daily average temperatures based on implementation of the flow measures in the Stevens Creek CWMZ as compared to the future baseline.

Table 4.8-22. 2035 FAHCE-plus Alterative Average Temperature Projections (°F) May 1 – October 31 in the Stevens Creek CWMZ (STEV4) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
May	64.0	62.8	59.0	58.2	53.0	53.1
June	63.6	63.3	61.0	60.5	56.9	56.9
July	67.0	65.1	62.7	62.0	59.0	58.9
August	67.4	66.8	62.3	61.7	60.4	60.3
September	67.4	66.8	61.5	61.4	59.3	59.5
October	61.5	62.9	59.3	60.2	55.9	58.2
6-month Season	65.2	64.6	61.0	60.7	57.4	57.8

As indicated in Table 4.8-22, all projected monthly average daily temperature between May 1 and October 31 are below 71.6°F, and there are only negligible differences with the future baseline. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season in the CWMZ. However, based on the maximum (high) average monthly temperature, water temperature could exceed both 66.2°F for limited durations. Based on the results of the analysis of water temperatures in the Stevens Creek CWMZ, the 2035 FAHCE-plus Alternative would have a less-than-significant impact to surface water temperature, with only rare occasions of exceeding Settlement Agreement temperatures.

As indicated in Table 4.8-23, all projected monthly average daily temperature between November 1 and April 30 are below 71.6°F, as well as the future baseline temperatures. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season.

Table 4.8-23. 2035 FAHCE-plus Alterative Average Temperature Projections (°F) November 1 – April 30 in the Stevens Creek CWMZ (STEV4) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
November	58.5	68.7	54.6	59.8	50.7	52.1
December	55.7	61.3	50.0	53.5	46.4	50.6
January	54.4	55.5	48.8	52.1	47.9	50.3
February	53.4	60.4	49.8	53.8	48.1	51.1
March	53.3	65.0	51.7	59.4	49.4	53.7
April	56.0	67.4	53.2	62.6	51.4	55.7
6-month Season	58.5	63.0	54.6	56.9	50.7	52.2

Based on the results of the analysis of project water temperatures in the Stevens Creek CWMZ, the 2035 FAHCE-plus Alternative would have no impact to surface water temperature.

Table 4.8-24 provides the 2035 FAHCE-plus Alternative projections of the monthly and seasonal (May 1 to October 31) average daily temperatures based on implementation of the flow measures downstream of the Stevens Creek CWMZ, as compared to the future baseline.

Table 4.8-24. 2035 FAHCE-plus Alterative Average Temperature Projections (°F) May 1 – October 31 Downstream of Stevens Creek CWMZ (STEV3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
May	64.3	64.0	59.2	58.8	52.8	53.3
June	65.2	64.9	62.3	62.0	56.9	56.9
July	70.5	67.9	64.8	64.4	60.8	60.8
August	71.9	69.5	63.8	63.1	60.6	61.1
September	71.3	69.1	62.3	62.1	59.4	60.0
October	61.9	63.0	59.3	59.6	55.8	57.0
6-month Season	67.5	66.4	62.0	61.7	57.7	58.2

As illustrated in Table 4.8-24, all projected monthly average daily temperature between May 1 and October 31 are below 71.6°F. Monthly daily averages would meet the Settlement Agreement objective of 66.2°F established for the upstream CWMZ. However, based on the maximum (high) average monthly temperature, water temperature could exceed 71.6°F at certain times by up to 0.3°F. This illustrates additional temperature inputs farther downstream from the CWMZ.

As indicated in Table 4.8-25, all projected monthly average daily temperature between November 1 and April 30 are below 71.6°F, and there would be only negligible differences from future baseline temperatures. All monthly daily averages would be below the Settlement Agreement objective of 66.2°F during this season downstream of the CWMZ.

Table 4.8-25. 2035 FAHCE-plus Alterative Average Temperature Projections (°F) November 1 – April 30 Downstream of the Stevens Creek CWMZ (STEV3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
November	57.5	57.6	53.3	53.4	48.1	47.8
December	60.1	60.7	50.1	49.0	45.9	44.0
January	54.0	54.1	48.6	48.6	47.3	46.7
February	54.4	58.1	50.0	50.2	48.5	48.5
March	54.4	58.4	52.1	52.2	49.7	49.7
April	57.0	56.8	53.5	53.4	51.1	51.4
6-month Season	56.2	57.6	51.3	51.1	48.4	48.0

Table 4.8-26 provides the 2035 FAHCE-plus Alterative projections of the monthly and seasonal (May 1 to October 31) daily average temperatures based on implementation of the flow measures in the Guadalupe Creek CWMZ as compared to the future baseline.

Table 4.8-26. 2035 FAHCE-plus Alterative Temperature Projections (°F) May 1 – October 31 in the Guadalupe Creek CWMZ (GCRK3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
May	63.6	61.1	59.0	56.8	52.7	51.7
June	68.6	65.8	62.9	58.4	57.8	53.5
July	69.0	65.9	63.2	58.3	57.1	51.9
August	67.2	64.9	62.1	59.1	56.8	51.8
September	66.9	64.6	61.4	59.8	54.9	54.4
October	63.6	69.6	53.3	56.6	49.2	49.4
6-month Season	66.5	65.3	60.3	58.2	54.7	52.1

As illustrated in Table 4.8-26, all projected monthly average daily temperature between May 1 and October 31 are below 71.6°F, although the Proposed Project would exceed future baseline temperatures. Monthly daily averages would also meet the Settlement Agreement objective of 64.4°F established for the CWMZ. However, the Settlement Agreement could be exceeded for certain short periods as illustrated by the high average monthly temperature.

As indicated in Table 4.8-27, all projected monthly average daily temperature between November 1 and April 30 are below 71.6°F, and there would be only negligible differences from future baseline temperatures in the Guadalupe Creek CWMZ. All monthly daily averages would be below the Settlement Agreement objective of 64.4°F during this season.

Table 4.8-27. 2035 FAHCE-plus Alterative Temperature Projections (°F) November 1 – April 30 in the Guadalupe Creek CWMZ (GCRK3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
November	57.6	58.9	53.5	54.7	50.6	50.8
December	51.8	51.9	48.6	48.6	46.8	46.7
January	53.2	55.0	47.7	48.5	43.3	45.2
February	55.4	55.3	50.7	50.1	45.2	45.1
March	54.1	54.6	52.7	52.9	50.6	50.6
Aril	58.7	58.9	53.7	53.7	50.5	50.5
6-month Season	55.1	**55.8**	51.2	**51.4**	47.8	**48.2**

Based on the results of the analysis of projected water temperatures in the Guadalupe Creek CWMZ, the 2035 FAHCE-plus Alterative would have a less-than-significant impact to surface water temperature, with only rare occasions of exceeding Settlement Agreement temperatures.

Table 4.8-28 provides the 2035 FAHCE-plus Alterative projections of the monthly and seasonal (May 1 to October 31) average daily temperatures based on implementation of the flow measures downstream of the Guadalupe Creek CWMZ in the Guadalupe River as compared to the future baseline.

Table 4.8-28. 2035 FAHCE-plus Alterative Average Temperature Projections (°F) May 1 – October 31 Downstream of the Guadalupe Creek CWMZ in the Guadalupe River (GUAD3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
May	72.6	72.7	66.1	66.6	59.9	61.7
June	75.9	75.3	70.2	69.6	64.1	63.5
July	74.5	74.6	70.0	69.9	66.7	65.8
August	74.0	74.0	68.0	67.6	60.3	58.7
September	70.4	70.3	66.1	66.2	60.7	59.5
October	68.0	68.1	63.8	63.8	60.2	58.3
6-month Season	72.6	72.5	67.4	67.3	62.0	61.3

As illustrated in Table 4.8-28, all projected monthly average daily temperature between May 1 and October 31 are below 71.6°F, and there would be only negligible differences from future baseline temperatures. During certain months, average daily temperatures would exceed the Settlement Agreement objective of 64.4°F established for the upstream CWMZ. Based on the maximum (high) average monthly temperature, water temperature would exceed 71.6°F. This illustrates additional temperature inputs farther downstream from the CWMZ.

As indicated in Table 4.8-29, all projected monthly average daily temperature between November 1 and April 30 are below 71.6°F downstream of the Guadalupe Creek CWMZ , and there would be only negligible differences from future baseline temperatures.

Table 4.8-29. 2035 FAHCE-plus Alterative Average Temperature Projections (°F) November 1 – April 30 Downstream of the Guadalupe Creek CWMZ in the Guadalupe River (GUAD3) as Compared to the Future Baseline

Month	High Monthly Temperature Average		Average Daily Temperature Monthly		Low Monthly Temperature Average	
	Proposed Project	Future Baseline	Proposed Project	Future Baseline	Proposed Project	Future Baseline
November	68.6	68.7	60.7	59.8	52.4	52.1
December	61.3	61.3	53.6	53.5	50.7	50.6
January	55.5	55.5	52.3	52.1	50.4	50.3
February	60.0	60.4	54.4	53.8	51.4	51.1
March	64.0	65.0	59.1	59.4	52.8	53.7
April	67.7	67.4	61.4	62.6	54.4	55.7
6-month Season	62.9	63.0	56.9	56.9	52.0	52.2

Based on the results of the analysis of projected water temperatures in the Guadalupe River, the 2035 FAHCE-plus Alterative would be below 71.6°F with only rare occasions of exceeding Settlement Agreement temperatures from November 1 to April 30. However, based on the maximum (high) average monthly temperature, water temperature would exceed 71.6°F during the May 1 to October 31 period. This illustrates additional temperature inputs farther downstream from the CWMZ.

Dissolved Oxygen Water Quality Standard

The proposed flow measures under the FAHCE-plus Alternative are intended to enhance cold-water habitat. Because DO saturation increases as temperature decreases, it is unlikely that the proposed flow measures would violate this water quality standard, conflict with the Basin Plan, or otherwise substantially degrade water quality.

Table 4.8-30 identifies the percentage of days, modeled over a 20-year period, where temperature decreases of more than 5°F (2.8°C) would be expected. These percentages compare the current baseline scenario with the modeled 2015 FAHCE-plus Alternative and the future baseline scenario with the modeled 2035 FAHCE-plus Alternative.

Table 4.8-30. Percentage of Days with Temperature Decreases

POI	2015 with FAHCE-plus Alternative Scenario: Percentage of Days with Temperature Decrease	2035 with FAHCE-plus Alternative Scenario: Percentage of Days with Temperature Decrease
STEV4	2.71	2.72
GCRK3	2.99	3.39
ALAM1	0.01	4.66
CALE1	1.93	1.43
LOSG1	3.41	3.56
GUAD4	3.38	4.37

As noted in the Table 4.8-30, the percentage of days with decreases *of* more than 5°F (2.8°C) in temperature are expected at all POIs considered*.* Given the relationship with temperature, increases in DO levels would be expected. Based on this analysis, the proposed flow measures would not result in substantial decreases in DO levels and overall would not violate this water quality standard. In fact, DO levels would improve.

pH Water Quality Standard

The proposed flow measures under the FAHCE-plus Alternative do not include any action or activity that would alter the current hydrological inputs of surface water pollutants into the system that would substantially affect pH in such a way that would violate this water quality standard, conflict with the Basin Plan, or otherwise substantially degrade water quality. Therefore, no impact to pH would occur.

Toxicity Water Quality Standard

The proposed flow measures under the FAHCE-plus Alternative would not result in additional inputs, re-suspend and/or redistribute substantial amounts of existing toxicants, introduce other toxicants that would violate this water quality standard, conflict with the Basin Plan, or otherwise substantially degrade water quality. Therefore, no impact would occur.

Population and Community Ecology Water Quality Standard

The proposed flow measures under the FAHCE-plus Alternative do not include any action or activity that would alter the current hydrological inputs of surface water pollutants into the system that would substantially affect population or community ecology in such a way that would violate this water quality standard, conflict with the Basin Plan, or otherwise substantially degrade water quality. However, the changes in flows under the FAHCE-plus Alternative are designed to improve habitat conditions for steelhead and Chinook salmon, and would lead to long-term improvement of related to the population and community ecology water quality standard.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The impacts of the non-flow measures under the FAHCE-plus Alternative would be identical to those of the Proposed Project. The non-flow measures included in the FAHCE-plus Alternative that could result in impacts are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the watersheds. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation that could affect water quality standards include removal of riparian vegetation to access the work area, use and staging of heavy equipment within the channel, channel dewatering within the limits of the active work area, modification of channel bed and bank dimensions, and installation of new structures.

These fish barrier remediation projects would result in short-term, construction-related impacts that could temporarily increase surface water temperature from removal of riparian vegetation and manipulation of the stream channel. Specifically, channel dewatering or other instream construction and water diversion could increase temperatures. Increased temperatures would result in decreased DO levels. This FAHCE-plus Alternative non-flow measure would not likely affect local pH levels.

Construction along and within the streambed could result in inadvertent releases of oils and other pollutants because of leaks from construction equipment. However, Valley Water would implement BMPs, including pre-work inspections of equipment, to reduce this risk. Therefore, impacts to water quality standards from the FAHCE-plus Alternative would be less than significant.

Implementation of Valley Water BMPs WQ-15, WQ-16, GEN-3, GEN-22, GEN-27, and VEG-1 would minimize the effects of FAHCE-plus Alternative non-flow measures on water quality standards by limiting activities and actions that could adversely impact water quality standards.

The FAHCE-plus Alternative would also adhere to VHP conditions 3, 4, and 5, where applicable, which would reduce FAHCE-plus Alternative impacts on water quality within the covered areas by maintaining the hydrologic condition to protect water quality and to avoid water quality pollution related to construction and maintenance.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects to certain water quality standards, it is unlikely that they would violate any applicable water quality standards in the study area, and impacts would be less than significant.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects that could affect water quality standards include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Impacts to water quality standards would be the same as described for fish barrier remediation projects described above. However, the long-term benefits would improve several of the water quality standards such as decreased temperature as a result in refugia created by LWD and improvements in the population and community ecology standard. Therefore, impacts to water quality standards from the FAHCE-plus Alternative would be less than significant.

Implementation of Valley Water BMPs WQ-15, WQ-16, GEN-3, GEN-21, GEN-22, GEN-27, and VEG-1 would minimize the effects of non-flow measures on water quality standards by limiting activities and actions that could impact water quality.

The FAHCE-plus Alternative would also adhere to VHP conditions 3, 4, and 5, where applicable, which would reduce FAHCE-plus Alternative impacts on water quality standards.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects on certain water quality standards, they would not violate any water quality standards in the study area, and impacts would be less than significant.

Other Non-flow Measures

The Stevens Creek Multiport Project would allow for additional flows during summer months from the Stevens Creek Reservoir; however, additional flows during summer months would be consistent with the flow measures analyzed above. Construction-related impacts would be similar to those described above for other non-flow measures. Overall, the impacts to water quality standards would be less than significant.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, the geomorphic function enhancement measures would impact the same water quality standards in the short term; however, they would not result in violations of applicable water quality standards. Similarly, impacts would be less than significant.

Implementation of Valley Water BMPs WQ-15, WQ-16, GEN-3, GEN-21, GEN-22, GEN-27, and VEG-1 would minimize the effects of FAHCE-plus Alternative non-flow measures on water quality standards.

The FAHCE-plus Alternative would also adhere to VHP conditions 3, 4, and 5, where applicable, which would reduce FAHCE-plus Alternative impacts to water quality standards within the covered areas.

Although non-flow measures relative to the current baseline conditions could result in short-term construction effects on water quality standards (that is, temperature and DO), they would not violate any applicable water quality standards of the waters in the study area, and impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys, and would have no impact to water quality standards. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or PIT tag readers using noninvasive technology, and would also have no impact to water quality standards. Water quality impacts of maintenance of non-flow measures, and AMP adaptive management of both flow and non-flow measures, would be similar to those analyzed for these measures, and would likewise be less than significant.

Significance Conclusion Summary

Implementation of the FAHCE-plus Alternative flow measures would modify temperatures in portions of the Stevens Creek and Guadalupe River watersheds. The results indicate that there would be **no impact** to the Stevens Creek CWMZ. Guadalupe Creek impacts to water temperature would be less than significant, although the CWMZ could experience limited times when the Settlement Agreement temperatures are unable to be met. For both CWMZs, the FAHCE-plus Alternative results in negligibly lower temperatures than the Proposed Project. Flow measures would also provide slight improvements in DO levels in the study area similar to the Proposed Project. Flow measures would not change pH levels or introduce additional pollutants; therefore, there would be **no impact** to these water quality standards. The population and community ecology standard would benefit from flow measures. Overall, flow measure impacts to water quality standards would be **less than significant**.

The impact to applicable water quality standards from non-flow measures and related maintenance would only occur in the short term as a result of construction activities but would not violate applicable water quality standards, and impacts would be **less than significant** and similar to the Proposed Project. In the long term, the FAHCE-plus Alternative non-flow measures could improve water quality. There would be **no impact** from monitoring activities, and adaptive management impacts would be similar to impacts experienced when measures are first implemented.

Mitigation

No mitigation would be required for Impact WQ-2.

4.9 Impact Analysis on Recreation

This section assesses the impacts on recreation resources from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. This alternatives analysis follows the same methodology as laid out in Section 3.6.3. This analysis references the *Valley Water Daily WEAP Model Technical Memorandum* (Appendix G).

Table 4.9-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.6, *Recreation*.

Table 4.9-1. Alternative Impacts Comparison Summary for Recreation

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact REC-1: Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated	Flow Measures	LTS	NI (-)	NI (-)	LTS (=)
Impact REC-1: Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)

Notes: LTS = less-than-significant impact, NI = no impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.9.1 No Project Alternative

The No Project Alternative would not alter flows released from Valley Water reservoirs in the Stevens Creek and Guadalupe River watersheds because the Proposed Project would not be implemented, although flows would change when comparing the current and future baselines. This section evaluates the impacts on recreational facilities and the WARM beneficial use as it relates to recreational warm-water fisheries associated with no flow release changes in Valley Water operations and no Project-associated non-flow measures.

4.9.1.1 Impact REC-1: Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (no impact)

Flow Measures Impact Analysis

The No Project Alternative would not alter flows released from Valley Water reservoirs because the Proposed Project would not be implemented, although flows would change when comparing the current and future baselines. Therefore, there would be no change in the recreation use of the available recreation facilities and trails.

Under the current and future baselines, Calero Reservoir is never closed to boating. As a result, the No Project Alternative would result in no changes in the number of reservoir boating closure days at

Calero Reservoir and would not result in an increase in boating use at any of other similar available reservoirs in the area. Therefore, there would be no impact to existing neighborhood and regional parks or other recreational facilities.

Overall, increases in the maximum average daily peak flows from current to future baselines would only occur in Guadalupe and Calero Creeks, as described in Section 4.5.1.1 and shown in Table 4.9-2. The increases in flow would be very infrequent, short in duration, and would not directly affect the existing recreation trails along these creeks or other recreation facilities such that users would be displaced and substantially increase the use of other existing recreation facilities and trails. Therefore, the No Project Alternative would not result in the substantial physical deterioration or acceleration of deterioration at any existing recreational facilities or trails in the study area. The impact to existing neighborhood and regional parks or other recreational facilities from the flow measures would be less than significant.

Table 4.9-2. Maximum Peak Daily Flows under the Current and Future Baseline Conditions

Creek	Current Baseline: Max. Peak Daily Flow (cfs)	Future Baseline: Max. Peak Daily Flow (cfs)
Stevens	550	550
Los Gatos	1,804	1,804
Guadalupe	314	455
Alamitos	940	850
Calero	231	402

Source: WEAP Model Output, Xu 2021

Non-flow Measures Impact Analysis

Because there would be no non-flow measures implemented under the No Project Alternative, there would be no impact to existing neighborhood and regional parks or other recreational facilities.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, adaptive management, or maintenance activities under the No Project Alternative. Therefore, there would be no impact to existing neighborhood and regional parks or other recreational facilities.

Significance Conclusion Summary

Under the No Project Alternative, there would not be any reductions in recreational facility days that would result in substantial physical deterioration of any recreational facilities in the study area or the acceleration of the physical deterioration of those facilities. Therefore, there would be **no impact** to recreation resources. The No Project Alternative would have a lower impact than the Proposed Project because there would be no non-flow measure impacts compared to the Proposed Project.

4.9.2 Non-flow Measures Only Alternative

Identified impacts on recreation resources under the Non-flow Measures Only Alternative are consistent with the non-flow measures impacts identified in Section 3.6.4.

4.9.2.1 Impact REC-1: Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to recreation.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. For the reasons discussed in Section 3.6.4.1, the Non-flow Measures Only Alternative would result in the disruption and possible closure of some existing recreation facilities, particularly trails, but this impact would be temporary and localized, with an abundance of alternative trail options available for displaced users. The impact to existing neighborhood and regional parks or other recreational facilities would be less than significant.

Monitoring, Maintenance, and Adaptive Management

As described for the other non-flow measures in Section 3.6.4.1, monitoring, maintenance, and adaptive management could affect existing recreation facilities by disrupting access, but these impacts would be temporary in any given location, and any disruption would not increase use at other available recreation facilities to a degree that would result in substantial physical deterioration of any recreational facilities or the acceleration of the physical deterioration of those facilities. The access and use of recreation facilities would be restored following the completion of these temporary measures and would not result in a permanent disruption. In addition, the monitoring program indicators could trigger adaptive management actions implemented through subsequent phases. As discussed in the AMP, adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting performance targets or measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. Maintenance would otherwise have similar impacts to the non-flow measures. The impact to existing neighborhood and regional parks or other recreational facilities from monitoring, maintenance, and adaptive management would be less than significant.

Significance Conclusion Summary

The Non-flow Measures Only Alternative would result in the disruption and possible closure of some existing recreation facilities, particularly trails, but this impact would be short term and localized, with an abundance of alternative trail options available for displaced users. The disruptions and/or closures would not result in increases in use that would cause substantial physical deterioration of other recreational facilities or the acceleration of the physical deterioration of those facilities. Therefore, the impact to recreation resources would be **less than significant**.

Mitigation

No mitigation is required for Impact REC-1.

4.9.3 FAHCE-plus Alternative

The FAHCE-plus Alternative would alter flows released from Valley Water reservoirs by adjusting the magnitude, duration, and frequency of the Proposed Project pulse flows. The FAHCE-plus Alternative also prioritizes multipurpose and steelhead pulse flows, conserves reservoir storage for pulse flows and summer rearing by reducing winter base flows, and attempts to provide a late-season failsafe outmigration pulse flow. The non-flow measures under this alternative would be with the same as those in the Proposed Project.

4.9.3.1 Impact REC-1: Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (less than significant)

Flow Measures Impact Analysis

The reservoir re-operation curves as part of the FAHCE-plus Alternative would not result in any reservoir closure days at Calero Reservoir under the Proposed Project, current baseline, and future baseline. Thus, the FAHCE-plus Alternative would not displace any reservoir boaters and also would not result in an increase in the use of existing recreational facilities and trails in the study area.

For the reasons discussed in Section 3.6.4.1, the changes in instream flow as part of FAHCE-plus Alternative would result in increased average daily peak flows in Alamitos and Stevens Creeks, and to the same degree and infrequency as the Proposed Project (refer to Tables 3.6-4 and 3.6-5). The increases in the maximum average daily peak flows on both Alamitos and Stevens Creeks would be very infrequent, short in duration, and would not directly impact the existing recreation trails along these creeks or other recreation facilities such that users would be displaced and substantially increase the use of other existing recreation facilities and trails. Therefore, the FAHCE-plus Alternative would not result in the substantial physical deterioration or acceleration of deterioration at any existing recreational facilities or trails in the study area. The impact to existing neighborhood and regional parks or other recreational facilities would be less than significant. The FAHCE-plus Alternative would result in the same changes in instream flow as under the Proposed Project.

For the reasons discussed in Section 3.6.4.1, the changes in instream flow as part of FAHCE-plus Alternative would result in increased average daily peak flows in Alamitos and Stevens Creeks (that is, a total of 6 days over the entire period of record) under the current baseline, as shown in Table 4.9-3. Under the future baseline, the changes in instream flow as part of the FAHCE-plus Alternative would result in increased average daily peak flows for 8 days over the entire period of record, including in Alamitos and Stevens Creeks (that is, a total of 7 days over the entire period of record) but also in Guadalupe Creek (that is, 1 day over the entire period of record), as shown in Table 4.9-4. The changes in instream flow as part of the FAHCE-plus Alternative are the same as the Proposed Project, except for the 1 day on Guadalupe Creek that does not occur as part of the Proposed Project.

Table 4.9-3. Summary of Days When the Average Daily Peak Instream Flows for the FAHCE-plus Alternative Exceed the Current Baseline Conditions Instream Flows

Creek	Year	Month	Number of Days	Peak Flow (cfs)	Increase from Baseline Peak Flow (cfs)
Alamitos Creek	1997	January	1	824	+181
Stevens Creek	1998	February	3	557	+147
Stevens Creek	1995	March	2	546	+136

Source: FAHCE WEAP Model (refer to Appendix G)

Table 4.9-4. Summary of Days When the Average Daily Peak Instream Flows for the FAHCE-plus Alternative Exceed the Future Baseline Conditions Instream Flows

Creek	Year	Month	Number of Days	Peak Flow (cfs)	Increase from Baseline Peak Flow (cfs)
Alamitos Creek	1997	January	1	753	+172
Alamitos Creek	2000	February	1	699	+118
Guadalupe Creek	1995	March	1	420	+91
Stevens Creek	1998	February	3	557	+147
Stevens Creek	1995	March	2	546	+136

Source: FAHCE WEAP Model (refer to Appendix G)

Overall, the increases in the maximum average daily peak flows in Alamitos, Stevens, Guadalupe, and Calero Creeks would be very infrequent, short in duration, and would not directly impact the existing recreation trails along these creeks or other recreation facilities such that users would be displaced and substantially increase the use of other existing recreation facilities and trails. Therefore, the FAHCE-plus Alternative would not result in the substantial physical deterioration or acceleration of deterioration at any existing recreational facilities or trails in the study area. The impact to existing neighborhood and regional parks or other recreational facilities from the flow measures would be less than significant.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. For the reasons discussed in Section 3.6.4.1, the FAHCE-plus Alternative may result in the disruption and possible closure of some existing recreation facilities, particularly trails, but this impact would be temporary and localized with an abundance of alternative recreation facility and trail options available for displaced users. The impact to existing neighborhood and regional parks or other recreational facilities would be less than significant.

Monitoring, Maintenance, and Adaptive Management

If any monitoring, maintenance, or adaptive management activities in the vicinity of existing recreation facilities occurs, the measures would be short term in any given location, and any disruption would be unlikely to increase use at other available recreation facilities to a degree that would result in substantial physical deterioration of any recreational facilities or the acceleration of deterioration of those facilities. The access and use of any disrupted recreation facilities would be restored following the completion of these temporary measures and would not result in a permanent disruption. In addition, the monitoring program indicators could trigger adaptive management actions implemented through subsequent phases. Adaptive measures proposed during Phase 1 would refine those Phase 1 measures that are not meeting measurable objectives, or not functioning as intended. These refinements would likely have impacts similar to those discussed in this EIR for the existing Phase 1 measures. Maintenance would likewise have similar impacts as the non-flow measures. The impact to existing neighborhood and regional parks or other recreational facilities from monitoring would be less than significant.

Significance Conclusion Summary

The flow and non-flow measures as part of the FAHCE-plus Alternative would result in the disruption of some existing recreation facilities and even the displacement of some users at select reservoirs, which may lead to increased use of other recreation facilities in the study area. However, these impacts would be infrequent and temporary, and would not cause substantial physical deterioration or accelerate the deterioration of other available recreation facilities in the study area. Therefore, the impact to recreation would be **less than significant**. The FAHCE-plus Alternative would have a slightly higher impact than the Proposed Project as the FAHCE-plus Alternative instream flows would result in increased average daily peak flows in Guadalupe Creek (that is, 1 day) that does not occur as part of the Proposed Project.

Mitigation

No mitigation is required for Impact REC-1.

4.10 Impact Analysis on Aquatic Biological Resources

This section assesses the impacts from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative on aquatic biological resources. This alternatives analysis follows the same methodology as laid out in Section 3.7.3.

Table 4.10-1 summarizes alternative impact conclusions and provides a comparison to the Proposed Project, as analyzed in Section 3.7, *Aquatic Biological Resources*. In contrast to other resources, for clarity these findings specify watershed, species, and a comparison against the current or future baseline.

4.10.1 No Project Alternative

The No Project Alternative would not alter flows released from Valley Water reservoirs in the Stevens Creek and Guadalupe River watersheds because the Proposed Project would not be implemented. This section evaluates the impacts on aquatic biological resources associated with no new flow measures, changes in aquatic biological resources between the current and future baseline conditions, and no new non-flow measures.

4.10.1.1 Impact AQUA-1a: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Stevens Creek watershed portion of the study area (no impact)

This section discusses the impacts on aquatic biological resources that would result from implementation of the No Project Alternative. For flow measures, the No Project Alternative is assessed by comparing current baseline conditions to future baseline conditions.

Steelhead

Flow Measures Impact Analysis: Comparison of the Future Baseline with the Current Baseline

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model for the No Project Alternative, there would be no difference in modeled effective spawning habitat between current and future baselines with the No Project Alternative.

Fry Rearing Habitat

There would be no difference in modeled fry rearing habitat between current and future baselines with the No Project Alternative.

Juvenile Rearing Habitat

There would be no difference in modeled juvenile rearing habitat between current and future baselines with the No Project Alternative.

Table 4.10-1. Alternative Impacts Comparison Summary for Aquatic Biological Resources

Impact	Watershed	Species	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact AQUA-1a: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Stevens Creek watershed portion of the study area	Stevens Creek	Steelhead	Flow Measures Compared with Current	NI (beneficial)	NI (=)	NI (=)	NI (beneficial) (=)
			Flow Measures Compared with Future	NI (beneficial)	NI (=)	NI (=)	NI (beneficial) (=)
			Non-flow Measures Short Term	LTS	NI (-)	LTS (=)	LTS (=)
			Non-flow Measures Long Term	NI (beneficial)	NI (=)	NI (beneficial) (=)	NI (beneficial) (=)
Impact AQUA-1a: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Stevens Creek watershed portion of the study area	Stevens Creek	Pacific Lamprey	Flow Measures Compared with Current	NI (beneficial)	NI (=)	NI (=)	NI (beneficial) (=)
			Flow Measures Compared with Future	NI (beneficial)	NI (=)	NI (=)	NI (beneficial) (=)
			Non-flow Measures Short Term	LTS	NI (-)	LTS (=)	LTS (=)
			Non-flow Measures Long Term	NI (beneficial)	NI (=)	NI (beneficial) (=)	NI (beneficial) (=)

Impact	Watershed	Species	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area	Guadalupe River	Steelhead	Flow Measures Compared with Current	NI (beneficial)	LTS (+)	NI (=)	NI (beneficial) (=)
			Flow Measures Compared with Future	NI (beneficial)	LTS (+)	NI (=)	NI (beneficial) (=)
			Non-flow Measures Short Term	LTS	NI (-)	LTS (=)	LTS (=)
			Non-flow Measures Long Term	NI (beneficial)	NI (=)	NI (beneficial) (=)	NI (beneficial) (=)
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area	Guadalupe River	Chinook Salmon	Flow Measures Compared with Current	LTS (beneficial)	LTS (beneficial) (=)	NI (-)	LTS (beneficial) (=)
			Flow Measures Compared with Future	LTS (beneficial)	LTS (=)	NI (-)	LTS (beneficial) (=)
			Non-flow Measures Short Term	LTS	NI (-)	LTS (=)	LTS (=)
			Non-flow Measures Long Term	NI (beneficial)	NI (=)	NI (beneficial) (=)	NI (beneficial) (=)

Impact	Watershed	Species	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area	Guadalupe River	Pacific Lamprey	Flow Measures Compared with Current	NI (beneficial)	LTS (+)	NI (=)	NI (beneficial) (=)
			Flow Measures Compared with Future	NI (beneficial)	LTS (+)	NI (=)	NI (beneficial) (=)
			Non-flow Measures Short Term	LTS	NI (-)	LTS (=)	LTS (=)
			Non-flow Measures Long Term	NI (beneficial)	NI (=)	NI (beneficial) (=)	NI (beneficial) (=)
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area	Guadalupe River	Sacra-mento hitch	Flow Measures Compared with Current	NI (beneficial)	NI (=)	NI (=)	NI (beneficial) (=)
			Flow Measures Compared with Future	NI (beneficial)	NI (=)	NI (=)	NI (beneficial) (=)
			Non-flow Measures Short Term	LTS	NI (-)	LTS (=)	LTS (=)
			Non-flow Measures Long Term	NI (beneficial)	NI (=)	NI (beneficial) (=)	NI (beneficial) (=)

Impact	Watershed	Species	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area	Guadalupe River	Riffle Sculpin	Flow Measures Compared with Current	NI	LTS (+)	N/A	NI (=)
			Flow Measures Compared with Future	NI	LTS (+)	N/A	NI (=)
			Non-flow Measures Short Term	LTS	NI (-)	LTS (=)	LTS (=)
			Non-flow Measures Long Term	NI (beneficial)	NI (=)	NI (beneficial) (=)	NI (beneficial) (=)

Notes: LTS = less-than-significant impact, N/A = not applicable, NI = no impact, SI = significant impact, S/M = significant but mitigable to less-than-significant impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project, beneficial = beneficial impact

Conditions for Migration

There would be no difference in modeled adult upstream passage between current and future baseline conditions with the No Project Alternative.

There would be no difference in modeled juvenile downstream passage between current and future baseline conditions with the No Project Alternative.

Summary of Impacts: Comparison of the Future Baseline with the Current Baseline

When comparing the future baseline with the current baseline, the No Project Alternative would result in no biologically meaningful differences to modeled effective spawning habitat, fry rearing habitat, juvenile rearing habitat, adult upstream migration conditions, and juvenile downstream migration conditions. The negligible difference in habitat and migration conditions between the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to future increases in reservoir storage, as is the case in the Guadalupe River watershed. Therefore, the No Project Alternative, in terms of adverse impacts, would result in **no impact** to steelhead, steelhead habitat, and steelhead migration opportunities. While there are no modeled adverse impacts under the No Project Alternative, there is also no benefit to migration conditions as modeled in the Proposed Project and the FAHCE-plus Alternative, because the pulse flows provided in the Proposed Project and FAHCE-plus Alternative to enhance migration would not be provided under the No Project Alternative.

Pacific Lamprey

Flow Measures Impact Analysis: Comparison of the Future Baseline with the Current Baseline

Pre-spawning Holding Habitat

Based on wetted areas and temperatures, there is no modeled difference in pre-spawning holding habitat between current and future baseline conditions with the No Project Alternative.

Effective Spawning Habitat

There is no modeled difference in effective spawning habitat between current and future baseline conditions with the No Project Alternative.

Larvae Rearing Habitat

There is no modeled difference in larvae rearing habitat between current and future baseline conditions with the No Project Alternative.

Conditions for Migration

For the reasons explained in the introduction to Proposed Project Impact AQUA-1a, passage analyses for Pacific lamprey would be similar to those for steelhead. The No Project Alternative analysis of impacts to steelhead above determines there would be no difference in adult upstream passage and juvenile downstream passage between current and future baseline conditions. Therefore, Pacific lamprey adult upstream passage and juvenile downstream passage would not change substantially in the Stevens Creek portion of the study area between current and future baseline conditions with the No Project Alternative.

Summary of Impacts: Comparison of the Future Baseline with the Current Baseline

When comparing the current baseline with the future baseline, the No Project Alternative would result in no differences to pre-spawning holding habitat, effective spawning habitat, larvae rearing habitat, adult upstream migration conditions, and juvenile downstream migration conditions. The negligible difference between the habitat and migration conditions between the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to future increases in reservoir storage, as is the case in the Guadalupe River watershed. Therefore, the No Project Alternative, in terms of adverse impacts, would result in **no impact** to Pacific lamprey, Pacific lamprey habitat, and Pacific lamprey migration opportunities. While there is no adverse impact under the No Project Alternative, there is also no benefit to migration conditions as modeled in the Proposed Project, because the pulse flows provided in the Proposed Project to enhance migration would not be provided under the No Project Alternative.

Non-flow Measures Impact Analysis

Non-flow measures, including fish passage barrier remediation, spawning and rearing habitat improvements, and other non-flow measures would not be implemented under the No Project Alternative. Therefore, there would be no potential for construction-related impacts to steelhead or Pacific lamprey associated with non-flow measures in the Stevens Creek portion of the study area at the program or project level. However, there would also be no long-term benefit to upstream and downstream fish passage or habitat enhancement from the non-flow measures projects under the No Project Alternative.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, there would be no monitoring, maintenance, and adaptive management because there would be no change in flow operations or new projects to monitor and adaptively manage. Therefore, there would be no impact to steelhead or Pacific lamprey.

Stevens Creek Impact Overview

Steelhead

Because of the absence of flow measures, non-flow measures, as well as monitoring, maintenance, and adaptive management, the No Project Alternative would result in no impacts to steelhead or steelhead migration opportunities within the Stevens Creek study area. When comparing the current with the future baseline, the No Project Alternative would result in no changes to effective spawning, fry rearing, and juvenile rearing habitat or conditions for migration for steelhead in the Stevens Creek portion of the study area. In addition, there would be no short- or long-term impacts to steelhead individuals, habitat, or migration conditions because non-flow measures would not be implemented, but there would also be no long-term benefits, particularly for steelhead migration conditions.

Pacific Lamprey

Because of the absence of flow and non-flow measures as well as monitoring, maintenance, and adaptive management, the No Project Alternative would result in no impacts to Pacific lamprey, Pacific lamprey habitat, and Pacific lamprey migration opportunities within the Stevens Creek study area. When comparing the current to the future baseline, the No Project Alternative would result in no changes to pre-spawning holding, effective spawning, fry rearing, and larvae rearing habitat or conditions for migration for Pacific lamprey in the Stevens Creek portion of the study area. In addition, there would be no short- or long-term impacts to Pacific lamprey individuals, habitat, or migration conditions because non-flow measures would not be implemented, but there would also be no long-term benefits, particularly for Pacific lamprey migration conditions.

When the results of the No Project Alternative are analyzed within the Stevens Creek portion of the study area, there would be no changes to steelhead or Pacific lamprey, their habitat, or migration conditions compared with the current and future baselines.

4.10.1.2 Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area have a substantial adverse effect, either directly or through habitat modifications, on any Guadalupe River watershed species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or USFWS (less than significant)

The impacts on special-status species and their habitat that would result from implementation of the No Project Alternative within the Guadalupe River watershed are provided in the following subsections.

Steelhead

Flow Measures Impact Analysis: Comparison of the Future Baseline with the Current Baseline

Effective Spawning Habitat

Based on the FAHCE WEAP Model, effective spawning habitat would increase in the Guadalupe River, Los Gatos Creek, Alamitos Creek, and portions of Calero Creek, but would decrease in Guadalupe Creek (27 percent; 205 square feet) and portions of Calero Creek between current and future baseline conditions with the No Project Alternative. The greatest increase would occur in the Guadalupe River (29.1 percent; 1,510 square feet).

Fry Rearing Habitat

Modeled fry rearing habitat during the steelhead fry rearing period (March 1 to May 31) would increase slightly (≤4 percent) in the Guadalupe River, Los Gatos Creek, Guadalupe Creek,[1] and Calero Creek, but would decrease slightly in Alamitos Creek (0.80 percent; 539 square feet) between current and future baseline conditions.

Juvenile Rearing Habitat

Modeled juvenile rearing habitat would increase in the Guadalupe River, Los Gatos Creek, Guadalupe Creek, and Calero Creek, but would decrease slightly in Alamitos Creek (0.72 percent; 498 square feet) between current and future baseline conditions. The largest increase would occur in Guadalupe Creek (13.6 percent; 7,630 square feet). In Calero Creek, juvenile rearing habitat would decrease slightly at the farthest downstream site (CALE1 ─ 2 percent; 47 square feet) and increase upstream (CALE2 ─ 4 percent; 2,246 square feet).[2]

Conditions for Migration

There would be a reduction of adult upstream passage for steelhead in all tributaries of the Guadalupe River watershed (including the Guadalupe River), except Los Gatos Creek, where

[1] There is a decrease of fry rearing habitat at the farthest upstream site (GCRK 4) in Guadalupe Creek.

[2] Refer to Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum*, Section 1.5.2, for steelhead effective spawning, fry rearing, and juvenile rearing summary data.

passage would increase, between current and future baseline conditions, with the No Project Alternative. The reduction of adult upstream passage days would be as great at 21 days per year (90.4 percent; Calero Creek).

There would be a reduction of juvenile downstream passage for steelhead in all tributaries of the Guadalupe River watershed (including the Guadalupe River), except Los Gatos Creek, where passage would be retained between current and future baseline conditions, under the No Project Alternative. The reduction of juvenile downstream passage would be as great as 6 days per year (28 percent) in Alamitos Creek.

Summary of Impacts: Comparison of the Future Baseline with the Current Baseline

Effective spawning, fry rearing, and modeled juvenile rearing habitat would generally increase in the Guadalupe River watershed with the No Project Alternative, benefiting incubating and rearing steelhead (anadromous form).

Los Gatos Creek would be the only location where modeled passage would increase under the future baseline. However, juvenile steelhead have not been detected in Los Gatos Creek during monitoring efforts in 2018, 2019, and 2020, indicating poor recruitment or a lack of spawning occurring in the Los Gatos Creek watershed, which may be attributable to degraded conditions in this watershed (Valley Water 2020e). Therefore, improved passage to Los Gatos Creek would have little benefit for steelhead without other restoration efforts in this tributary, and the No Project Alternative would not have non-flow measures so there would be no habitat restoration efforts.

The No Project Alternative would decrease adult upstream passage opportunities in the mainstem Guadalupe River, which is critically important as all adult steelhead must traverse the mainstem to get to the other tributaries for spawning, so even a modest decrease in adult upstream passage opportunities in the mainstem would be detrimental to anadromous adult steelhead passage. A decrease in passage opportunities would limit adult steelhead access to spawning locations and would decrease spawning opportunities in the watershed.

Although habitat would generally increase under the No Project Alternative, the decreased passage would limit anadromous adult steelhead access to effective spawning habitat, which would be an adverse impact to anadromous steelhead*).* However, given the increases in habitat and the modeled changes in migration opportunities are adverse but not substantial, the No Project Alternative impacts to steelhead would be **less than significant**.

Chinook Salmon

Flow Measures Impact Analysis: Comparison of the Future Baseline with the Current Baseline

Effective Spawning Habitat

Based on the FAHCE WEAP Model, the No Project Alternative would result in an increase in effective spawning habitat in Los Gatos and Alamitos Creeks, and a decrease in the Guadalupe River, Guadalupe Creek, and Calero Creek. While the greatest percent increase in effective spawning habitat would occur in Alamitos Creek (20 percent), the large percent increase is primarily attributable to a small increase in the absolute magnitude of the effective spawning habitat (91 square feet) when there is initially a relatively small absolute magnitude of effective spawning habitat in Alamitos Creek (479 square feet). This increase in modeled effective spawning habitat in Alamitos Creek under the No Project Alternative is the net result of relatively small variations in flow, wetted area, and water temperature resulting from the increased storage capacity and water demand between the current and future baseline. The largest decrease in effective spawning habitat, which occurs in the

Guadalupe River, is also a relatively small absolute magnitude change (3 percent; 385 square feet). Overall, the absolute amount of effective spawning habitat in the Guadalupe River watershed portion of the study area would increase under the No Project Alternative.

Fry Rearing Habitat

There would be increases in modeled fry rearing habitat during the Chinook salmon fry rearing period (January 1 to April 30) in the Guadalupe River and all tributaries except Alamitos Creek (5 percent decrease, 3,975 square feet) between current and future baseline conditions. The decrease in fry rearing habitat in Alamitos Creek is primarily attributable to a decrease in flow during April and corresponding decrease in available wetted habitat during this period that may serve as fry rearing habitat between current and future baseline conditions. Overall, the absolute amount of fry rearing habitat would increase in the Guadalupe River watershed portion of the study area.

Juvenile Rearing Habitat

Modeled juvenile rearing habitat during the Chinook salmon juvenile rearing period (January 1 to June 30) would increase slightly (≤4 percent) in the Guadalupe River and all tributaries except Alamitos Creek (3 percent decrease, 2,052 square feet). The greatest increase (15 percent; 10,502 square feet) of juvenile rearing habitat would occur in Guadalupe Creek during the period from May 1 to June 30, with an increase in habitat overall.

Conditions for Migration

There would be a reduction of adult upstream passage in Guadalupe Creek (2 days per year), Alamitos Creek (3 days per year), and Calero Creek (4 days per year) between current and future baseline conditions with the No Project Alternative. There would be an increase of adult upstream passage in the Guadalupe River and Los Gatos Creek (19 and 13 days per year, respectively).

There would be a reduction of juvenile downstream passage for Chinook salmon in all tributaries of the Guadalupe River watershed (including the Guadalupe River) between current and future baseline conditions with the No Project Alternative. The reduction of juvenile downstream passage days ranged from 2 to 12 days per year on average, with the largest reduction (25 percent) in downstream passage predicted to occur in Alamitos Creek.

Summary of Impacts: Comparison of the Future Baseline with the Current Baseline

Chinook salmon modeled effective spawning habitat, fry rearing habitat, and juvenile rearing habitat would increase overall, but the increases are modeled to be small absolute changes and small relative changes in the Guadalupe River and most tributaries resulting from the No Project Alternative. There would be **no direct effects** to Chinook salmon with the No Project Alternative.

Overall, Chinook salmon adult upstream passage would increase substantially in the Guadalupe River and Los Gatos Creek and decrease in Guadalupe, Alamitos, and Calero Creeks under the No Project Alternative. Although there is a decrease in adult upstream passage to some tributaries, Chinook salmon in the Guadalupe River watershed are primarily mainstem spawners (Valley Water 2018e), so an increase in passage opportunities in the Guadalupe River mainstem would be beneficial. Juvenile downstream passage opportunities would decrease under the No Project Alternative throughout the watershed, which would limit the successful emigration of juvenile Chinook salmon.

Although juvenile downstream passage would decrease resulting from the No Project Alternative, the decrease would not be substantial and the increase in adult upstream passage in the Guadalupe River would be beneficial to Chinook salmon. Additionally, given the small absolute increases in available habitat, in terms of adverse impacts, the No Project Alternative would result in **less-than-**

significant impacts to Chinook salmon with minor benefits for rearing habitat and substantial benefits for upstream migration.

Pacific Lamprey

Flow Measures Impact Analysis: Comparison of the Future Baseline with the Current Baseline

Pre-spawning Holding Habitat

Based on the FAHCE WEAP Model, future baseline Pacific lamprey pre-spawning holding habitat would remain similar in area to the current baseline in winter and increase in the reaches of the Guadalupe River upstream of Los Gatos Creek during summer under the No Project Alternative. Water temperatures would remain similar between current and future baseline conditions, and would be suitable for Pacific lamprey. Additionally, Pacific lamprey pre-spawning holding, effective spawning, and rearing habitats would increase with the No Project Alternative (see No Project Alternative Impact AQUA-1b), supporting the assessment that Pacific lamprey pre-spawning holding habitat would remain similar or increase slightly between current and future baseline conditions.

Effective Spawning Habitat

There would be no change of modeled Pacific lamprey effective spawning habitat comparing the current baseline with the future baseline under the No Project Alternative. Water temperatures would remain similar between current and future baseline conditions, and would be suitable for Pacific lamprey. Additionally, Pacific lamprey pre-spawning holding, effective spawning, and rearing habitats would increase with the No Project Alternative (see No Project Alternative Impact AQUA-1b), supporting the assessment that Pacific lamprey effective spawning habitat would remain similar or increase slightly between current and future baseline conditions.

Larvae Rearing Habitat

Based on the FAHCE WEAP Model, future baseline Pacific lamprey larvae rearing habitat would remain similar in area to the current baseline in winter and increase in the reaches of the Guadalupe River upstream of Los Gatos Creek during summer under the No Project Alternative. Water temperatures would remain similar between current and future baseline conditions, and would be suitable for Pacific lamprey. The increase of summer larvae rearing habitat in the upstream reaches of Guadalupe River would likely result in negligible condition changes for Pacific lamprey. Modeled steelhead pre-spawning holding, effective spawning, and rearing habitats would increase with the No Project Alternative (see No Project Alternative Impact AQUA-1b), supporting the assessment that Pacific lamprey larvae rearing habitat would remain similar or increase slightly between current and future baseline conditions.

Conditions for Migration

As discussed previously, passage analyses for Pacific lamprey were evaluated based on a combination of modeled data for flow, water depth, wetted area, and temperature, as well as based on modeled HAI for steelhead when life cycles and habitat preference overlap between the species. The assessment of No Project Alternative impacts on steelhead above concludes that there would be reductions of adult upstream passage and juvenile downstream passage for steelhead between current and future baseline conditions. Given the minimum depth requirement for adult Pacific lamprey is slightly less than for adult steelhead, the reduction of adult upstream passage and juvenile downstream passage in all tributaries of the Guadalupe River watershed (including the Guadalupe River), except Los Gatos Creek, may not be as negative for Pacific lamprey as for steelhead, but there would still be a reduction of Pacific lamprey adult upstream passage and juvenile downstream passage between current and future baseline conditions with the No Project Alternative. In Los Gatos Creek, there would likely be an increase of adult upstream passage for Pacific lamprey from January to April, and juvenile downstream passage would be retained between current and future baseline conditions with the No Project Alternative.

Summary of Impacts: Comparison of the Future Baseline with the Current Baseline

Based on the FAHCE WEAP Model, Pacific lamprey pre-spawning holding, effective spawning, and larvae rearing habitat would experience small absolute changes and small relative changes in most tributaries in the Guadalupe River watershed with the No Project Alternative. These slight changes would likely be neutral to the Pacific lamprey population and would not be biologically meaningful.

Given that there would be reductions of Pacific lamprey adult upstream passage and juvenile downstream passage in some tributaries of the Guadalupe River watershed between current and future baseline conditions with the No Project Alternative, there would be adverse impacts to Pacific lamprey. But given there would still be migration opportunities and habitat throughout the watershed, these changes would not substantially interfere with migration. In terms of adverse impacts, the impacts to Pacific lamprey from the No Project Alternative would be **less than significant**.

Sacramento Hitch

Flow Measures Impact Analysis: Comparison of the Future Baseline with the Current Baseline

Effective Spawning Habitat

Sacramento hitch and steelhead share similar habitat preferences during spawning and incubation (gravel substrate with flowing water and similar depth requirements), and Sacramento hitch have higher temperature tolerances than the other fish species analyzed. Based on the above analysis of No Project Alternative impacts to steelhead and modeled steelhead habitat, modeled effective spawning habitat for Sacramento hitch would increase in the Guadalupe River and slightly increase in Los Gatos Creek between the current and future baseline with the No Project Alternative.

Fry Rearing Habitat

Regarding rearing, Sacramento hitch can occupy diverse habitats during rearing and can tolerate higher temperatures compared with steelhead, Chinook salmon, and Pacific lamprey. Therefore, based on the above analysis of No Project Alternative impacts to steelhead, steelhead habitat, Chinook salmon, Chinook salmon habitat, Pacific lamprey, and Pacific lamprey habitat, modeled hitch rearing habitat would increase in the Guadalupe River and Los Gatos Creek between the current and future baseline with the No Project Alternative.

Summary of Impacts: Comparison of the Future Baseline with the Current Baseline

Based on the FAHCE WEAP Model, Sacramento hitch effective spawning habitat would increase, and fry rearing habitat would increase in the Guadalupe River and Los Gatos Creek between current and future baseline. Given the increases to spawning and rearing in the Guadalupe River and Los Gatos Creek, the No Project Alternative would result in **no impact** and would benefit Sacramento hitch.

Riffle Sculpin

Flow Measures Impact Analysis: Comparison of the Future Baseline with the Current Baseline

Effective Spawning Habitat

Riffle sculpin and steelhead share similar habitat preferences for spawning and incubation habitat (gravel substrate with cool, flowing water and similar depth requirements). For the Guadalupe River watershed study area, the species is only present in the Guadalupe River and Guadalupe Creek. Based on the above analysis of No Project Alternative impacts to steelhead and modeled steelhead habitat, modeled effective spawning habitat for riffle sculpin would increase in the Guadalupe River and decrease in Guadalupe Creek with the No Project Alternative.

Fry Rearing Habitat

Riffle sculpin and steelhead share similar habitat preferences for fry rearing habitat (gravel substrate with cool, flowing water and similar depth requirements). Riffle sculpin modeled fry rearing habitat would increase in the Guadalupe River and Guadalupe Creek downstream of GCRK 4 and decrease upstream of GCRK 4.

Summary of Impacts: Comparison of the Future Baseline with the Current Baseline

When compared with the current baseline, the future baseline would result in variable changes to spawning and fry rearing habitat for riffle sculpin in the Guadalupe River watershed under the No Project Alternative, based on the FAHCE WEAP Model. Riffle sculpin spawning and rearing habitat would increase in the Guadalupe River and decrease in Guadalupe Creek. Fry rearing habitat would increase in the Guadalupe River and decrease in Guadalupe Creek downstream of GCRK 4. Riffle sculpin primarily occur in the upper reaches of Guadalupe Creek, with abundance generally declining downstream of GCRK 3 (Smith 2013; Valley Water 2019c, 2020e, 2021b). Therefore, the decrease in fry rearing habitat in Guadalupe Creek would cause adverse impacts to the species but would not be substantial given the increase in habitat in Guadalupe River. In terms of adverse impacts, the No Project Alternative would result in **less-than-significant** impacts to riffle sculpin.

Non-flow Measures Impact Analysis

Non-flow measures, including fish passage barrier remediation, spawning and rearing habitat improvements, geomorphic functions enhancement, and other non-flow measures, would not be implemented under the No Project Alternative. Therefore, there would be no potential for construction-related impacts to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, or riffle sculpin associated with non-flow measures. However, there would also be no long-term benefit to upstream and downstream fish passage or increased habitat from the non-flow measures projects under the No Project Alternative. Therefore, in the long term, the Proposed Project would benefit steelhead, Central Valley fall-run Chinook salmon, Pacific lamprey, Sacramento hitch, or riffle sculpin more than the No Project Alternative despite the short-term construction impacts.

Summary of Short-term Impacts

There would be no short-term impacts on steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, or riffle sculpin; their habitat; or migration conditions of steelhead, Central Valley fall-run Chinook salmon, and Pacific lamprey because construction of the non-flow measures would not occur. Therefore, there would be **no impact** under the No Project Alternative.

Summary of Long-term Impacts

There would be no long-term benefits to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, or riffle sculpin; their habitat; and migration conditions of steelhead, Chinook salmon, and Pacific lamprey because fish passage barrier remediation, spawning and rearing habitat improvements, and other non-flow measures would not occur. In the long term, the No Project Alternative would result in **no impact** under the No Project Alternative.

Monitoring, Maintenance, and Adaptive Management

Guadalupe River Impact Overview

Steelhead

Because of the absence of flow measures, the No Project Alternative would result in less-than-significant impacts, while the absence of non-flow measures would result in no impacts to steelhead, steelhead habitat, and steelhead migration opportunities within the Guadalupe River study area. When comparing the current to the future baseline for steelhead, the No Project Alternative would result in increased modeled effective spawning, fry rearing, and juvenile rearing habitat; however, conditions for migration would be reduced, except for Los Gatos Creek, where juvenile steelhead have not been detected recently, for steelhead in the Guadalupe River portion of the study area (Valley Water 2020e). The No Project Alternative would limit passage in the mainstem Guadalupe River, which is critically important as all adult steelhead must traverse the mainstem to get to the other tributaries for spawning, so even a modest decrease in upstream passage opportunities in the mainstem would be detrimental to anadromous adult steelhead passage. Anadromous adults are more fecund than resident adults, and the overall decreased migratory opportunities may result in a decreased abundance of the population in the study area (Bell et al. 2011; NMFS 2016; Dagit et al. 2017). Finally, there would be no short- or long-term impacts to steelhead individuals, habitat, or migration conditions because non-flow measures would not be implemented.

Chinook Salmon

Because of the absence of flow measures, the No Project Alternative would result in less-than-significant impacts, while the absence of non-flow measures would result in no impacts to Chinook salmon, Chinook salmon habitat, and Chinook salmon migration opportunities within the Guadalupe River study area. When comparing the current to the future baseline for Chinook salmon, the No Project Alternative would result in small changes to modeled effective spawning, fry rearing, and juvenile rearing habitat; however, adult upstream passage conditions would be substantially reduced, and juvenile downstream passage conditions would be reduced in some tributaries. The No Project Alternative would limit adult upstream passage in the mainstem Guadalupe River, which is critically important as all Chinook salmon must traverse the mainstem to get to the other tributaries for spawning, so even a modest decrease in upstream passage opportunities in the mainstem would be detrimental to the species. Finally, there would be no short- or long-term impacts to Chinook salmon individuals, habitat, or migration conditions because non-flow measures would not be implemented.

Pacific Lamprey

Because of the absence of flow measures, the No Project Alternative would result in less-than-significant impacts, while the absence of non-flow measures would result in no impacts to Pacific lamprey, Pacific lamprey habitat, and Pacific lamprey migration opportunities within the Guadalupe River study area. When comparing the current to the future baseline for Pacific lamprey, the No Project Alternative would result in small changes to modeled pre-spawning holding, effective spawning, and larvae rearing habitat; however, adult upstream and juvenile passage conditions would be reduced in some tributaries. The No Project Alternative would limit species' passage throughout the watershed, which is critically important as adult Pacific lamprey must traverse the watershed to access effective spawning habitat. Finally, there would be no short- or long-term impacts to steelhead individuals, habitat, or migration conditions because non-flow measures would not be implemented.

Sacramento Hitch

Because of the absence of flow measures, the No Project Alternative would result in no impact and would benefit Sacramento hitch, while the absence of non-flow measures would result in no impacts to Sacramento hitch and Sacramento hitch habitat within the Guadalupe River study area. When comparing the current to the future baseline for Sacramento hitch, the No Project Alternative would result in increases to modeled effective spawning habitat and would increase fry rearing habitat in the Guadalupe River and Los Gatos Creek. In addition, there would be no short- or long-term impacts to Sacramento hitch individuals or habitat because non-flow measures would not be implemented.

Riffle Sculpin

Because of the absence of flow measures, the No Project Alternative would result in less-than-significant impacts, while the absence of non-flow measures would result in no impacts to riffle sculpin and riffle sculpin habitat within the Guadalupe River study area. When comparing the current to the future baseline for riffle sculpin, the No Project Alternative would result in increases to modeled effective spawning habitat and would increase modeled fry rearing habitat in the Guadalupe River and Guadalupe Creek downstream of GCRK 4. Riffle sculpin primarily occur in the upper reaches of Guadalupe Creek, with abundance generally declining downstream of GCRK 3 (Smith 2013; Valley Water 2019c, 2020e, 2021b). Therefore, the decrease in fry rearing habitat in Guadalupe Creek would be detrimental to the species. In addition, there would be no short- or long-term impacts to Sacramento hitch individuals or habitat because non-flow measures would not be implemented.

4.10.2 Non-flow Measures Only Alternative

The impacts of the Non-flow Measures Only Alternative to aquatic biological resources would be the same as the non-flow measures impacts identified in Section 3.7.4; that is, impacts on aquatic biological resources could result from the non-flow measures, monitoring, and maintenance of habitat improvements. These elements of the Non-flow Measures Only Alternative include such actions as ground disturbance; soil compaction; disturbances to channel beds and banks; weir installation; channel modification; construction staging and access; and the removal of culverts, riprap, or other structures that could affect a variety of aquatic biological resources, as described below. Because there would be no flow measure implemented under the Non-flow Measures Only Alternative, there would be no impact from flow measures as compared with either existing or future baseline conditions.

4.10.2.1 Impact AQUA-1a: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Stevens Creek watershed portion of the study area (less than significant)

The impacts on special-status species and their habitat that would result from implementation of the Non-flow Measures Only Alternative within the Stevens Creek portion of the study area are provided in the following subsections.

Flow Measures Impact Analysis

Steelhead

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and there would be no impact.

Pacific Lamprey

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and there would be no impact.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures on steelhead and Pacific lamprey, their habitat, and migration opportunities in the Stevens Creek portion of the study area. The non-flow measures included in the Non-flow Measures Only Alternative analyzed in this section are fish passage barrier remediation, spawning and rearing habitat improvements, and the portable multiport outlet specific to the Stevens Creek portion of the study area. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Passage Barrier Remediation

The impacts of the fish passage barrier remediation projects, which may include removal or remediation of the Fremont Fish Ladder, retaining the existing fish ladder structure, and constructing a low-flow channel downstream of the existing Moffett Fish Ladder, would be the same as described in Proposed Project Impact AQUA-1a. Fish barrier removal or remediation could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead and Pacific lamprey, their modeled habitat, and migration conditions.

Spawning and Rearing Habitat Improvements

Based on the FAHCE WEAP Model, the impacts of the spawning and rearing habitat improvement projects, which would generally occur within the upper watershed below Stevens Creek Dam, would be the same as described in Proposed Project Impact AQUA-1a. Spawning and rearing habitat improvement projects could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead and Pacific lamprey, their habitat, and migration conditions.

Portable Multiport Outlet

The impacts of the operation of the portable multiport outlet, which would allow water to be released from Stevens Creek Reservoir in more than one location in the water column, would be the same as described in Proposed Project Impact AQUA-1a. The portable multiport outlet project would have no short-term adverse impacts and would have long-term benefits to steelhead and Pacific lamprey, their habitat, and migration conditions.

Summary of Short-term Impacts

There could be a short-term reduction of modeled steelhead fry rearing and juvenile rearing habitat, and modeled Pacific lamprey pre-spawning holding, spawning, and larvae rearing habitat during the construction of the non-flow measures. However, BMPs would be implemented, and seasonal timing of the work would reduce impacts on spawning and fry rearing habitat. Therefore, non-flow measures would result in **less-than-significant** impacts in the short-term construction period.

Summary of Long-term Impacts

There could be increased modeled steelhead spawning, fry rearing, and juvenile rearing habitat, and modeled Pacific lamprey pre-spawning holding, spawning, and larvae rearing habitat, as well as increased migration conditions as a result of the fully constructed non-flow measures. In the long-term, the Non-flow Measures Only Alternative would have **no impact** and would benefit steelhead and Pacific lamprey individuals, habitat, and migration conditions resulting from the completed non-flow measures.

Monitoring, Maintenance, and Adaptive Management

Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys, and would have no impact to steelhead and Pacific lamprey. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or in-channel PIT tag reader stations, and would have no impact to steelhead and Pacific lamprey.

Long-term monitoring would also include electrofishing, capturing, DNA sampling, and PIT tagging, which would cause some adverse impacts to steelhead and Pacific lamprey. During electrofishing, steelhead and Pacific lamprey would be stunned, captured, crowded, and handled, which would cause acute physiological stress and may cause occasional incidental injury and/or mortality. Additionally, juvenile steelhead would be sampled for DNA and PIT tagged, which would cause acute physiological stress and may cause occasional incidental injury and/or mortality. Electrofishing would follow standard NMFS survey protocols, which would minimize injury and mortality during sampling and tagging. Electrofishing and associated sampling would be conducted under incidental take coverage pursuant to the federal ESA and a scientific collecting permit pursuant to the California Fish and Game Code. These permits would provide limits on incidental take during monitoring and would include measures designed to minimize and avoid adverse effects to aquatic resources during electrofishing activities. The monitoring program would provide valuable long-term trend data for steelhead that could be used to adjust components of the Non-flow Measures Only Alternative through the AMP to be more beneficial to native fish, including steelhead and Pacific lamprey, over the long term.

Maintenance of non-flow measures would involve similar activities as laid out in the non-flow measure, with additional riprap, restoration, or operational repair of a facility, and causing fisheries impacts similar to those of the non-flow measure being maintained.

AMP implementation during Phase 1 could include minor adjustments to the non-flow measures, such as minor modifications to fish passage barriers, additional gravel augmentation, or habitat modifications. Impacts related to these Phase 1 AMP adaptive measures would be consistent with those of the Non-flow Measures Only Alternative.

Stevens Creek Impact Overview

Steelhead

Because of the absence of flow measures, the Non-flow Measures Only Alternative would result in no impacts from flow measures, while the short-term non-flow measures would result in less-than-significant impacts, and the long-term flow measures would result in no impacts and would benefit steelhead, steelhead habitat, and steelhead migration opportunities within the Stevens Creek study area. The flow measures would not be implemented, and would not cause any changes to steelhead, steelhead habitat, or migration conditions of steelhead. There would be a short-term reduction to steelhead habitat and migration conditions during construction of the non-flow measures. Impacts to steelhead would be reduced with Valley Water's BMPs. In the long term, steelhead habitat and migration conditions would increase as a result of the non-flow measures. The net benefits of the long-term non-flow measures could support increased abundance of steelhead in the watershed, which would lead to increased population health and greater genetic diversity.

Pacific Lamprey

Because of the absence of flow measures, the Non-flow Measure Only Alternative would result in no impacts from flow measures, while the short-term non-flow measures would result in less-than-significant impacts, and the long-term flow measures would result in no impacts and would benefit Pacific lamprey, Pacific lamprey habitat, and Pacific lamprey migration opportunities within the Stevens Creek study area. The flow measures would not be implemented, and would not cause any changes to Pacific lamprey, Pacific lamprey habitat, or migration conditions of Pacific lamprey. There would be a short-term reduction to Pacific lamprey habitat and migration conditions during construction of the non-flow measures. Impacts to Pacific lamprey would be reduced with Valley Water's BMPs. In the long term, Pacific lamprey habitat and migration conditions would increase as a result of the non-flow measures. The net benefits of the long-term non-flow measures could support increased abundance of Pacific lamprey in the watershed, which would lead to increased population health and greater genetic diversity.

Mitigation

No mitigation would be required for Impact AQUA-1a.

4.10.2.2 Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area (less than significant)

The impacts on special-status species and their habitat that would result from implementation of the Non-flow Measures Only Alternative within the Guadalupe River watershed are provided in the following subsections.

Flow Measures Impact Analysis

Steelhead

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and there would be no impact.

Chinook Salmon

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and there would be no impact.

Pacific Lamprey

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and there would be no impact.

Sacramento Hitch

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and there would be no impact.

Riffle Sculpin

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and there would be no impact.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures on steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin in the Guadalupe River watershed. The non-flow measures included in the Non-flow Measures Only Alternative analyzed in this section are fish passage barrier remediation, spawning and rearing habitat improvements, and the geomorphic functions enhancement specific to the Guadalupe River watershed. The impacts from each of these non-flow measures is discussed in the sections below.

Fish Passage Barrier Remediation

The impacts of the fish passage barrier remediation projects, which may include remediation of the Pheasant Creek Culvert on Guadalupe Creek, Old Dam on Guadalupe Creek, and the Bertram Road Drop Structure on Alamitos Creek, would be the same as described in Proposed Project Impact AQUA-1b. Fish barrier removal or remediation could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin; their habitat; and migration opportunities for steelhead, Chinook salmon, and Pacific lamprey.

Spawning and Rearing Habitat Improvements

The impacts of the spawning and rearing habitat improvement projects, the exact locations of which are unknown as the projects are currently described in a programmatic level of detail, would be the same as described in Proposed Project Impact AQUA-1b. Spawning and rearing habitat improvement projects could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin; their habitat; and migration opportunities for steelhead, Chinook salmon, and Pacific lamprey.

Geomorphic Functions Enhancement

The impacts of the geomorphic functions enhancement projects, the exact locations of which are unknown as the projects are currently described in a programmatic level of detail, would be the same as described in Proposed Project Impact AQUA-1b. Spawning and rearing habitat improvement projects could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin; their habitat; and migration opportunities for steelhead, Chinook salmon, and Pacific lamprey.

Summary of Short-term Impacts

There could be a short-term reduction of steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin habitat as well as a reduction of migration conditions for steelhead, Chinook salmon, and Pacific lamprey during the construction of the non-flow measures. In addition, the construction period could result in localized impacts to Pacific lamprey larvae if the project footprint is located within areas with fine sediment where Pacific lamprey larvae are burrowed. However, BMPs would be implemented, and seasonal timing of the work would reduce impacts to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin habitat. Therefore, non-flow measures would result in **less-than-significant** impacts in the short-term construction period.

Summary of Long-term Impacts

There could be increased steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin habitat as well as increased migration conditions as a result of the fully constructed non-flow measures. In the long-term, the Non-flow Measures Only Alternative would have **no impact**, and would benefit steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin individuals and habitat as well as migration conditions for steelhead, Chinook salmon, and Pacific lamprey resulting from the completed non-flow measures.

Monitoring, Maintenance, and Adaptive Management

Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys, and would have no impact to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or PIT tag readers using noninvasive technology, and would have no impact to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin.

Long-term monitoring would also include electrofishing, capturing, DNA sampling, and PIT tagging, which would cause some adverse impacts to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin. During electrofishing, steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin could be stunned, captured, crowded, and handled, which would cause acute physiological stress and may cause occasional incidental injury and/or mortality. Additionally, juvenile steelhead would be sampled for DNA and PIT tagged, which would cause acute physiological stress and may cause occasional incidental injury and/or mortality. Electrofishing would follow standard NMFS survey protocols, which would minimize injury and mortality during sampling and tagging. Electrofishing and associated sampling would be conducted under a Research and Recovery or incidental take coverage pursuant to the federal ESA and a scientific collecting permit pursuant to the California Fish and Game Code. These permits would provide limits on incidental take during monitoring, and would include measures designed to minimize and avoid adverse effects to aquatic resources during electrofishing activities. The monitoring program would provide valuable long-term trend data for steelhead that could be used to adjust components of the Non-flow Measures Only Alternative through the AMP to be more beneficial to steelhead over the long term. Data would also be incidentally collected for Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin, providing valuable long-term population information benefitting these species. Therefore, the impact of monitoring under Phase 1 of the AMP is considered less than significant.

Maintenance of non-flow measures would involve similar activities as laid out in the non-flow measure, with additional riprap, restoration or operational repair of a facility, and causing fisheries impacts similar to those of the non-flow measure being maintained.

AMP implementation during Phase 1 could include minor adjustments to the non-flow measures, such as modifications to fish passage barriers, additional gravel augmentation, or habitat modifications. Impacts related to these Phase 1 AMP adaptive measures would be consistent with those of the Non-flow Measures Only Alternative. Therefore, impacts from implementation of the AMP would be less than significant.

Guadalupe River Impact Overview

Steelhead

Because of the absence of flow measures, the Non-flow Measure Only Alternative would result in no impacts from flow measures, while the short-term non-flow measures would result in less-than-significant impacts, and the long-term flow measures would result in no impacts and would benefit steelhead, steelhead habitat, and steelhead migration opportunities within the Guadalupe River study area. The flow measures would not be implemented and would not cause any changes to steelhead, steelhead habitat, or migration conditions of steelhead. There would be a short-term reduction to steelhead habitat and migration conditions during construction of the non-flow measures. Impacts to steelhead would be reduced with Valley Water's BMPs. In the long term, steelhead habitat and migration conditions would increase as a result of the non-flow measures. The net benefits of the long-term non-flow measures could support increased abundance of steelhead in the watershed, which would lead to increased population health and greater genetic diversity.

Chinook Salmon

Because of the absence of flow measures, the Non-flow Measure Only Alternative would result in no impacts from flow measures, while the short-term non-flow measures would result in less-than-significant impacts, and the long-term flow measures would result in no impacts and would benefit Chinook salmon, Chinook salmon habitat, and Chinook salmon migration opportunities within the Guadalupe River study area. The flow measures would not be implemented and would not cause any changes to Chinook salmon, Chinook salmon habitat, or migration conditions of Chinook salmon. There would be a short-term reduction to Chinook salmon habitat and migration conditions during construction of the non-flow measures. Impacts to Chinook salmon would be reduced with Valley Water's BMPs. In the long term, Chinook salmon habitat and migration conditions would increase as a result of the non-flow measures. The net benefits of the long-term non-flow measures could support increased abundance of Chinook salmon in the watershed, which would lead to increased population health and greater genetic diversity.

Pacific Lamprey

Because of the absence of flow measures, the Non-flow Measure Only Alternative would result in no impacts from flow measures, while the short-term non-flow measures would result in less-than-significant impacts, and the long-term flow measures would result in no impacts and would benefit Pacific lamprey, Pacific lamprey habitat, and Pacific lamprey migration opportunities within the Guadalupe River study area. The flow measures would not be implemented and would not cause any changes to Pacific lamprey, Pacific lamprey habitat, or migration conditions of Pacific lamprey. There would be a short-term reduction to Pacific lamprey habitat and migration conditions during construction of the non-flow measures. Impacts to Pacific lamprey would be reduced with Valley Water's BMPs. In the long term, Pacific lamprey habitat and migration conditions would increase as a result of the non-flow measures. The net benefits of the long-term non-flow measures could support increased abundance of Pacific lamprey in the watershed, which would lead to increased population health and greater genetic diversity.

Sacramento Hitch

Because of the absence of flow measures, the Non-flow Measure Only Alternative would result in no impacts from flow measures, while the short-term non-flow measures would result in less-than-significant impacts, and the long-term flow measures would result in no impacts and would benefit Sacramento hitch and Sacramento hitch habitat within the Guadalupe River study area. The flow measures would not be implemented and would not cause any changes to Sacramento hitch or

Sacramento hitch habitat. There would be a short-term reduction to Sacramento hitch habitat during construction of the non-flow measures. Impacts to Sacramento hitch would be reduced with Valley Water's BMPs. In the long term, Sacramento hitch habitat would increase as a result of the non-flow measures. The net benefits of the long-term non-flow measures could support increased abundance of Sacramento hitch in the watershed, which would lead to increased population health and greater genetic diversity.

Riffle Sculpin

Because of the absence of flow measures, the Non-flow Measure Only Alternative would result in no impacts from flow measures, while the short-term non-flow measures would result in less-than-significant impacts, and the long-term flow measures would result in no impacts and would benefit riffle sculpin and riffle sculpin habitat within the Guadalupe River study area. The flow measures would not be implemented and would not cause any changes to riffle sculpin or riffle sculpin habitat. There would be a short-term reduction to riffle sculpin habitat during construction of the non-flow measures. Impacts to riffle sculpin would be reduced with Valley Water's BMPs. In the long term, riffle sculpin habitat would increase as a result of the non-flow measures. The net benefits of the long-term non-flow measures could support increased abundance of riffle sculpin in the watershed, which would lead to increased population health and greater genetic diversity.

Mitigation

No mitigation would be required for Impact AQUA-1b.

4.10.3 FAHCE-plus Alternative

This section evaluates the impacts associated with changes in Valley Water operations on aquatic resources under the FAHCE-plus Alternative and refers to the FAHCE WEAP Model scenarios described in Section 3.1, *Introduction,* and Appendix G, *Valley Water Daily WEAP Model Technical Memorandum*, including a current baseline scenario with existing reservoir seismic constraints, and a future baseline scenario that assumes reservoir seismic constraints have been resolved. The non-flow measures under this alternative would be consistent with those of the Proposed Project.

As discussed in Section 3.1.4.1, the FAHCE WEAP Model (Appendix G, *Valley Water Daily WEAP Model Technical Memorandum*) was used to model hydrologic, hydraulic, water temperature, and fisheries current baseline conditions. Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum,* includes a more detailed description of the analysis of the model outputs completed to support the aquatic biological resources analysis.

Under the FAHCE-plus Alternative, there would be modifications in the reservoir flows as compared with the Proposed Project. The impacts of this modification on aquatic biological resources are discussed below. The non-flow measures of the FAHCE-plus Alternative would be identical to those of the Proposed Project, and would involve ground disturbance; soil compaction; disturbances to channel beds and banks; weir installation; channel modification; construction staging and access; gravel augmentation; sediment removal; bank stabilization; minor maintenance; and the removal of culverts, riprap, or other structures. Any of these activities could have the potential for impacts on a variety of aquatic biological resources, also described below. Effects of monitoring and maintenance of habitat improvements are included in the analysis.

4.10.3.1 Impact AQUA-1a: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Stevens Creek watershed portion of the study area (less than significant)

The impacts on special-status species and their habitat that would result from implementation of the FAHCE-plus Alternative within the Stevens Creek portion of the study area are provided in the following subsections.

Consistent with the Proposed Project impact assessment, there was no HAI model outputs for habitat or passage for Pacific lamprey. Thus, the effects of the FAHCE-plus Alternative on Pacific lamprey habitat and passage were evaluated based on a combination of data for flow, water depth, wetted area, and temperature, as well as based on HAI for steelhead when life cycles and habitat preference overlap between the species.

Steelhead

Flow Measures Compared with Current Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 31 percent (2,140 square feet) average increase in effective spawning habitat in the Stevens Creek portion of the study area compared with the current baseline. An increase in effective spawning habitat would support increased abundance of anadromous adult spawners, add to the spatial diversity of available effective spawning habitat, decrease competition among spawners, and increase resiliency of spawning to temporal and spatial changes in habitat conditions.

Fry Rearing Habitat

There would be a 5 percent (11,000 square feet) average increase in modeled fry rearing habitat in the Stevens Creek portion of the study area for steelhead under the FAHCE-plus Alternative compared with the current baseline. Increased fry rearing habitat would support greater abundance of fry, increase the spatial diversity of available fry rearing habitat, decrease intra-specific competition, and improve resiliency of fry to temporal and spatial changes in habitat conditions.

Juvenile Rearing Habitat

There would be a 10 percent (16,000 square feet) average increase for modeled juvenile rearing habitat under the FAHCE-plus Alternative, mostly driven by increases in habitat during Winter Operations, because there would be a 4 percent (2,000 square feet) average decrease in juvenile rearing habitat in the upstream reaches during the Stevens Creek Summer Cold Water Program and Fall Flows (further discussed in Section 2.4.1 and Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum*) releases under the FAHCE-plus Alternative.

The Stevens Creek Cold Water Management Program aims to provide cooler temperatures to rearing juveniles in the hottest times of the year, but must do so by decreasing the amount of water released, allowing a slower draw on the coldest part of the reservoir to maintain temperatures as near to optimal as possible. Therefore, the modeled habitat shows a decrease in wetted area and not enough of a temperature decrease to avoid an overall decrease in juvenile rearing habitat. A reduction in juvenile rearing habitat area during summer could result in higher densities, increased competition, and reduced growth of juvenile steelhead. However, given that the modeled habitat is based on temperature thresholds developed from literature focused on Pacific Northwest salmonids, the modeled decrease in habitat is likely conservative, as there is evidence that juvenile steelhead in the CCC steelhead population likely can tolerate higher temperatures than steelhead and other salmonids in the Pacific Northwest (Exponent 2020).

Based on the FAHCE WEAP Model, suitable juvenile rearing habitat would increase during winter. Because winter habitat was previously identified as limiting for steelhead in Stevens Creek as a result of high-water velocities during winter flow conditions (Stillwater Sciences 2004), increased winter rearing habitat is predicted to support greater productivity of the population. However, there would be slight decreases in rearing habitat during the hottest months in summer, with not enough compensatory decrease in temperature to avoid a decrease in summer habitat. Overall, juvenile rearing habitat would increase under the FAHCE-plus Alternative, and increases in winter rearing habitat would likely offset any decreases during summer.

Conditions for Migration

The FAHCE-plus Alternative would result in a 12 percent (12 days per year) average increase in adult upstream passage in downstream Stevens Creek (STEV1 and STEV2) and a 10 percent (3 days per year) average increase in upstream Stevens Creek (STEV3 through STEV6). The increase in adult upstream passage consistently throughout the Stevens Creek portion of the watershed would be very beneficial for steelhead because migrating adult steelhead would have more opportunity to get to the upstream reaches where the CWMZ is located under FAHCE-plus Alternative compared to the current baseline.

The FAHCE-plus Alternative would result in increases in juvenile downstream passage of 2 percent (1 day per year) from upstream Stevens Creek, providing additional opportunities for steelhead smolts to emigrate to the ocean from rearing habitat compared with the current baseline.

An increase in adult and smolt migration opportunities under the Proposed Project increases the potential for anadromous *O. mykiss* life history production in the Stevens Creek watershed compared with the current baseline. Anadromous adults are more fecund than resident adults, and the overall influence of enhanced migratory opportunities is an increase in abundance and improved resilience of the population to persist through time (Bell et al. 2011; NMFS 2016; Dagit et al. 2017). This is apparent in watersheds such as Topanga Creek, where recolonization by anadromous adults resulted in reestablishment and increased abundance of an *O. mykiss* population (Bell et al. 2011).

Summary of Impacts Compared with Current Baseline

The increased habitat and migration conditions under the FAHCE-plus Alternative flow measures would result in a net benefit to anadromous steelhead. The FAHCE-plus Alternative flow measures would result in increases of all habitat types for steelhead, including effective spawning, fry rearing, and juvenile rearing habitat, on average, across both the Summer Cold Water Program and Fall Flows and Winter Base Flow Operations (excluding Fall Flows). The FAHCE-plus Alternative would also increase upstream and downstream migration conditions for both adult and juvenile steelhead throughout the Stevens Creek study area. In particular, the FAHCE-plus Alternative increases adult passage opportunities to the upstream reaches where the Stevens Creek CWMZ is located, unlike the Proposed Project where there was an average 1 day per year modeled decrease in passage to the CWMZ of Stevens Creek. In terms of adverse impacts, the FAHCE-plus Alternative would result in **no impact** and would benefit steelhead, steelhead habitat, and steelhead migration opportunities compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative compared with the future baseline would result in nearly identical increases to effective spawning habitat as observed in the comparison with the current baseline. The negligible difference between the comparisons of the FAHCE-plus Alternative with the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to more future increases in reservoir storage, as is the case in the Guadalupe River watershed.

Fry Rearing Habitat

There would be negligible differences between current and future baselines for modeled fry rearing habitat, and the effects are the same as those described for the comparison of the FAHCE-plus Alternative with the current baseline. The negligible difference between the comparisons of the FAHCE-plus Alternative with the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to more future increases in reservoir storage, as is the case in the Guadalupe River watershed.

Juvenile Rearing Habitat

There would be negligible differences between current and future baselines for modeled juvenile rearing habitat, and the effects are the same as described for the comparison of the FAHCE-plus Alternative with the current baseline. The negligible difference between the comparisons of the FAHCE-plus Alternative with the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to more future increases in reservoir storage, as is the case in the Guadalupe River watershed.

Conditions for Migration

There would be negligible differences between the comparisons of the FAHCE-plus Alternative with the current and future baselines for migration conditions, and the effects are the same as described for the comparison of the FAHCE-plus Alternative with the current baseline. The negligible difference between the comparisons of the FAHCE-plus Alternative with the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to more future increases in reservoir storage, as is the case in the Guadalupe River watershed.

Summary of Impacts Compared with Future Baseline

For the same reasons outlined in the comparison of the FAHCE-plus Alternative with the current baseline, the FAHCE-plus Alternative would benefit steelhead spawning, fry rearing, and juvenile rearing habitat, and would increase upstream adult passage and juvenile downstream passage opportunities throughout the whole stretch of Stevens Creek in the study area compared to the future baseline. Therefore, the FAHCE-plus Alternative, in terms of adverse impacts, would result in **no impact** and would benefit steelhead, steelhead habitat, and steelhead migration opportunities compared with the future baseline.

Pacific Lamprey

The impacts on Pacific lamprey and Pacific lamprey habitat that would result from the FAHCE-plus Alternative within the Stevens Creek watershed are provided in the following discussion. There were no HAI model outputs for habitat or passage for Pacific lamprey, because the model was developed specifically for steelhead and Chinook salmon habitat assessments as these are the focal species of the FAHCE. However, the effects of the FAHCE-plus Alternative on Pacific lamprey habitat and passage were evaluated based on a combination of modeled data for flow, water depth, wetted area, and temperature, as well as based on modeled HAI for steelhead when life cycles and habitat preferences overlap between the species. Appendix K, *Fisheries and Aquatic Habitat Technical Memorandum,* provides more detail with regard to how Pacific lamprey habitat was assessed.

Flow Measures Compared with Current Baseline Impact Analysis

Pre-spawning Holding Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in increased pre-spawning holding habitat during winter because of increased flows and wetted area, and would have variable effects on pre-spawning holding habitat during summer between downstream and upstream Stevens Creek. Decreases in pre-spawning holding habitat would occur in upstream reaches of Stevens Creek (STEV4 through STEV6) during the Summer Cold Water Program release because of reduced flows and wetted area, but there would be increased pre-spawning holding habitat in downstream Stevens Creek during summer because of an increased wetted area.

Effective Spawning Habitat

The FAHCE-plus Alternative would result in similar conditions to those analyzed under the Proposed Project and would result in modeled increased effective spawning habitat during 2 months of the spawning and incubation period for this species (March 1 through April 30) and, depending on the location in Stevens Creek, remain unchanged or decrease during 4 months of the spawning and incubation period for this species (March 1 through August 31). Increases in spawning and incubation habitat would occur from March 1 through April 30 under the FAHCE-plus Alternative as a result of increased flows under Winter Base Flow Operations (excluding Fall Flows, a portion of the winter operational flow release period that generally runs from November 1 to April 30), but effective spawning habitat generally decrease between May 1 and August 31 because of Summer Cold Water Program releases that reduce flows and wetted area in Stevens Creek. Incubation temperatures for successful hatching (ranging from 50 to 71°F) occur under the current baseline and would be maintained under the FAHCE-plus Alternative. The FAHCE-plus Alternative would result in a truncated spawning and incubation window for Pacific lamprey as a result of reduced flows in summer. However, spawning typically ends by mid-June so there would be minimal effects from decreased flows during the Summer Cold Water Program releases because they would be offset by increased effective spawning habitat during the Winter Base Flow Operations (excluding Fall Flows).

Larvae Rearing Habitat

The FAHCE-plus Alternative would result in modeled increased rearing habitat during winter because of increased flows and wetted area, and would have variable effects on rearing habitat during summer between downstream and upstream Stevens Creek. Decreases in rearing habitat would occur in upstream Stevens Creek (STEV4 through STEV6) during the Summer Cold Water Program as a result of reduced flows and wetted area. There is effectively no flow in downstream Stevens Creek during summer, but wetted area would increase under the FAHCE-plus Alternative. Increased wetted area in downstream Stevens Creek could provide additional rearing habitat if temperatures remain suitable. Modeled temperature was not available for STEV1 and STEV2 in downstream Stevens Creek, but modeled MWAT at STEV3 would remain suitable (the average temperature was less than 66°F and the maximum temperature was less than 70°F) during summer.

Conditions for Migration

During the adult Pacific lamprey upstream migration period (January 1 through June 30), the FAHCE WEAP Model results for thalweg depth indicate a 28 percent increase (29 days per year on average) in adult upstream passage opportunities in the Stevens Creek watershed under the FAHCE-plus Alternative when compared with the current baseline. In addition to the thalweg depth analysis, modeled results for adult steelhead upstream passage, which overlaps with the timing of upstream passage of adult Pacific lamprey (January through April), also indicate increases to adult Pacific lamprey upstream passage opportunities in the Stevens Creek watershed. During May and June, the FAHCE-plus Alternative would provide fewer passage opportunities compared with the current baseline because of reduced flows. However, Pacific lamprey migrations in Central California are associated with high flow events that provide longitudinal connectivity in streams that are normally intermittent under baseline flows, especially in summer. High flow events are typically restricted to winter and spring months in Central California, and there are likely few high flow events that would provide upstream passage after May under the current baseline, resulting in a negligible effect of the FAHCE-plus Alternative on upstream migrations in May and June. The FAHCE-plus Alternative would have variable effects on upstream passage across locations and time but increased upstream passage in the downstream reaches of Stevens Creek would provide additional spawning opportunities for Pacific lamprey, promoting a larger and more resilient population.

During the adult Pacific lamprey downstream migration period (December 1 through May 31), the FAHCE WEAP Model results for thalweg depth indicate a 28 percent (32 days per year) average increase in juvenile downstream passage opportunities in the Stevens Creek watershed under the FAHCE-plus Alternative when compared with the current baseline. In addition to the thalweg depth analysis, modeled results for juvenile steelhead downstream passage (with the water temperature criteria included), which overlaps with the timing of downstream passage of juvenile Pacific lamprey (December through May), also indicate increases to adult Pacific lamprey upstream passage opportunities in the Stevens Creek watershed. Reduced flows under the Summer Cold Water Program could reduce downstream passage for Pacific lamprey if critical riffles become dry during low flows in summer and fall. As described in the paragraph above with respect to adult passage, there are likely few high flow events that would provide juvenile downstream passage after May under the current baseline, resulting in a negligible effect of the FAHCE-plus Alternative on downstream migrations in summer and fall. Overall, the FAHCE-plus Alternative would result in increased opportunities for downstream passage for juvenile Pacific lamprey.

Summary of Impacts Compared with Current Baseline

Although the operations associated with the Proposed Project are management actions that benefit federally listed steelhead and salmon, the actions would provide an overall benefit to Pacific lamprey as well. Net benefits of implementing the FAHCE-plus Alternative flow measures would support increased abundance of Pacific lamprey in the Stevens Creek watershed.

Under the FAHCE-plus Alternative, there would be overall increases of modeled pre-spawning holding and larvae rearing habitat in winter, and increased upstream and downstream migration Therefore, the FAHCE-plus Alternative would benefit, and in terms of adverse impacts, result in **no impact** overall to lamprey, lamprey habitat, and lamprey migration conditions compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Pre-spawning Holding Habitat

Based on the results of the FAHCE WEAP Model and habitat analysis, there are negligible differences in the FAHCE-plus Alternative in analysis between the current and future baseline for pre-spawning holding habitat. For the reasons outlined in the comparison with current baseline, decreases in flows and wetted area during summer under the FAHCE-plus Alternative would reduce pre-spawning holding habitat, but increases in pre-spawning holding habitat would occur during winter as a result of increases in flows and wetted area. The negligible difference between the comparisons of the FAHCE-plus Alternative with the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to more future increases in reservoir storage, as is the case in the Guadalupe River watershed.

Effective Spawning Habitat

There are negligible differences in the FAHCE-plus Alternative in analysis between the current and future baseline for modeled effective spawning habitat. The negligible difference between the comparisons of the FAHCE-plus Alternative with the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to more future increases in reservoir storage, as is the case in the Guadalupe River watershed.

Larvae Rearing Habitat

There are negligible differences in the FAHCE-plus Alternative in analysis between the current and future baseline for modeled larvae rearing habitat. The negligible difference between the comparisons of the FAHCE-plus Alternative with the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to more future increases in reservoir storage, as is the case in the Guadalupe River watershed.

Conditions for Migration

There would be negligible differences between the comparisons of the FAHCE-plus Alternative with the current and future baselines for migration conditions, and the effects are the same as described for the comparison of the FAHCE-plus Alternative with the current baseline. The negligible difference between the comparisons of the FAHCE-plus Alternative with the current and future baselines occurs because there are no seismic retrofit projects in Stevens Creek that would lead to more future increases in reservoir storage, as is the case in the Guadalupe River watershed.

Summary of Impacts Compared with Future Baseline

Although the operations associated with the Proposed Project are management actions that benefit federally listed steelhead and salmon, the actions would provide an overall benefit to Pacific lamprey as well. Net benefits of implementing the FAHCE-plus Alternative flow measures would support increased abundance of Pacific lamprey in the Stevens Creek watershed.

Under the FAHCE-plus Alternative, there would be overall increases of modeled pre-spawning holding and larvae rearing habitat in winter, and increased upstream and downstream migration Therefore, the FAHCE-plus Alternative would benefit, and in terms of adverse impacts, result in **no impact** overall to lamprey, lamprey habitat, and lamprey migration conditions compared with the future baseline.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures on steelhead and Pacific lamprey, their habitat, and migration conditions in the Stevens Creek portion of the study area. The non-flow measures included in the FAHCE-plus Alternative analyzed in this section are fish passage barrier remediation, spawning and rearing habitat improvements, geomorphic functions enhancement, and the portable multiport outlet specific to the Stevens Creek portion of the study area. The impacts from each of these non-flow measures is discussed in the sections below.

Fish Passage Barrier Remediation

The impacts of the fish passage barrier remediation projects, which may include removal or remediation of the Fremont Fish Ladder, retaining the existing fish ladder structure, and constructing a low-flow channel downstream of the existing Moffett Fish Ladder, would be the same as described in Proposed Project Impact AQUA-1a. Fish barrier removal or remediation could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead and Pacific lamprey, their habitat, and migration conditions.

Spawning and Rearing Habitat Improvements

The impacts of the spawning and rearing habitat improvement projects, which would generally occur within the upper watershed below Stevens Creek Dam, would be the same as described in Proposed Project Impact AQUA-1a. Spawning and rearing habitat improvement projects could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead and Pacific lamprey, their habitat, and migration conditions.

Portable Multiport Outlet

The impacts of the operation of the portable multiport outlet, which would allow water to be released from Stevens Creek Reservoir in more than one location in the water column, would be the same as described in Proposed Project Impact AQUA-1a. Implementation of the portable multiport outlet project could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead and Pacific lamprey, their habitat, and migration conditions.

Summary of Short-term Impacts

The short-term impacts of non-flow measures under the FAHCE-plus Alternative are the same as those described in the Proposed Project. In summary, there could be a short-term reduction of steelhead effective spawning, fry rearing, and juvenile rearing habitat as well as migration conditions; and Pacific lamprey pre-spawning holding, spawning, and larvae rearing habitat as well as migration conditions during the construction of the non-flow measures. However, BMPs and VHP conditions would be implemented, reducing impacts to spawning and fry rearing habitat. Therefore, non-flow measures would result in **less-than-significant** impacts in the short-term construction period to steelhead and Pacific lamprey in the Stevens Creek portion of the study area.

Summary of Long-term Impacts

The long-term benefits of non-flow measures under the FAHCE-plus Alternative are the same as those described in the Proposed Project. In summary, there would be increased steelhead spawning, fry rearing, and juvenile rearing habitat as well as migration conditions; and Pacific lamprey pre-spawning holding, spawning, and larvae rearing habitat as well as increased migration conditions as a result of the fully constructed non-flow measures. In the long term, in terms of adverse impacts, the non-flow measures under the FAHCE-plus Alternative would result in **no impact** and would benefit steelhead and Pacific lamprey individuals, habitat, and migration conditions in the Stevens Creek portion of the study area.

Monitoring, Maintenance, and Adaptive Management

Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys, and would have no impact to steelhead and Pacific lamprey. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or in-channel PIT tag reader stations, and would have no impact to steelhead and Pacific lamprey.

Long-term monitoring would also include electrofishing, capturing, DNA sampling, and PIT tagging, which would cause some adverse impacts on steelhead and Pacific lamprey. During electrofishing, steelhead and Pacific lamprey would be stunned, captured, crowded (although the Fish Rescue and Relocation Plan would include measures to minimize crowding), and handled, which could cause acute physiological stress and may cause occasional incidental injury and/or mortality. Additionally, juvenile steelhead would be sampled for DNA and PIT tagged, which would cause acute physiological stress and may cause occasional incidental injury and/or mortality. Electrofishing would follow standard NMFS survey protocols, which would minimize injury and mortality during sampling and tagging. Electrofishing and associated sampling would be conducted under incidental take coverage pursuant to the federal ESA and a scientific collecting permit pursuant to the California Fish and Game Code. These permits would provide limits on incidental take during monitoring and would include measures designed to minimize and avoid adverse effects to aquatic resources during electrofishing activities. The monitoring program would provide valuable long-term population information for steelhead that could be used to adjust components of the FAHCE-plus Alternative through the AMP to be more beneficial to native fish, including steelhead and Pacific lamprey, over the long term. Therefore, the impacts of monitoring activities implemented under Phase 1 of the AMP would be less than significant to steelhead and Pacific lamprey.

AMP implementation during Phase 1 could include minor adjustments to the flow and non-flow measures, such as minor modifications or adjustments to the rule curves, modifications to fish passage barriers, additional gravel augmentation, or habitat modifications. Impacts related to these Phase 1 AMP adaptive measures would be consistent with those of the FAHCE-plus Alternative. Therefore, impacts from implementation of the AMP would be less than significant.

In summary, there would be some adverse impacts from the monitoring, maintenance, and AMP, but they would be less than significant.

Stevens Creek Impact Overview

Steelhead

As a result of the FAHCE-plus Alternative, the flow measures, when compared with both the current and future baseline, would result in no impact and would benefit steelhead spawning, fry rearing, and juvenile rearing habitat and migration conditions; the short-term non-flow measures would result in less-than-significant impacts; and the long-term non-flow measures would result in no impact and would benefit steelhead, steelhead habitat, and steelhead migration opportunities within the Stevens Creek portion of the study area.

The increased habitat and migration conditions under the flow measures would benefit anadromous steelhead. In addition, the potential short-term impacts of implementing the non-flow measures would be reduced with the implementation of BMPs and VHP conditions, and would be offset by the long-term benefits of increased habitat and migration conditions. Maintenance, monitoring, and the

Phase 1 AMP adaptive measures would be consistent with the FAHCE-plus Alternative and would likewise result in few impacts on steelhead, steelhead habitat, and migration conditions. These overall benefits would improve conditions for steelhead.

Comparing the Proposed Project with the FAHCE-plus Alternative, the non-flow measures would result in the same impacts and benefits to steelhead. The Proposed Project flow measures would result in overall increases in steelhead upstream and downstream passage opportunities, as well as increased spawning and rearing habitat from late fall to spring. However, the Proposed Project flow measures would also result in decreases in flow from May through November, which would lead to decreased juvenile rearing habitat during this period and would decrease adult passage to upstream Stevens Creek (where the CWMZ is located) by 1 day per year. In contrast, the flow measures under the FAHCE-plus Alternative would result in increases to all habitat types for steelhead, including juvenile rearing habitat, in addition to effective spawning and fry rearing habitat. The FAHCE-plus Alternative would also increase upstream and downstream migration conditions for both adult and juvenile steelhead throughout the whole Stevens Creek study area but would not show as much total increase in passage days in the downstream reaches. However, the FAHCE-plus Alternative increases adult passage opportunities to the upstream reaches where the CWMZ is located, while the Proposed Project decreases passage opportunities to these reaches by 1 day per year. Overall, the FAHCE-plus Alternative would result in increased habitat during winter and summer, whereas the Proposed Project would only increase rearing habitat during winter. Therefore, because of the increased juvenile rearing habitat and the improved migration conditions to the CWMZ, the FAHCE-plus Alternative would be better for steelhead under the AQUA-1a impact assessment.

Pacific Lamprey

As a result of the FAHCE-plus Alternative, the flow measures when compared with both the current and future baseline would result in no impacts and would benefit pre-spawning holding habitat in winter, effective spawning habitat in the early spawning season, rearing habitat in winter, rearing habitat in downstream reaches in summer, and migration conditions; the short-term non-flow measures would result in less-than-significant impacts; and the long-term non-flow measures would result in no impact and would benefit Pacific lamprey, Pacific lamprey habitat, and Pacific lamprey migration opportunities within the Stevens Creek portion of the study area.

While the FAHCE-plus flow measures would maintain the current population of Pacific lamprey overall despite some adverse impacts, they were ultimately emphasizing benefits to federally listed steelhead. Therefore, some impacts on habitat suitability for certain life stages of Pacific lamprey are expected. However, the net benefits of implementing the flow and non-flow measures would support increased abundance of Pacific lamprey in the Stevens Creek watershed, which would lead to increased population health and greater genetic diversity of the Pacific lamprey population as a whole.

Although the results of the flow and non-flow measures are similar between the Proposed Project and FAHCE-plus Alternative, the FAHCE-plus Alternative results in slightly more habitat and passage increases than the Proposed Project. The FAHCE-plus Alternative flow measures compared to the current and future baselines would result in overall increases in Pacific lamprey pre-spawning holding habitat in the winter, rearing habitat in the downstream reaches, and upstream and downstream passage opportunities. Decreases would occur in pre-spawning holding and effective spawning habitat in summer and in rearing habitat in the upstream reaches. The FAHCE-plus Alternative flow measures would also result in increases to pre-spawning holding and rearing habitat, increased upstream migration opportunities overall, some decreases to pre-spawning holding, and effective spawning habitat throughout the Stevens Creek study area. However, decreases in pre-spawning holding habitat in the upstream reaches and reduced downstream passage during summer and fall would also occur. The impacts and benefits of the non-flow measures to Pacific lamprey would be identical under the Proposed Project and the FAHCE-plus Alternative (that is, some increases to pre-spawning holding and effective spawning habitat and increased upstream migration opportunities). Overall, the FAHCE-plus Alternative would result in greater decreases to habitat and passage than the Proposed Project compared to the current and future baseline because the FAHCE-plus Alternative results in decreases to pre-spawning holding habitat in the upstream reaches and reduced downstream passage during summer and fall. Therefore, the Proposed Project would be slightly better for Pacific lamprey under the AQUA-1a impact assessment compared to the FAHCE-plus Alternative.

Mitigation

No mitigation would be required for Impact AQUA-1a.

4.10.3.2 Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area (less than significant)

The impacts on special-status species and their habitat that would result from implementation of the FAHCE-plus Alternative within the Guadalupe River watershed are provided in the following subsections.

Steelhead

Flow Measures Compared with Current Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 68 percent (3,435 square feet) average increase in effective spawning habitat in the Guadalupe River. Compared with the current baseline; however, increases were primarily observed in the early spawning period (December), with minimal differences observed during the rest of the spawning period (January through May), when most upstream migration occurs (Moyle et al. 2008).

There would be an 18 percent (198 square feet) average decrease in effective spawning habitat in Los Gatos Creek compared with the current baseline; however, decreases were only observed in the early spawning period (late December to early January), likely attributable to decreases in wetted area, with minimal differences observed during the rest of the spawning period (early January to May), when most upstream migration occurs (Moyle et al. 2008).

There would be a 13 percent (97 square feet) average increase in modeled effective spawning habitat during the spawning and incubation lifestage period (that is, December to May) across POIs in Guadalupe Creek compared with the current baseline. In the Guadalupe Creek CWMZ, there would be a 1 percent (4 square foot) increase in modeled steelhead effective spawning habitat across the entire spawning and incubation period.

There would be a 37 percent (23 square feet) average decrease in modeled effective spawning habitat in Alamitos Creek.

There were no FAHCE WEAP Model predictions for effective spawning habitat in Calero Creek despite known occurrence of spawners. Based on the results of the FAHCE WEAP Model for wetted area, effective spawning habitat would decrease in Calero Creek compared with the current baseline because of decreased wetted area during Winter Base Flow Operations.

The FAHCE-plus Alternative would have variable effects on modeled effective spawning habitat across locations in the Guadalupe River watershed. Negligible changes in effective spawning habitat would occur in the Guadalupe River and Los Gatos Creek, and there would be an increase in Guadalupe Creek and a decrease in Alamitos and Calero Creeks. Variability in changes to effective spawning habitat combined with the amount of available effective spawning habitat under the current conditions considered not to be limiting to the species (Moyle 2002) would result in the FAHCE-plus Alternative having little influence on the steelhead population compared with the current baseline conditions.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 0.7 percent (8,300 square feet) average decrease in fry rearing habitat in the Guadalupe River.

There would be a 2 percent (6,000 square feet) average increase in modeled fry rearing habitat in Los Gatos Creek. Los Gatos Creek contains a large amount of fry rearing habitat under the current baseline (382,000 square feet).

There would be a 1 percent (960 square feet) average increase in modeled fry rearing habitat in Guadalupe Creek with a 10 percent (9,740 square feet) average increase from March to April and a 19 percent (16,340 square feet) average decrease during May compared with the current baseline. In the Guadalupe Creek CWMZ, fry rearing habitat decreased by a total of 6 percent (1,600 square feet), with an 11 percent (2,700 square feet) increase observed during the Winter Base Flow Operations followed by a 2 percent (600 square feet) decrease during the Summer Cold Water Program.

There would be a 0.1 percent (80 square feet) average decrease in modeled fry rearing habitat in Alamitos Creek.

There would be a 10 percent (6,110 square feet) average decrease in modeled fry rearing habitat in Calero Creek compared with the current baseline, with a 23 percent (11,320 square feet) average decrease from March to April and a 4 percent (4,000 square feet) average increase in May compared with the current baseline. The average decrease during Winter Base Flow Operations does not completely characterize the change in fry rearing habitat during January 1 through March 31. Habitat survey data input into the model indicated there was zero winter cover in the reach associated with the CALE2 POI (that is, CALE1 to CALE2) and caused fry rearing habitat to be zero in January through March under all scenarios, but subsequent habitat surveys indicated there was winter cover (Valley Water 2019c, 2020e). Variations in wetted area at CALE2 in March under the FAHCE-plus Alternative compared to the current baseline suggest that there would be a decrease in fry rearing habitat during the time when the model output predicted zero habitat (March to April). The fry rearing habitat decrease in March would likely be a smaller relative magnitude than in April since the decrease in wetted area in March is less than in April at CALE2.

The FAHCE-plus Alternative would result in changes to modeled fry rearing habitat in the Guadalupe River watershed portion of the study area. Increases were mostly observed during Winter Base Flow Operations from March to April, and decreases in fry rearing habitat would be observed at some locations during the Summer Release Program in May except for Calero Creek, where fry rearing habitat would decrease during Winter Baseflow Operations and increase during the Summer Release Program compared to the current baseline. The observed increases in fry rearing habitat in winter would be beneficial for steelhead growth in these reaches; however, growth could be reduced in May in Guadalupe and Los Gatos Creeks because of increased metabolic demands from elevated temperature or because of increased competition for resources when wetted area is reduced. The minor changes to the amount of fry rearing habitat under the FAHCE-plus Alternative would have limited effects on the steelhead population.

Juvenile Rearing Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 0.6 percent (7,600 square feet) average decrease in steelhead juvenile rearing habitat in the Guadalupe River, with large decreases apparent during June and November.

There would be a 4 percent (14,000 square feet) average decrease in modeled steelhead juvenile rearing habitat in Los Gatos Creek, with large decreases apparent during May and November. Los Gatos Creek contains a large amount of juvenile rearing habitat (331,000 square feet) under the current baseline.

There would be a 17 percent (9,480 square feet) average decrease in modeled steelhead juvenile rearing habitat within Guadalupe Creek, with a 7 percent (4,610 square feet) average increase during Winter Base Flow Operations and a 53 percent (23,501 square feet) average decrease during the Summer Cold Water Release Program. In the Guadalupe Creek CWMZ, juvenile rearing habitat decreased by 9 percent (1,300 square feet), with a 13 percent (1,800 square feet) increase observed during the Winter Base Flow Operations, followed by a decrease of 32 percent (4,430 square feet) during the Summer Cold Water Program.

There would be a 0.1 percent (90 square feet) average increase in modeled steelhead juvenile rearing habitat, with an abrupt decrease in November, compared with the current baseline within Alamitos Creek.

There would be a 4 percent (2,390 square feet) average decrease in modeled juvenile rearing habitat in Calero Creek, with a 29 percent (10,030 square feet) average decrease during Winter Base Flow Operations releases attributable to decreased wetted area, and a 6 percent (5,250 square feet) average increase during the Summer Cold Water Program releases attributable to increased wetted area under the FAHCE-plus Alternative.

Based on the FAHCE WEAP Model, The FAHCE-plus Alternative would result in potential adverse impacts to steelhead from net decreases to juvenile rearing habitat in the Guadalupe River watershed, with decreases being pronounced during the Summer Cold Water Program releases but substantial decreases also observed during the Winter Baseflow Operations. However, Calero Creek shows an opposite trend, with increased juvenile rearing habitat modeled during the Summer Cold Water Program and decreases during the Winter Baseflow Operations. Juvenile rearing habitat decreases mostly result from reduced wetted area and/or elevated water temperatures to above those metabolically optimal for rearing steelhead (64°F; McCullough et al. 2001). During periods of high temperatures, juvenile steelhead may experience reduced growth rates, although steelhead in Central California may be capable of tolerating and even benefitting from higher temperatures (Myrick and Cech 2001); therefore, the modeled habitat decreases described here are likely conservative for juvenile CCC steelhead. Also, despite decreases, there is already a lot of juvenile rearing habitat in some of the sub-watersheds such as Los Gatos Creek, which is modeled to have 331,000 square feet of juvenile rearing habitat under the current baseline; however, Valley Water rearing surveys have not demonstrated many juveniles rearing in this tributary to date.

Conditions for Migration

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 2 percent (1 day per year) average decrease in adult upstream passage at sites in the Guadalupe River compared with the current baseline.

There would be a 5 percent (less than 2 days per year) average decrease in adult upstream passage in Los Gatos Creek compared with the current baseline.

There would be a 14 percent (approximately 2 days per year) average increase in adult upstream passage in Guadalupe Creek compared with the current baseline.

There would be a 6 percent (approximately 3 days per year) average increase in adult upstream passage in Alamitos Creek compared with the current baseline.

The FAHCE-plus Alternative would result in a 7 percent (2 days per year) average increase in adult upstream passage in Calero Creek compared with the current baseline.

The FAHCE-plus Alternative would result in increases to adult upstream passage in Guadalupe, Alamitos, and Calero Creeks and decreases in the Guadalupe River and Los Gatos Creek. More passage to the upstream tributaries would be beneficial for allowing adults to move to the more distal reaches of the watershed to expand spawning opportunities throughout the watershed. Although the Guadalupe River mainstem is critically important because adult steelhead need to traverse the main stem before migrating to the rest of the watershed for spawning, a decrease of less than 1 day per year is likely not biologically meaningful in the Guadalupe River.

The FAHCE-plus Alternative would result in a 3 percent (1 day per year) average decrease in juvenile downstream passage in the Guadalupe River compared with the current baseline. Evaluating the juvenile downstream passage, excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the FAHCE-plus Alternative would result in a 5 percent (3 days per year) average increase in juvenile downstream passage in the Guadalupe River compared with the current baseline.

The FAHCE-plus Alternative would result in a 3 percent (1 day per year) average increase in juvenile downstream passage in Los Gatos Creek compared with the current baseline. However, during dry years (when the minimum passage is observed), the FAHCE-plus Alternative would nearly double the number of downstream passage days per year. Evaluating the juvenile downstream passage, excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the FAHCE-plus Alternative would result in a 31 percent (24 days per year) average increase in juvenile downstream passage in Los Gatos Creek compared with the current baseline.

The FAHCE-plus Alternative would result in a 7 percent (1 day per year) average increase in juvenile downstream passage in Guadalupe Creek compared with the current baseline. Evaluating the juvenile downstream passage, excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the FAHCE-plus Alternative would result in a 13 percent (3 days per year) average increase in juvenile downstream passage in Guadalupe Creek compared with the current baseline.

The FAHCE-plus Alternative would result in a 10 percent (less than 2 days per year) average decrease in juvenile downstream passage in Alamitos Creek compared with the current baseline. Evaluating the juvenile downstream passage, excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the FAHCE-plus Alternative would result in a 2 percent (1 day per year) average increase in juvenile downstream passage in Alamitos Creek compared with the current baseline.

The FAHCE-plus Alternative would result in a 5 percent (1 day per year) average decrease in juvenile downstream passage in Calero Creek compared with the current baseline. Evaluating the juvenile downstream passage, excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the FAHCE-plus Alternative would result in no change to juvenile downstream passage in Calero Creek compared with the current baseline.

Based on the results of the FAHCE WEAP Model, there would be negligible modeled changes in downstream passage in the Guadalupe River watershed under the FAHCE-plus Alternative. However, downstream passage would be clearly increased based on models, excluding water temperature criteria compared with models that included water temperature criteria.

Summary of Impacts Compared with Current Baseline

The FAHCE-plus Alternative flow measures would result in overall average increases of effective spawning and fry rearing habitat, and upstream and downstream passage opportunities, with the tradeoff of decreased average juvenile rearing habitat in Los Gatos and Guadalupe Creeks.

The amount of available effective spawning habitat under the current baseline conditions is not considered to be limiting to steelhead (Moyle 2002). Decreases in Los Gatos and Calero Creeks occur at a time of year when few migrants are expected. Fry rearing habitat would increase on average in Los Gatos and Guadalupe Creeks compared with the current. These beneficial increases outweigh any near-term average decrease of fry rearing habitat in the Guadalupe River and Calero Creek.

Juvenile rearing habitat would increase slightly in Alamitos Creek, but would decrease in Los Gatos and Guadalupe Creeks under the current baseline. The decrease would be substantial in Guadalupe Creek, which is known to continually support rearing steelhead (Valley Water and Stillwater Sciences 2015, 2016, 2017; Valley Water et al. 2018), during summer and fall, and would be lesser in Los Gatos Creek because of the existing large areas of rearing habitat available. The Guadalupe River and Calero Creek would experience average decreases of juvenile rearing habitat compared with the current baseline.

The FAHCE-plus Alternative flow measures would increase upstream and downstream passage opportunities overall. There would be a substantial average increase of upstream passage to Guadalupe and Alamitos Creeks, which are tributaries that support high abundances of *O. mykiss* (Valley Water and Stillwater Sciences 2015, 2016, 2017; Valley Water et al. 2018). Increased upstream passage opportunities to these tributaries would provide additional spawning opportunities for steelhead in the Guadalupe River portion of the study area.

Downstream passage would be largely unaffected until seismic restrictions are lifted (see comparison with future baseline). When downstream passage was analyzed with and without water temperature criteria, results varied slightly, with some increase of passage when assessed without water temperature.

Therefore, the FAHCE-plus Alternative would benefit, and in terms of adverse impacts, result in **no impact** to steelhead, steelhead habitat, and steelhead migration opportunities compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 56 percent (3,681 square feet) average increase in effective spawning habitat in the Guadalupe River compared with the future baseline, with increases observed in the early spawning period (December) and minimal differences observed during the rest of the spawning period (January through May), when most upstream migration occurs (Moyle et al. 2008).

There would be a 16 percent (195 square feet) average decrease in modeled effective spawning habitat in Los Gatos Creek compared with the future baseline but only in the early spawning period (late December through early January), with minimal differences observed during the rest of the spawning period (early January through May), when most upstream migration occurs (Moyle et al. 2008).

There would be a 50 percent (279 square feet) average increase in modeled effective spawning habitat in Guadalupe Creek. Guadalupe Creek has limited effective spawning habitat (553 square feet) under the future baseline. In the Guadalupe Creek CWMZ, there would be a 39 percent (108 square foot) increase in steelhead effective spawning habitat.

There would be a 36 percent (29 square feet) average decrease in modeled effective spawning habitat in Alamitos Creek. Alamitos Creek has limited effective spawning habitat (79 square feet) under the future baseline.

There were no FAHCE WEAP Model predictions for effective spawning habitat in Calero Creek despite known occurrence of spawners. Based on the results of the FAHCE WEAP Model for wetted area, effective spawning habitat would increase in Calero Creek compared with the future baseline because of increased wetted area during Winter Base Flow Operations, when spawning is expected to occur.

The FAHCE-plus Alternative would have variable effects on modeled effective spawning habitat across locations in the Guadalupe River watershed. Negligible changes in effective spawning habitat would occur in the Guadalupe River and Los Gatos Creek, and there would be an increase in Guadalupe and Calero Creeks and a slight decrease in Alamitos Creek, where effective spawning habitat is limited. Variability in changes to effective spawning habitat combined with the amount of available effective spawning habitat under the current conditions, which is not considered to be limiting to the species (Moyle 2002), would result in the FAHCE-plus Alternative having little influence on the steelhead population compared with the future baseline conditions.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 2 percent (25,000 square feet) average increase in fry rearing habitat in the Guadalupe River compared to the future baseline. There is a large amount of fry rearing habitat in the Guadalupe River under future baseline conditions (1,214,500 square feet).

There would be a 0.5 percent (2,000 square feet) average increase in modeled fry rearing habitat in Los Gatos Creek compared to the future baseline. Los Gatos Creek contains a large amount (387,000 square feet) of fry rearing habitat under the future baseline.

There would be a 3 percent (2,760 square feet) average increase in modeled fry rearing habitat in Guadalupe Creek compared to the future baseline with a 13 percent (12,250 square feet) average increase from March to April and a 17 percent (15,590 square feet) average decrease during May. In the Guadalupe Creek CWMZ, fry rearing habitat increased by a total of 9 percent (2,300 square feet), with an 8 percent (2,000 square feet) increase observed during the Winter Base Flow Operations, followed by a 12 percent (3,000 square feet) increase during the Summer Cold Water Program.

There would be a 5 percent (3,360 square feet) average increase in modeled fry rearing habitat in Alamitos Creek compared to the future baseline.

There would be an 9 percent (6,030 square feet) average increase in modeled fry rearing habitat in Calero Creek compared with the future baseline, with a 15 percent (7,660 square feet) average increase from March to April and a 3 percent (3,060 square feet) average increase in May. These changes are likely attributable to increases in wetted area during both Winter Base Flow Operations and the Summer Release Program.

The FAHCE-plus Alternative would result in increases in modeled fry rearing habitat throughout the Guadalupe River watershed portion of the study area, benefitting and supporting an increased abundance of steelhead fry compared to the future baseline.

Juvenile Rearing Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 2 percent (26,500 square feet) average increase in juvenile rearing habitat in the Guadalupe River compared with the future baseline.

There would be a 5 percent (16,000 square feet) average decrease in modeled juvenile rearing habitat in Los Gatos Creek compared to the future baseline. Decreases would occur in May and November as a result of decreased wetted area and increased temperatures under the FAHCE-plus Alternative. Los Gatos Creek contains a large amount (348,000 square feet) of juvenile rearing habitat under the future baseline.

There would be a 11 percent (6,770 square feet) average decrease in modeled juvenile rearing habitat within Guadalupe Creek compared to the future baseline, with a 21 percent (14,180 square feet) increase during Winter Base Flow Operations and 46 percent (27,471 square feet) decrease during Summer Cold Water Program releases in Guadalupe Creek. In the Guadalupe Creek CWMZ, juvenile rearing habitat decreased by 17 percent (3,100 square feet), with a 37 percent (4,900 square feet) increase observed during Winter Base Flow Operations, followed by a decrease of 47 percent (10,900 square feet) during the Summer Cold Water Program.

There would be a 5 percent (3,630 square feet) average increase in modeled juvenile rearing habitat within Alamitos Creek compared with the future baseline. The FAHCE-plus Alternative would result in an abrupt decrease in November related to reduced wetted area compared with the future baseline.

There would be a 1 percent (600 square feet) average increase in modeled juvenile rearing habitat in Calero Creek compared with the future baseline. The increase in juvenile rearing habitat is likely an underestimate because there were no model predictions for POI 2 during Winter Base Flow Operations, but there would be increased habitat during this time because of increases in wetted area compared to the future baseline.

The FAHCE-plus Alternative would result in increases in modeled juvenile rearing habitat in the Guadalupe River, Alamitos Creek, and Calero Creek, and decreases in juvenile rearing habitat in Los Gatos and Guadalupe Creeks, with a net gain of 4,330 square feet of juvenile rearing habitat on average (likely an underestimate due to missing POI data in Calero Creek). Decreases in Guadalupe Creek were attributable to Summer Cold Water Program releases that reduced wetted area and/or elevated water temperatures to above those metabolically optimal for rearing steelhead (64°F; McCullough et al. 2001). During periods of high temperatures, juvenile steelhead may experience reduced growth rates, although steelhead in Central California may be capable of tolerating and even benefiting from higher temperatures (Myrick and Cech 2001); therefore, the modeled habitat decreases described here are likely conservative for juvenile CCC steelhead, further underestimating the net gain in juvenile rearing habitat. Also, despite decreases, there is already a lot of juvenile rearing habitat in Los Gatos Creek, which is modeled to have 348,000 square feet of juvenile rearing habitat under the future baseline. Also, Valley Water rearing surveys have not demonstrated many juveniles rearing in this tributary to date; therefore, a decrease in juvenile habitat in this tributary may not be as biologically meaningful as the other tributaries. Given the net gain in juvenile rearing habitat, which is likely an underestimate, the FAHCE-plus Alternative would benefit juvenile rearing habitat, supporting more abundance of steelhead juveniles

Conditions for Migration

Adult Upstream Passage

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 12 percent (9 days per year) average increase in adult upstream passage in the Guadalupe River compared to the future baseline, most notably at the upstream-most POIs (GUAD6 and GUAD7), where upstream passage increased by 35 percent (24 days per year) on average.

There would be a 3 percent (1 day per year) average decrease in adult upstream passage in Los Gatos Creek compared with the future baseline.

There would be a 25 percent (3 days per year) average increase in adult upstream passage in Guadalupe Creek compared with the future baseline.

There would be a 29 percent (13 days per year) average increase in Alamitos Creek compared with the future baseline.

There would be a 414 percent (9 days per year) average increase in adult upstream passage in Calero Creek compared with the future baseline.

The FAHCE-plus Alternative is modeled to have substantial increases in adult upstream passage throughout the Guadalupe River watershed portion of the study area, except for Los Gatos Creek, which would result in a negligible decrease in adult upstream passage. Additional upstream passage opportunities would provide adults more access to spawning locations and would improve spawning opportunities in the watershed. Given the degraded condition of Los Gatos Creek, a decrease in adult upstream passage would not be an adverse impact to steelhead compared to existing conditions.

Juvenile Downstream Passage

The FAHCE-plus Alternative would result in a 19 percent (6 days per year) average increase in juvenile downstream passage in the Guadalupe River compared with the future baseline. Evaluating the juvenile downstream passage, excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the FAHCE-plus Alternative would result in a 27 percent (17 days per year) average increase in juvenile downstream passage in the Guadalupe River compared with the future baseline.

The FAHCE-plus Alternative would result in a 6 percent increase (2 days per year) average increase in juvenile downstream passage in Los Gatos Creek compared with the future baseline. However, during dry years (when the minimum passage is observed), the FAHCE-plus Alternative would nearly double the number of downstream passage days per year. Evaluating the juvenile downstream passage, excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the FAHCE-plus Alternative would result in a 13 percent (12 days per year) average increase in juvenile downstream passage in Los Gatos Creek compared with the future baseline.

The FAHCE-plus Alternative would result in a 200 percent (16 days per) average increase in juvenile downstream passage in Guadalupe Creek, which is nearly triple the number of passage opportunities for juveniles provided by the future baseline. Evaluating the juvenile downstream passage, excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the FAHCE-plus

Alternative would result in a 100 percent (19 days per year) average increase in juvenile downstream passage in Guadalupe Creek compared with the future baseline.

The FAHCE-plus Alternative would result in a 5 percent (1 day per year) average increase in juvenile downstream passage in Alamitos Creek compared with the future baseline. Evaluating the juvenile downstream passage, excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the FAHCE-plus Alternative would result in a 20 percent (7 days per year) average increase in juvenile downstream passage in Alamitos Creek compared with the future baseline.

The FAHCE-plus Alternative would result in a 281 percent (23 days per year) average increase in juvenile downstream passage in Calero Creek, which is nearly quadruple the passage opportunities provided by the future baseline. Evaluating the juvenile downstream passage, excluding the water temperature criteria utilized to calculate the FAHCE WEAP Model results, the FAHCE-plus Alternative would result in a 338 percent (44 days per year) average increase in juvenile downstream passage in Calero Creek compared with the future baseline.

The FAHCE-plus Alternative provides substantially more juvenile downstream passage compared with the future baseline across the Guadalupe River watershed portion of the study area, except for a slight decrease in migration opportunity in Alamitos Creek clearly benefitting outmigrating steelhead smolts.

An increase in downstream migrants would support increased abundance of returning anadromous adult spawners to the watershed. An increase in adult and smolt migration opportunities under the FAHCE-plus Alternative increases the potential for anadromous *O. mykiss* life history production in the Guadalupe River watershed portion of the study area compared with the future baseline.

Summary of Impacts Compared with Future Baseline

The FAHCE-plus Alternative flow measures would result in overall average increases of effective spawning and fry rearing habitat, and upstream and downstream passage opportunities, with the tradeoff of decreased average juvenile rearing habitat in Los Gatos and Guadalupe Creeks.

Substantial increases of effective spawning habitat in the Guadalupe River and Guadalupe Creek, as well as an increase in Calero Creek compared with the future baseline, outweigh the small average area of decreased effective spawning habitat in Alamitos Creek and decrease in Los Gatos Creek at a time of year when few migrants are expected. Fry rearing habitat would increase on average in all streams compared with the future baseline. These beneficial increases outweigh any near-term average decreases of fry rearing habitat in the Guadalupe River and Calero Creek.

Juvenile rearing habitat would increase slightly in Alamitos Creek, but would decrease in Los Gatos and Guadalupe Creeks under the future baselines. The decrease would be substantial in Guadalupe Creek, which is known to continually support rearing steelhead (Valley Water and Stillwater Sciences 2015, 2016, 2017; Valley Water et al. 2018), during summer and fall, and would be lesser in Los Gatos Creek because of the existing large areas of rearing habitat available. The Guadalupe River and Calero Creek would experience average increases in juvenile rearing habitat compared with the future baseline.

The FAHCE-plus Alternative flow measures would increase upstream and downstream passage opportunities overall. There would be a substantial average increase of upstream passage to Guadalupe and Alamitos Creeks, which are tributaries that support high abundances of *O. mykiss* (Valley Water and Stillwater Sciences 2015, 2016, 2017; Valley Water et al. 2018). Increased upstream passage opportunities to these tributaries would provide additional spawning opportunities for steelhead in the Guadalupe River portion of the study area.

Downstream passage would experience an increase in modeled downstream passage under the FAHCE-plus Alternative. When downstream passage was analyzed with and without water temperature criteria, results varied slightly, with some increase of passage when assessed without water temperature. Improved passage conditions would support the anadromous life history within the Guadalupe River portion of the study area.

Therefore, the FAHCE-plus Alternative would benefit, and in terms of adverse impacts, result in **no impact** to steelhead, steelhead habitat, and steelhead migration opportunities compared with the current baseline.

Chinook Salmon

Flow Measures Compared with Current Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 26 percent (3,230 square feet) average decrease in effective spawning habitat in the Guadalupe River compared with the current baseline. Changes in effective spawning habitat varied across POIs, with the largest decreases observed at GUAD3 and GUAD4, while GUAD5 and GUAD6 experienced slight increases in modeled effective spawning habitat. Decreases are associated with increased water temperatures at the end of the incubation period and decreased water depths.

There would be an 80 percent (5,088 square feet) average decrease in modeled effective spawning habitat in Los Gatos Creek for Chinook salmon resulting from the FAHCE-plus Alternative. The decrease in effective spawning habitat is observed in November, and there is little change in effective spawning habitat under the FAHCE-plus Alternative outside of this period.

There would be a 79 percent (705 square feet) average increase in modeled effective spawning habitat in Guadalupe Creek for Chinook salmon resulting from the FAHCE-plus Alternative. In the Guadalupe Creek CWMZ, there would be a 130 percent (294 square foot) increase in Chinook salmon effective spawning habitat. Two large spikes in effective spawning habitat associated with pulse flows were observed in December, with very little changes during the remainder of the spawning period.

There would be a 23 percent (108 square feet) average decrease in modeled effective spawning habitat in Alamitos Creek for Chinook salmon resulting from the FAHCE-plus Alternative.

Based on the results of the FAHCE WEAP Model for wetted area, effective spawning habitat would decrease in Calero Creek compared with the current baseline because of decreased wetted area during Winter Base Flow Operations. The largest decrease in effective spawning habitat would occur during October and December.

The FAHCE-plus Alternative would result in decreases in modeled effective spawning habitat throughout most of the Guadalupe River watershed portion of the study area, with all reaches except Guadalupe Creek modeled to have decreases in the absolute amount of available effective spawning habitat.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 1 percent (12,900 square feet) average decrease in fry rearing habitat in the Guadalupe River compared to the current baseline. The largest decrease in suitable fry rearing habitat occurs in mid-April, with little change from the current baseline observed outside of this period.

There would be a 3 percent (15,000 square feet) average increase in modeled fry rearing habitat in Los Gatos Creek compared with the current baseline. Fry rearing habitat steadily increases over the course of the fry rearing period at both POIs, reaching a maximum in late April.

There would be a 4 percent (3,710 square feet) average increase in modeled fry rearing habitat in Guadalupe Creek compared with the current baseline. In the Guadalupe Creek CWMZ, Chinook salmon fry rearing habitat decreased by 3 percent (600 square feet) when compared with the current baseline. Suitable fry rearing habitat in Guadalupe Creek steadily increases from March until the end of the fry rearing period (April 30).

There would be a 0.1 percent (100 square feet) average decrease in modeled fry rearing habitat in Alamitos Creek compared to the current baseline.

There would be a 15 percent (4,390 square feet) average decrease in modeled fry rearing habitat in Calero Creek compared with the current baseline. These changes are likely attributable to decreases in wetted area during Winter Base Flow Operations. Based on the FAHCE WEAP Model, there would be a net gain of 5,710 square feet of available fry rearing habitat across the watershed despite some reaches experiencing decreases in available habitat. Fry rearing habitat in the Guadalupe River watershed remains abundant under the FAHCE-plus Alternative compared with the current baseline.

Juvenile Rearing Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 2 percent (25,400 square feet) average decrease in juvenile rearing habitat in the Guadalupe River compared with the current baseline, with a slight decrease during the Winter Base Flow Operations (less than 1 percent) and a larger decrease during the Summer Release Program (5 percent). However, the Guadalupe River contains a very large amount (1,335,500 square feet) of juvenile rearing habitat under the current baseline and would still provide 1,446,500 square feet of suitable juvenile rearing habitat under the FAHCE-plus Alternative. Decreases in juvenile rearing habitat are attributable to decreases in wetted area.

There would be a 2 percent (8,000 square feet) average increase in modeled juvenile rearing habitat in Los Gatos Creek compared with the current baseline with a 5 percent (20,000 square feet) increase during the Winter Base Flow Operations and a 5 percent (19,000 square feet) decrease during the Summer Release Program.

There would be a 1 percent (150 square feet) average decrease in modeled juvenile rearing habitat in Guadalupe Creek compared with the current baseline, with an 11 percent (9,670 square feet) average increase during Winter Base Flow Operations and a 27 percent (19,150 square feet) average decrease during the Summer Release Program. In the Guadalupe Creek CWMZ, juvenile rearing habitat increased by 8 percent (1,700 square feet), with a 20 percent (4,100 square feet) increase occurring during Winter Base Flow Operations, followed by an 11 percent (2,900 square feet) decrease during the Summer Release Program.

There would be a 1 percent (90 square feet) average increase in modeled juvenile rearing habitat in Alamitos Creek compared with the current baseline, with a less than 1 percent (170 square feet) average decrease during Winter Base Flow Operations and a 1 percent (600 square feet) average increase during the Summer Release Program.

There would be a 5 percent (2,970 square feet) average decrease in modeled juvenile rearing habitat in Calero Creek compared with the current baseline, with a 21 percent (5,990) average decrease during Winter Base Flow Operations and a 3 percent (3,080 square feet) average increase during the Summer Release Program.

Most locations within the Guadalupe River watershed experienced variable changes in modeled juvenile rearing habitat under the FAHCE-plus Alternative compared with the current baseline, with increases observed in Alamitos and Los Gatos Creeks and decreases observed in the Guadalupe River, Guadalupe Creek, and Calero Creek. Increases were mostly observed during Winter Base Flow Operations from March to April, and decreases in juvenile rearing habitat were modeled at some locations during the Summer Release Program because of reduced wetted area and/or elevated water temperatures. Despite the decreases during summer releases, most of the juvenile rearing period occurs during the Winter Base Flow Operations period, and the decreases during the summer release period are unlikely to affect the Chinook salmon population because these decreases occur towards the end of the outmigration period.

Conditions for Migration

Adult Upstream Passage

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 6 percent (less than 1 day per year) average increase in adult upstream Chinook salmon passage in the Guadalupe River compared with the current baseline, with the farthest upstream sites (GUAD6 and GUAD7) increasing by an average of 5 days per year, and the lower sites (GUAD3 and GUAD4) decreasing an average of 4 days per year.

There would be a 16 percent (2 days per year) average decrease in Los Gatos Creek compared with the current baseline.

There would be a 28 percent (1 day per year) average increase in Guadalupe Creek compared with the current baseline. There are limited passage opportunities provided under the current baseline (4 days per year on average).

There would be a 7 percent (1 day per year) average increase in Alamitos Creek compared to the current baseline, with an 18 percent (4 days per year) average increase at ALAM1 in downstream Alamitos Creek and a 3 percent increase (less than 1 passage day per year) average increase at upstream sites compared with the current baseline.

The FAHCE-plus Alternative would result in a 5 percent (4 days per year) average increase in Calero Creek compared with the current baseline. All reaches in the Guadalupe River watershed were modeled to have increases in upstream passage opportunities under the FAHCE-plus Alternative, except for Los Gatos Creek. Chinook salmon can spawn in the Guadalupe River or hold until passage opportunities present themselves at the upstream tributaries in the Guadalupe watershed (Valley Water et al. 2018; Moyle 2002). The FAHCE WEAP Model predicts that the Guadalupe River would have one extra passage day per year and would continue to provide an average of 58 days of passage per year under the FAHCE-plus Alternative. While modest, an increase in passage in the Guadalupe River could be beneficial to Chinook salmon and would not be an adverse impact. Based on this and the net increases in passage throughout the Guadalupe River watershed portion of the study area, the FAHCE-plus Alternative would benefit Chinook salmon upstream migration conditions.

Juvenile Downstream Passage

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in no changes (0 percent) to juvenile downstream Chinook salmon passage in the Guadalupe River compared with current baseline.

There would be a 2 percent (2 days per year) average decrease in juvenile downstream passage in Los Gatos Creek compared with the current baseline. On average, there are 85 passage days per year across sites in Los Gatos Creek under the current baseline.

There would be a 19 percent (6 days per year) average increase in juvenile downstream passage in Guadalupe Creek compared with current baseline.

There would be an 8 percent (4 days per year) average decrease in juvenile downstream passage in Alamitos Creek compared with current baseline. On average, there are 49 passage days per year across sites in Alamitos Creek under the current baseline.

There would be a 6 percent (3 days per year) average decrease in juvenile downstream passage in Calero Creek compared with the current baseline. The FAHCE-plus Alternative would result in decreases in juvenile downstream passage throughout the Guadalupe River watershed portion of the study area except for there being no change in the Guadalupe River, which would still provide 69 days of downstream passage per year, and increased downstream passage in Guadalupe Creek. Despite decreases from the future baseline, Los Gatos and Alamitos Creeks both already have a substantial amount of passage opportunities (83 and 45 days per year on average, respectively) under the FAHCE-plus Alternative. The decreases in juvenile downstream passage opportunities are unlikely to have a noticeable effect on the Chinook salmon population in the Guadalupe River watershed.

Summary of Impacts Compared with Current Baseline

Although the operations associated with the FAHCE-plus Alternative are management actions that benefit federally listed steelhead, the actions support Chinook salmon as well. Net changes of habitat and passage resulting from implementation of the FAHCE-plus Alternative flow measures would not substantially change overall conditions for Chinook salmon in the Guadalupe River watershed compared to the current baseline.

Implementing the FAHCE-plus Alternative flow measures would result in overall increases in upstream and downstream passage opportunities, minor changes in fry and juvenile rearing habitat, and an overall decrease in effective spawning habitat. Increased passage opportunities would be beneficial, and the Guadalupe River would maintain relatively high passage opportunities for Chinook salmon, which would allow the species more opportunities to enter the watershed, migrate upstream, and spawn when conditions are present. Increased fry and juvenile rearing habitat would support a greater abundance of fry and juveniles, benefitting the Chinook salmon population and reducing the dependency on hatchery stocks.

The FAHCE-plus Alternative would decrease the amount of effective spawning habitat across POIs in the Guadalupe River portion of the study area, with the exception of Guadalupe Creek, where effective spawning habitat would substantially increase when compared with the current baseline. The loss of habitat mainly occurs earlier in the spawning season and has little to no change later in the spawning season, when more spawners would be expected to arrive at the effective spawning habitat. Additionally, spawning surveys conducted by Valley Water from 1995 to 2014 found an average of 11 redds per year during the survey period throughout the Guadalupe River portion of the study area (Valley Water 2018e). Although spawning survey data are not population estimates, the annual average number of redds indicate small run sizes of Chinook salmon; therefore, available effective spawning habitat under the FAHCE-plus Alternative is likely sufficient to support the current run size of Chinook salmon within the watershed.

The FAHCE-plus Alternative compared with the current baseline would result in minimal changes on average to Chinook salmon fry rearing habitat in the Guadalupe River portion of the watershed.

The FAHCE-plus Alternative is modeled to increase juvenile rearing habitat in the Guadalupe River main stem and all tributaries. Most locations within the Guadalupe River portion of the study area would have increased juvenile rearing habitat under the FAHCE-plus Alternative, except for the Guadalupe River and Guadalupe Creek, where available habitat decreased slightly. Increases were mostly observed during Winter Base Flow Operations from March to April, and decreases in juvenile rearing habitat would occur at some locations during the Summer Release Program.

The FAHCE-plus Alternative would also increase adult upstream passage in Guadalupe, Alamitos, and Calero Creeks, but would decrease passage in Los Gatos Creek. Upstream passage at POIs in the Guadalupe River would have negligible changes and continue to provide an average of 60 days of passage per year under the FAHCE-plus Alternative. Chinook salmon are able to spawn in the Guadalupe River or hold until passage opportunities present themselves at the upstream tributaries in the Guadalupe River portion of the study area (Valley Water et al. 2018; Moyle 2002).

On balance, the FAHCE-plus Alternative would maintain the abundance of naturally spawned Chinook salmon in the watershed. The FAHCE-plus Alternative, in terms of adverse impacts, would result in **less-than-significant** impacts to Chinook salmon, Chinook salmon habitat, and Chinook salmon migration opportunities compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 31 percent (3,610 square feet) average decrease in effective spawning habitat in the Guadalupe River for Chinook salmon compared with the future baseline.

There would be an 81 percent (5,664 square feet) average decrease in modeled effective spawning habitat in Los Gatos Creek compared with the future baseline. The decrease in effective spawning habitat is modeled in November, and there is little change in effective spawning habitat under the FAHCE-plus Alternative outside of this period.

There would be a 114 percent (935 square feet) average increase in modeled effective spawning habitat in Guadalupe Creek compared with the future baseline. In the Guadalupe Creek CWMZ, Chinook salmon effective spawning habitat increased by 96 percent (164 square feet) when compared with the future baseline. A slight dip in effective spawning habitat occurs in late November, followed by a steady increase and peak availability of habitat in late December.

There would be a 116 percent (645 square feet) average increase in modeled effective spawning habitat in Alamitos Creek compared with the future baseline.

Based on the results of the FAHCE WEAP Model for wetted area, effective spawning habitat would decrease in Calero Creek compared with the future baseline because of decreased wetted area during Winter Base Flow Operations. The largest decrease in effective spawning habitat would occur during the beginning of the spawning period (October to November), with the rest of the spawning period (December to January) providing more effective spawning habitat compared with the future baseline.

The FAHCE-plus Alternative would have variable effects on modeled effective spawning habitat within the Guadalupe River watershed portion of the study area, with decreases in the Guadalupe River, Los Gatos Creek, and Calero Creek and increases in Guadalupe and Alamitos Creeks. The loss of effective spawning habitat across the watershed is similar to the FAHCE-plus Alternative compared with the current baseline. There are large decreases (9,274 square feet) in effective spawning habitat in the Guadalupe River and Los Gatos Creek; however, there is a large amount of effective spawning habitat available in the watershed, and there would be more modeled habitat after November, when more adult Chinook are expected to arrive in the watershed for spawning.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 2 percent (28,900 square feet) average increase in fry rearing habitat in the Guadalupe River compared with the future baseline. The Guadalupe River contains a very large amount (1,472,800 square feet) of fry rearing habitat under the future baseline.

There would be a 2 percent (11,000 square feet) average increase in modeled fry rearing habitat in Los Gatos Creek compared with the future baseline. Los Gatos Creek contains a large amount (494,000 square feet) of fry rearing habitat under the future baseline.

There would be a 10 percent (9,130 square feet) average increase in modeled fry rearing habitat in Guadalupe Creek compared with the future baseline. In the Guadalupe Creek CWMZ, modeled fry rearing habitat increased by less than 1 percent (100 square feet) when compared with the future baseline.

There would be a 9 percent (7,040 square feet) average increase in modeled fry rearing habitat in Alamitos Creek compared with the future baseline.

There would be a 6 percent (1,620 square feet) average increase in modeled fry rearing habitat in Calero Creek compared with the future baseline.

The FAHCE-plus Alternative would result in increases in modeled fry rearing habitat throughout the Guadalupe River watershed compared with the future baseline. There would be a net gain of 57,690 square feet of modeled fry rearing habitat across the watershed. The gain of fry rearing habitat within the watershed would benefit Chinook salmon by supporting a greater abundance of Chinook salmon fry and decreasing competition among fry.

Juvenile Rearing Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 2 percent (31,200 square feet) average increase in juvenile rearing habitat in the Guadalupe River for Chinook salmon compared with the future baseline, with a 4 percent (61,700 square feet) average increase during Winter Base Flow Operations and a 3 percent (30,900 square feet) average decrease during the Summer Release Program.

There would be a 1 percent (5,000 square feet) average increase in modeled juvenile rearing habitat in Los Gatos Creek compared with the future baseline, with a 3 percent (14,000 square feet) average increase during Winter Base Flow Operations and a 4 percent (17,000 square feet) average decrease during the Summer Release Program.

There would be a 6 percent (5,020 square feet) average increase in modeled juvenile rearing habitat in Guadalupe Creek compared with the future baseline. In the Guadalupe Creek CWMZ, juvenile rearing habitat increased by 13 percent (3,000 square feet), with a 32 percent (6,200 square feet) increase occurring during Winter Base Flow Operations, followed by a 12 percent (3,400 square feet) decrease during the Summer Cold Water Program.

There would be an 8 percent (6,110 square feet) average increase in modeled juvenile rearing habitat in Alamitos Creek compared with the future baseline.

There would be a 7 percent (3,850 square feet) average increase in juvenile rearing habitat in Calero Creek compared with the future baseline.

All locations within the Guadalupe River watershed experienced increases in modeled juvenile rearing habitat under the FAHCE-plus Alternative compared with the future baseline. Increases were modeled during Winter Base Flow Operations from March to April, and decreases were modeled at some locations during summer releases as a result of the reduced wetted area. Overall gains in juvenile rearing habitat under the FAHCE-plus Alternative would be approximately 47,330 square feet, benefitting Chinook salmon by supporting more abundance of rearing Chinook juveniles and decreasing competition between juveniles.

Conditions for Migration

Adult Upstream Passage

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 1 percent (less than 1 day per year) average decrease in Chinook salmon adult modeled upstream passage in the Guadalupe River compared with the future baseline, with adult upstream passage at the upstream sites (GUAD5 to GUAD7) increased by 16 percent (4 days per year) while the downstream sites (GUAD3 and GUAD4) decreased by 12 percent (8 days per year). Overall, adult upstream passage was only reduced by less than 1 day per year on average across sites in the Guadalupe River, which still provides 61 days of adult upstream passage opportunities under the FAHCE-plus Alternative.

There would be a 39 percent (7 days per year) average decrease in adult modeled upstream passage in Los Gatos Creek compared with the future baseline.

There would be a 21 percent (less than 1 day per year) average increase in adult modeled upstream passage in Guadalupe Creek compared with the future baseline. There are limited adult upstream passage opportunities provided under the future baseline (2.5 days per year).

There would be a 22 percent (2 days per year) average increase in adult modeled upstream passage in Alamitos Creek compared with the future baseline.

The FAHCE-plus Alternative would result in a 267 percent (1 day per year) average increase in adult modeled upstream passage in Calero Creek compared with the future baseline, given the extremely low amount of modeled passage provided in Calero Creek under the future baseline.

There are minimal changes in adult modeled upstream passage throughout the Guadalupe River watershed portion of the study area, with a net decrease in passage overall, but there is still sufficient migration opportunity to support Chinook salmon adult migration conditions. Upstream passage days in the Guadalupe River are modeled to decrease slightly overall but continue to provide an average of 60 days of passage per year under the FAHCE-plus Alternative. Chinook salmon can spawn in the Guadalupe River or hold until passage opportunities present themselves at the upstream tributaries in the Guadalupe watershed (Valley Water et al. 2018; Moyle 2002), so an average of 60 passage days per year provides more than sufficient migration opportunities in the mainstem for adults to migrate upstream to spawning habitat.

Juvenile Downstream Passage

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in a 30 percent (18 days per year) average increase in Chinook salmon juvenile downstream passage in the Guadalupe River compared with the future baseline.

There would be a 6 percent (5 days per year) average increase in juvenile downstream passage in Los Gatos Creek compared with the future baseline.

There would be a 27 percent (10 days per year) average increase in juvenile downstream passage in Alamitos Creek. On average, there are 47 juvenile downstream passage days per year in Alamitos Creek under the FAHCE-plus Alternative, compared to 37 under the future baseline conditions.

There would be a 135 percent (32 days per year) average increase in juvenile downstream passage in Guadalupe Creek compared with the future baseline.

There would be a 27 percent (11 days per year) average increase in juvenile downstream passage in Alamitos Creek compared with the future baseline.

There would be an 88 percent (35 days per year) average increase in juvenile downstream passage in Calero Creek compared with the future baseline.

The FAHCE-plus Alternative would improve juvenile downstream passage at all locations within the Guadalupe River watershed compared with the future baseline, providing additional opportunities for downstream migrants to reach the ocean, which would benefit the Chinook salmon population.

Summary of Impacts Compared with Future Baseline

Although the operations associated with the Proposed Project are management actions that benefit federally listed steelhead, the actions would support Chinook salmon as well. Net changes of habitat and passage resulting from implementation of the FAHCE-plus Alternative flow measures would not substantially change overall conditions for Chinook salmon in the Guadalupe River watershed compared to the future baseline.

Implementing the FAHCE-plus Alternative flow measures would result in an overall increase in downstream passage opportunities, minor changes in fry and juvenile rearing habitat, little to no change in upstream passage opportunities, and an overall decrease of effective spawning habitat. Increased downstream passage opportunities would be beneficial, and the Guadalupe River would maintain upstream passage opportunities for Chinook salmon. Increased fry and juvenile rearing habitat would support a greater abundance of fry and juveniles, benefitting the Chinook salmon population and potentially reducing the dependency of the Chinook salmon population on hatchery stocks.

The FAHCE-plus Alternative would decrease the amount of effective spawning habitat across POIs in the Guadalupe River portion of the study area, with the exception of Guadalupe and Alamitos Creeks, where effective spawning habitat would substantially increase when compared with the future baseline. The modeled decreases in effective spawning habitat mainly occur earlier in the spawning season, with little to no change later in the spawning season when more spawners would be expected to arrive at the effective spawning habitat. Additionally, spawning surveys conducted by Valley Water from 1995 to 2014 found an average of 11 redds per year during the survey period throughout the Guadalupe River portion of the study area (Valley Water 2018e). Although spawning survey data are not population estimates, the annual average number of redds indicate small run sizes of Chinook salmon; therefore, available effective spawning habitat under the Proposed Project is likely sufficient to support the current run size of Chinook salmon within the watershed as well as a potential increase in population size.

The FAHCE-plus Alternative compared with the future baseline would on average increase fry rearing habitat at all POIs by 2 to 10 percent, which would benefit Chinook salmon. Increases would occur because of increased wetted area during winter operations from March to April, but fry rearing habitat in these locations would generally decrease during summer operations in May.

The FAHCE-plus Alternative is modeled to increase juvenile rearing habitat in the Guadalupe River main stem and all tributaries. Most locations within the Guadalupe River portion of the study area would have increased juvenile rearing habitat under the FAHCE-plus Alternative, except for the Guadalupe River and Guadalupe Creek, where available habitat decreased slightly. Increases were mostly observed during Winter Base Flow Operations from March to April, and decreases in juvenile rearing habitat would occur at some locations during the Summer Release Program, when most juveniles have already outmigrated.

The FAHCE-plus Alternative would increase juvenile downstream passage in Los Gatos, Guadalupe, Alamitos, and Calero Creeks, and there would be no change in the Guadalupe River compared with the future baseline. The FAHCE-plus Alternative would also increase adult upstream passage in Guadalupe, Alamitos, and Calero Creeks, but would decrease passage in Los Gatos Creek. Upstream passage at POIs in the Guadalupe River would have negligible changes and continue to provide an average of 60 days of passage per year under the FAHCE-plus Alternative. Chinook salmon are able to spawn in the Guadalupe River or hold until passage opportunities present themselves at the upstream tributaries in the Guadalupe River portion of the study area (Valley Water et al. 2018; Moyle 2002).

On balance, the FAHCE-plus Alternative would maintain the abundance of naturally spawned Chinook salmon in the watershed and may support an increase in Chinook population size. In terms of adverse impacts, the FAHCE-plus Alternative would result in **less-than-significant** impacts to Chinook salmon, Chinook salmon habitat, and migration opportunities compared with the future baseline.

Pacific Lamprey

Flow Measures Compared with Current Baseline Impact Analysis

Pre-spawning Holding Habitat

Based on the results of the FAHCE WEAP Model and habitat analysis, the FAHCE-plus Alternative had similar effects on wetted area and temperatures as the Proposed Project across locations in the Guadalupe River watershed, and thus would have similar impacts. Refer to Proposed Project Impact AQUA-1b for more details.

The FAHCE-plus Alternative would result in decreases to modeled pre-spawning holding habitat during summer and increases during winter based on changes in wetted area within the Guadalupe River watershed, except for Calero Creek, where pre-spawning holding habitat would decrease in winter and increase in summer compared with the current baseline.

Effective Spawning Habitat

The FAHCE-plus Alternative had similar effects on wetted area and temperatures as the Proposed Project across locations in the Guadalupe River watershed, and thus would have similar impacts. Refer to Proposed Project Impact AQUA-1b for more details.

The FAHCE-plus Alternative would result in negligible changes to modeled effective spawning habitat in most locations within the Guadalupe River watershed. However, there would be a decrease in effective spawning habitat and elevated temperatures in Guadalupe Creek during summer because of decreased flow and increased water temperature. However, fewer spawners are expected in summer, and there is increased effective spawning habitat during winter.

Larvae Rearing Habitat

The FAHCE-plus Alternative had similar effects on wetted area and temperatures as the Proposed Project across locations in the Guadalupe River watershed, and thus would have similar impacts. Refer to Proposed Project Impact AQUA-1b for more details.

The FAHCE-plus Alternative would result in decreases to modeled larvae rearing habitat during summer and increases during winter based on changes in wetted area within the Guadalupe River watershed, except for Calero Creek, where larvae rearing habitat would decrease in winter and increase in summer compared with the current baseline.

Conditions for Migration

During the adult Pacific lamprey upstream migration period (January 1 through June 30), the FAHCE WEAP Model results for thalweg depth indicate variable effects to upstream passage opportunities across the Guadalupe River watershed when compared with the current baseline. Overall, the Alternative Project would have minor effects on upstream passage across the Guadalupe River watershed but would generally decrease adult upstream passage for Pacific lamprey in the Guadalupe River portion of the study area. Minor decreases (1 to 2 percent, 2 to 3 days per year on average) were observed in the Guadalupe River, Alamitos Creek, and Calero Creek, while a larger 10 percent decrease (14 days per year on average) was observed in Guadalupe Creek. The FAHCE-plus Alternative resulted in no change in adult upstream passage opportunities for adult Pacific lamprey in Los Gatos Creek when compared with the current baseline. Modeled results for adult steelhead upstream passage, which overlaps with the timing of upstream passage of adult Pacific lamprey (January through April), indicate increases in passage opportunities in Calero, Guadalupe and Alamitos Creeks and minor fluctuations in passage opportunities in Guadalupe River and Los Gatos Creek. Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in an average increase in opportunity for downstream passage across the Guadalupe River watershed compared to the current baseline. The number of days the thalweg water depths in the Guadalupe River watershed increased resulted in a less than 2 percent (less than 2 days) average increase across the entire watershed, with the exception of Alamitos and Calero Creeks, which both had 4 percent (6 days on average) average increase compared to the current baseline during Pacific lamprey downstream migration periods (December 1 through May 31). Modeled results for juvenile steelhead downstream passage (with the water temperature criteria included), which overlaps with the timing of downstream passage of adult Pacific lamprey (December through May), indicate increases in passage opportunities in Los Gatos and Guadalupe Creeks and minor fluctuations in passage opportunities in the Guadalupe River, Alamitos Creek, and Calero Creek.

Summary of Impacts Compared with Current Baseline

The FAHCE-plus Alternative flow measures would have variable effects on pre-spawning holding, spawning, and larvae rearing habitat compared with the current and future baselines. Generally, increased flows and wetted area during winter would provide additional habitat for Pacific lamprey, but decreases in flow and/or increased summer temperatures would reduce habitat during summer compared with baseline conditions.

Upstream passage would be slightly decreased under the FAHCE-plus Alternative compared with the current baseline. The Guadalupe River is the location where the most Pacific lamprey are observed (Leidy 2007), and improved upstream passage in this location would increase opportunities for adult access to spawning areas.

Therefore, the FAHCE-plus Alternative would, in terms of adverse impacts, result in **no impact** overall to lamprey, lamprey habitat, and lamprey migration conditions compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Pre-spawning Holding Habitat

Based on the results of the FAHCE WEAP Model and habitat analysis, there are negligible differences in the FAHCE-plus Alternative in analysis between the current and future baseline for pre-spawning holding habitat, except for Calero Creek. In Calero Creek, the FAHCE-plus Alternative would increase pre-spawning holding habitat when compared with the future baseline, whereas a decrease would be observed when compared with the current baseline. For the reasons outlined in the comparison of the FAHCE-plus Alternative with the current baseline, the FAHCE-plus Alternative would result in negligible changes to pre-spawning holding habitat for Pacific lamprey.

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model and habitat analysis, there are negligible differences in the FAHCE-plus Alternative in analysis between the current and future baseline for effective spawning habitat, except for Calero Creek. In Calero Creek, the FAHCE-plus Alternative would increase effective spawning habitat during winter and decrease it during summer when compared with the future baseline, whereas a decrease would be observed in winter and an increase in summer when compared with the current baseline. Despite differences in Calero Creek between the current and future baselines, the FAHCE-plus Alternative would result in reduced summer effective spawning habitat and elevated temperatures for Pacific lamprey, as described in the comparison of the FAHCE-plus Alternative with the current baseline.

Larvae Rearing Habitat

Based on the results of the FAHCE WEAP Model and habitat analysis, there are negligible differences in the FAHCE-plus Alternative in analysis between the current and future baselines for larvae rearing habitat, except for Calero Creek. In Calero Creek, the FAHCE-plus Alternative would increase larvae rearing habitat during winter and decrease it during summer when compared with the future baseline, whereas a decrease would be observed in winter and an increase in summer when compared with the current baseline. For the reasons outlined in the comparison of the FAHCE-plus Alternative with the current baseline, the FAHCE-plus Alternative would result in negligible changes to larvae rearing habitat for Pacific lamprey.

Conditions for Migration

Based on the results of the FAHCE WEAP Model and habitat analysis, the FAHCE-plus Alternative would result in either increases or negligible changes to adult upstream Pacific lamprey passage in the Guadalupe River watershed during Winter Base Flow Operations. As described in the comparison of the FAHCE-plus Alternative with the current baseline, there would be decreases in upstream passage during summer releases, but adult Pacific lamprey would likely not undertake upstream migrations during this time of the year under either the FAHCE-plus Alternative or the future baseline.

Based on the results of the FAHCE WEAP Model and habitat analysis, the FAHCE-plus Alternative would result in either increases or negligible changes to juvenile downstream Pacific lamprey passage in the Guadalupe River watershed during Winter Base Flow Operations. As described in the comparison of the FAHCE-plus Alternative with the current baseline, there would be decreases in juvenile downstream passage during summer releases, but juvenile Pacific lamprey would likely not undertake downstream migrations during this time of the year under either the FAHCE-plus Alternative or the future baseline.

Summary of Impacts Compared with Future Baseline

The FAHCE-plus Alternative flow measures would have variable effects on pre-spawning holding, spawning, and larvae rearing habitat compared with the future baseline. Generally, increased flows and wetted area during winter would provide additional habitat for Pacific lamprey but decreases in flow and/or increased summer temperatures would reduce habitat during summer compared with baseline conditions.

Upstream passage would slightly increase when compared with the future baseline. Downstream passage would be improved compared with the future baseline. The Guadalupe River is the location where the most Pacific lamprey are observed (Leidy 2007), and improved downstream and upstream passage in this location would increase opportunities for juvenile migration to the ocean and adult access to spawning areas.

Therefore, the FAHCE-plus Alternative would, in terms of adverse impacts, result in **no impact** overall to lamprey, lamprey habitat, and lamprey migration conditions compared with the future baseline.

Sacramento Hitch

Flow Measures Compared with Current Baseline Impact Analysis

Based on Smith (2013) and Leidy (2007) as well as sampling conducted by Valley Water and Stillwater Sciences (Valley Water unpublished data 2004–2017; Valley Water 2019c, 2020e, 2021b; Stillwater Sciences 2018), Sacramento hitch have only been detected in the Guadalupe River (downstream of the Norman Mineta Airport) and Los Gatos Creek over the last 17 years; therefore, Sacramento hitch are only assessed in these two sub-watersheds.

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, and an analysis of modeled water temperature and wetted area, the FAHCE-plus Alternative would result in increases to effective spawning habitat in the Guadalupe River and a slight decrease in Los Gatos Creek while the steelhead spawning and hitch spawning season overlap (February through April) compared with the current baseline. Effective spawning habitat in both the Guadalupe River and Los Gatos Creek would decrease for the remainder of the spawning season (May through July), beginning at the start of the Summer Release Program, because of decreased wetted areas. Overall, the FAHCE-plus Alternative would result in increased effective spawning habitat during Winter Base Flow Operations and decreased habitat during the Summer Release Program, starting in May.

Predicted water temperatures in the Guadalupe River and Los Gatos Creek remain similar to those described in the comparison of FAHCE-plus Alternative with the current baseline. Although decreases in flow can cause elevated water temperatures, Sacramento hitch can tolerate high water temperatures (up to 86°F). Additionally, modeled water temperatures in both the Guadalupe River and Los Gatos Creek would not exceed 78°F, which would not be high enough to limit the availability of spawning and incubation habitat for Sacramento hitch.

Fry Rearing Habitat

There would be variable changes in modeled fry rearing habitat in the Guadalupe River watershed compared with the current baseline. The FAHCE-plus Alternative would result in increased habitat during Winter Base Flow Operations and decreased habitat during the summer releases. The increases to Sacramento hitch rearing habitat in winter would be expected to offset the decreases in summer, and the FAHCE-plus Alternative would have negligible effects on Sacramento hitch rearing.

Summary of Impacts Compared with Current Baseline

The FAHCE-plus Alternative flow measures would result in neutral changes of conditions for Sacramento hitch. When compared with the current baseline, implementing the FAHCE-plus Alternative flow measures would result in increases to Sacramento hitch spawning and rearing habitat in winter and early spring, and decreases during summer. Although some locations might experience water temperature increases under the FAHCE-plus Alternative, temperature increases would not be elevated enough to limit the availability of spawning and incubation habitat. Additionally, Sacramento hitch are likely to move to suitable summer holding habitat such as deep pools and are unlikely to become stranded as a result of reduced flows. The reduction in wetted area and increased temperatures during summer are unlikely to have an impact to Sacramento hitch spawning and incubation. Therefore, given the benefits to habitat during winter and spring, the impacts in the summer are unlikely to substantially change conditions for the species.

The FAHCE-plus Alternative, in terms of adverse impacts, would result in **no impact** to Sacramento hitch and Sacramento hitch habitat compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model and habitat analysis, there are negligible differences in the FAHCE-plus Alternative comparisons with the current and future baselines for effective spawning habitat.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model and habitat analysis, there are negligible differences in the FAHCE-plus Alternative comparisons with the current and future baselines for fry rearing habitat.

Summary of Impacts Compared with Future Baseline

The FAHCE-plus Alternative flow measures would result in neutral changes of conditions for Sacramento hitch. When compared with the future baseline, implementing the FAHCE-plus Alternative flow measures would result in increases to Sacramento hitch spawning and rearing habitat in winter and early spring, and decreases during summer. Although some locations might experience water temperature increases under the FAHCE-plus Alternative, temperature increases would not be elevated enough to limit the availability of spawning and incubation habitat. Additionally, Sacramento hitch are likely to move to suitable summer holding habitat such as deep pools and are unlikely to become stranded as a result of reduced flows. The reduction in wetted area and increased temperatures during summer are unlikely to have an impact to Sacramento hitch spawning and incubation. Therefore, given the benefits to habitat during winter and spring, the impacts in summer are unlikely to substantially change conditions for the species.

The FAHCE-plus Alternative, in terms of adverse impacts, would result in **no impact** to Sacramento hitch and Sacramento hitch habitat compared with the future baseline.

Riffle Sculpin

Flow Measures Compared with Current Baseline Impact Analysis

The FAHCE-plus Alternative flow measures would result in neutral changes of conditions for riffle sculpin. When compared with the current baseline, implementing the FAHCE-plus Alternative flow measures would result in increases to spawning and rearing habitat in winter and early spring, and decreases during summer. In both the Guadalupe River and Guadalupe Creek, there would be net increases to effective spawning habitat. Water temperature increases would not limit the availability of spawning and incubation habitat as increases would occur outside of the spawning season for riffle sculpin (that is, February through March). If water temperature increases to 86°F, this could cause rearing riffle sculpin to relocate or result in stress or mortality, though it is unlikely temperatures would exceed 86°F in the upper portion of the watershed, where riffle sculpin are present. Given the benefits to habitat during winter and spring, and potential habitat reduction in summer, the overall change would be neutral.

Effective Spawning Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in increases to effective spawning habitat in Guadalupe Creek and the Guadalupe River compared with the current baseline. The FAHCE-plus Alternative would result in increased habitat during Winter Base Flow Operations (when spawning occurs for riffle sculpin; February to March) in both the Guadalupe River and the Guadalupe Creek compared with the current baseline.

Fry Rearing Habitat

Based on the results of the FAHCE WEAP Model, the FAHCE-plus Alternative would result in an overall decrease in fry rearing habitat in the Guadalupe River during Winter Base Flow Operations (when riffle sculpin fry would be rearing); however, the decrease is small relative to the total amount of fry rearing habitat available in the Guadalupe River. There would be a larger decrease in fry rearing habitat during the Summer Release Program in the Guadalupe River across POIs, with the largest decrease occurring at GUAD5. In Guadalupe Creek, fry rearing habitat had a modeled increase during Winter Base Flow Operations; however, the Summer Release Program caused a substantial decrease in fry rearing habitat across POIs. Modeled results showed that GCRK 4 had the largest increase in available habitat during the Winter Base Flow Operations and the smallest decrease in habitat during the Summer Release Program.

Summary of Impacts Compared with Current Baseline

The FAHCE-plus Alternative flow measures would result in neutral changes of conditions for riffle sculpin. When compared with the current baseline, implementing the FAHCE-plus Alternative flow measures would result in increases to spawning and rearing habitat in winter and early spring, and decreases during summer. In both the Guadalupe River and Guadalupe Creek, there would be net increases to effective spawning habitat. Water temperature increases would not limit the availability of spawning and incubation habitat as increases would occur outside of the spawning season for riffle sculpin (that is, February through March). If water temperature increases to 86°F, this could cause rearing riffle sculpin to relocate or result in stress or mortality, though it is unlikely temperatures would exceed 86°F in the upper portion of the watershed, where riffle sculpin are present. Given the benefits to habitat during winter and spring, and potential habitat reduction in summer, the overall change would be neutral.

In terms of adverse impacts, the FAHCE-plus Alternative would result in **no impact** to riffle sculpin and riffle sculpin habitat compared with the current baseline.

Flow Measures Compared with Future Baseline Impact Analysis

Effective Spawning Habitat

Based on the results of the FAHCE-WEAP Model, there are greater increases to effective spawning habitat resulting from the FAHCE-plus Alternative when compared with the future baseline rather than the current baseline. The FAHCE-plus Alternative resulted in greater increases to effective spawning habitat in Guadalupe Creek and a similar increase in effective spawning habitat in the Guadalupe River, except for a greater increase during the tail end of the spawning season (March) when compared with the future baseline.

Fry Rearing Habitat

The FAHCE-plus Alternative would result in increases to modeled fry rearing habitat in the Guadalupe River, primarily during Winter Base Flow Operations from March to April, and negligible decreases in fry rearing habitat would be observed during the Summer Release Program, beginning in May and extending through summer and fall. In Guadalupe Creek, the FAHCE-plus Alternative would result in increases to fry rearing habitat during Winter Base Flow Operations and significant decreases in fry rearing habitat during the Summer Release Program, beginning in May and extending through summer and fall. Decreases in available habitat during the Summer Release Program are associated with a decrease in flows, which results in reduced wetted areas in both the Guadalupe River and Guadalupe Creek.

Summary of Impacts Compared with Future Baseline

The FAHCE-plus Alternative flow measures would result in neutral changes of conditions for riffle sculpin. When compared with the future baseline, implementing the FAHCE-plus Alternative flow measures would result in increases to spawning and rearing habitat in winter and early spring, and decreases during summer. In both the Guadalupe River and Guadalupe Creek there would be net increases to effective spawning habitat. Water temperature increases would not limit the availability of spawning and incubation habitat as increases would occur outside of the spawning season for riffle sculpin (that is, February through March). If water temperature increases to 86°F, this could cause rearing riffle sculpin to relocate or result in stress or mortality, though it is unlikely temperatures would exceed 86°F in the upper portion of the watershed, where riffle sculpin are present. Given the benefits to habitat during winter and spring, and potential habitat reduction in summer, the overall change would be neutral.

Therefore, the FAHCE-plus Alternative, in terms of adverse impacts, would result in **no impact** to riffle sculpin and riffle sculpin habitat compared with the future baseline.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures on steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin in the Guadalupe River watershed. The non-flow measures included in the FAHCE-plus Alternative analyzed in this section are fish passage barrier remediation, spawning and rearing habitat improvements, and the geomorphic functions enhancement specific to the Guadalupe River watershed. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Passage Barrier Remediation

The impacts of the fish passage barrier remediation projects, which may include remediation of the Pheasant Creek Culvert on Guadalupe Creek, Old Dam on Guadalupe Creek, and the Bertram Road Drop Structure on Alamitos Creek, would be the same as described in Proposed Project Impact AQUA-1b. Fish barrier removal or remediation could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead, Chinook salmon, Pacific lamprey, and riffle sculpin; their habitat; and migration opportunities for steelhead, Chinook salmon, and Pacific lamprey.

Spawning and Rearing Habitat Improvements

The impacts of the spawning and rearing habitat improvement projects, the exact locations of which are unknown as the projects are currently described in a programmatic level of detail, would be the same as described in Proposed Project Impact AQUA-1b. Spawning and rearing habitat improvement projects could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin; their habitat; and migration opportunities for steelhead, Chinook salmon, and Pacific lamprey.

Geomorphic Functions Enhancement

The impacts of the geomorphic functions enhancement projects, the exact locations of which are unknown as the projects are currently described in a programmatic level of detail, would be the same as described in Proposed Project Impact AQUA-1b. Spawning and rearing habitat improvement projects could result in short-term impacts that would be minimized by BMPs and VHP conditions as well as long-term benefits to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin; their habitat; and migration opportunities for steelhead, Chinook salmon, and Pacific lamprey.

Summary of Short-term Non-flow Measure Impacts

There could be a short-term reduction of steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin habitat as well as a reduction of migration conditions for steelhead, Chinook salmon, and Pacific lamprey during construction of the non-flow measures. In addition, the construction period could result in localized impacts on Pacific lamprey larvae if the project footprint is located within areas with fine sediment where Pacific lamprey larvae are burrowed. However, BMPs would be implemented, and seasonal timing of the work would reduce impacts on steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin individuals; habitat; and migration conditions for steelhead, Chinook salmon, and Pacific lamprey. Therefore, non-flow measures would result in **less-than-significant** impacts in the short-term construction period.

Summary of Long-term Non-flow Measure Impacts

There could be increased steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin habitat as well as increased migration conditions as a result of the fully constructed non-flow measures. In the long term, the FAHCE-plus Alternative would result in **no impact** and would benefit steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin individuals; habitat; and migration conditions for steelhead, Chinook salmon, and Pacific lamprey from the completed non-flow measures.

Monitoring, Maintenance, and Adaptive Management

Under the AMP, there would be compliance monitoring, validation monitoring, and a long-term trend monitoring program. Compliance and validation monitoring would collect data through passive monitoring technology and habitat surveys, and would have no impact to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin. Long-term trend monitoring would include passive monitoring such as VAKI Riverwatchers or PIT tag readers using noninvasive technology, and would have no impact to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin.

Long-term monitoring would also include electrofishing, capturing, DNA sampling, and PIT tagging, which could cause some adverse impacts on steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin. During electrofishing, steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin could be stunned, captured, crowded, and handled, which could cause acute physiological stress and may cause occasional but rare incidental injury and/or mortality. Additionally, juvenile steelhead would be sampled for DNA and PIT tagged, which would cause acute physiological stress and may cause occasional but rare incidental injury and/or mortality. Electrofishing would follow standard NMFS survey protocols, which would minimize injury and mortality during sampling and tagging. Electrofishing and associated sampling would be conducted under a Research and Recovery or incidental take coverage pursuant to the federal ESA and a scientific collecting permit pursuant to the California Fish and Game Code. These permits would provide limits on incidental take during monitoring and would include measures designed to minimize and avoid adverse effects to aquatic resources during electrofishing activities. The monitoring program would provide valuable long-term population information for steelhead that could be used to adjust components of the FAHCE-plus Alternative through the AMP to be more beneficial to steelhead over the long term. Data would also be incidentally collected for Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin, providing valuable long-term population information benefitting these species. Therefore, the impacts of monitoring activities implemented under Phase 1 of the AMP would be less than significant to steelhead, Chinook salmon, Pacific lamprey, Sacramento hitch, and riffle sculpin.

Maintenance of non-flow measures would involve similar activities as laid out in the non-flow measure, with additional riprap, restoration, or operational repair of a facility, and causing fisheries impacts similar to those of the non-flow measure being maintained.

AMP implementation during Phase 1 could include minor adjustments to the flow and non-flow measures, such as minor modifications or adjustments to the rule curves, modifications to fish passage barriers, additional gravel augmentation, or habitat modifications. Impacts related to these Phase 1 AMP adaptive measures would be consistent with those of the FAHCE-plus Alternative. Therefore, impacts from implementation of the AMP would be less than significant.

Guadalupe River Impact Overview

Steelhead

As a result of the FAHCE-plus Alternative, the flow measures, when compared with the current and future baseline, would both result in no adverse impacts; the non-flow measures would result in less-than-significant short-term impacts; and the non-flow measures over the long term would result in no impact and would benefit steelhead, steelhead habitat, and steelhead migration opportunities within the Guadalupe River watershed portion of the study area. When compared with the current and future baselines, implementing the FAHCE-plus Alternative flow measures would result in variable effects to modeled steelhead effective spawning habitat, fry rearing habitat, and juvenile rearing habitat, and overall increases to upstream passage opportunities for adults and downstream passage for juvenile steelhead. Variability in changes to effective spawning habitat combined with the amount of available effective spawning habitat under the current conditions, which is not considered limiting to the species (Moyle 2002), would have little influence on the steelhead population compared with the current baseline conditions.

The increased habitat and migration conditions would provide benefits for anadromous steelhead as a result of the FAHCE-plus Alternative. In addition, the potential short-term impacts of implementing the non-flow measures would be reduced with the implementation of BMPs and offset by the long-term benefits of increased habitat and migration conditions. Maintenance, monitoring, and the Phase 1 AMP adaptive measures would be consistent with the FAHCE-plus Alternative and would likewise result in few impacts on steelhead, steelhead habitat, and migration conditions. These overall benefits would improve conditions for the anadromous steelhead population.

The net benefits of implementing the flow and non-flow measures would support increased abundance of steelhead in the watershed, which would lead to increased population health and greater genetic diversity.

As discussed in Proposed Project Impact AQUA-1b, the Proposed Project flow measures would result in overall increases in steelhead upstream and downstream passage opportunities, as well as increased spawning and rearing habitat from late fall to spring. However, the Proposed Project flow measures would also result in decreases in flow during summer and early fall, which would lead to decreased juvenile rearing habitat during this period. The FAHCE-plus Alternative flow measures would result in net benefits to steelhead spawning and fry rearing habitat; however, a substantial decrease in juvenile rearing habitat would occur in Guadalupe Creek, also during summer and early fall. Both the Proposed Project and FAHCE-plus Alternative would result in overall benefits to upstream passage opportunities for adults and downstream passage for juvenile steelhead. Implementing the non-flow measures would result in similar impacts and benefits to steelhead between the Proposed Project and FAHCE-plus Alternative, but the FAHCE-plus Alternative flow measures would have substantially more adult upstream passage opportunities in the Guadalupe River compared with the future baseline and similar adult upstream and juvenile downstream passage opportunities compared with the current and future baseline, which would result in more passage opportunities overall for adults under the FAHCE-plus Alternative flow measures. The FAHCE-plus Alternative flow measures would result in less juvenile rearing habitat in Guadalupe Creek compared with the current baseline, but fewer decreases to juvenile rearing habitat compared with the future baseline. As a result, the FAHCE-plus Alternative would result in increased benefits to anadromous steelhead and rearing juveniles as compared with the Proposed Project.

Chinook Salmon

As a result of the FAHCE-plus Alternative, the flow measures, when compared with the current and future baseline, would result in no impacts; the short-term non-flow measures would result in less-than-significant impacts; and the long-term non-flow measures would result in no impact and would benefit Chinook salmon, Chinook salmon habitat, and Chinook salmon migration opportunities within the Guadalupe River watershed study area. When compared with the current and future baseline, implementing the flow measures would result in an overall decrease of effective spawning habitat, minor changes in fry and juvenile rearing habitat, and an overall increase in upstream and downstream passage opportunities. The potential short-term impacts of implementing the non-flow measures would be reduced with the implementation of BMPs and offset by the long-term benefits of increased migration conditions. The net benefits of implementing the flow and non-flow measures outweigh the impacts of the flow measures, including decreases in modeled effective spawning habitat, and the short-term impacts of the non-flow measures. Maintenance, monitoring, and the Phase 1 AMP adaptive measures would be consistent with those of the FAHCE-plus Alternative and would likewise result in few impacts on Chinook salmon, Chinook salmon habitat, and migration conditions. Overall, the FAHCE-plus Alternative would support increased abundance of naturally spawned Chinook salmon in the watershed, which would lead to increased population health and greater genetic diversity.

As discussed in Proposed Project Impact AQUA-1b, the Proposed Project flow measures would result in overall increases to Chinook salmon downstream passage opportunities, increases in fry and juvenile rearing habitat, variable changes to upstream passage opportunities, and decreases to effective spawning habitat. The FAHCE-plus Alternative flow measures would result in an overall increase in downstream passage opportunities, minor changes in fry and juvenile rearing habitat, variable changes to upstream passage opportunities, and decreased effective spawning habitat. When compared to the Proposed Project, the FAHCE-plus Alternative would result in less overall modeled effective spawning habitat when compared to the current and future baselines but would provide slightly more fry and juvenile rearing habitat than the Proposed Project. Both the Proposed Project and the FAHCE-plus Alternative would result in overall benefits to adult upstream passage and juvenile downstream passage for Chinook salmon. The FAHCE-plus Alternative provides less juvenile downstream passage than the Proposed Project when compared with the current baseline; however, juvenile downstream passage would increase substantially under the FAHCE-plus

Alternative when compared with the future baseline conditions. The FAHCE-plus Alternative provides more adult upstream passage than the Proposed Project when compared with both the current and future baselines, except for Los Gatos Creek, where adult upstream passage remains the same under both Project scenarios. Overall, compared to the Proposed Project, the FAHCE-plus Alternative would provide more juvenile downstream passage in the long term and would provide increased adult upstream passage opportunities when compared with both the current and future baselines.

Pacific Lamprey

As a result of the FAHCE-plus Alternative, the flow measures when compared with the current and future baseline would result in no impacts; the short-term non-flow measures would result in less-than-significant impacts; and the long-term non-flow measures would result in no impact and would benefit Pacific lamprey, Pacific lamprey habitat, and Pacific lamprey migration opportunities within the Guadalupe River watershed study area.

Implementing the non-flow measures would result in similar impacts and benefits to Pacific lamprey between the Proposed Project and FAHCE-plus Alternative, but the FAHCE-plus Alternative would have substantially more adult upstream passage opportunities in the Guadalupe River compared with the future baseline and similar adult upstream and juvenile downstream passage opportunities compared with the current and future baseline, which would result in more passage opportunities overall for adults under the FAHCE-plus Alternative flow measures. The FAHCE-plus Alternative and Proposed Project flow measures would result in less pre-spawning holding, spawning, and larvae rearing habitat in summer compared with the current and future baseline. As a result, the FAHCE-plus Alternative would result in increased benefits to anadromous Pacific lamprey compared with the Proposed Project.

Sacramento Hitch

As a result of the FAHCE-plus Alternative, the flow measures, when compared with the current and future baseline, would result in no impacts; the short-term non-flow measures would result in less-than-significant impacts; and the long-term non-flow measures would result in no impact and would benefit Sacramento hitch and Sacramento hitch habitat within the Guadalupe River watershed study area.

As discussed in Proposed Project Impact AQUA-1b, the Proposed Project flow measures would result in overall increases to Sacramento hitch spawning and fry rearing habitat in winter and early spring, and decreases of the habitat in summer. The FAHCE-plus Alternative flow measures benefit migratory and anadromous species, and would result in similar effects to Sacramento hitch as those discussed above. Implementing the non-flow measures would result in the same impacts and benefits to Sacramento hitch between the Proposed Project and FAHCE-plus Alternative. As a result, the FAHCE-plus Alternative would result in similar benefits to Sacramento hitch as those resulting from the Proposed Project.

Riffle Sculpin

As a result of the FAHCE-plus Alternative, the flow measures, when compared with the current and future baseline would, result in no impacts; the short-term non-flow measures would result in less-than-significant impacts; and the long-term non-flow measures would result in no impact and would benefit riffle sculpin and riffle sculpin habitat within the Guadalupe River watershed study area. When compared with the current and future baselines, implementing the FAHCE-plus Alternative flow measures would benefit spawning and rearing habitat in winter and early spring, and decreases during summer.

As discussed in Proposed Project Impact AQUA-1b, the Proposed Project flow measures would result in overall increases to riffle sculpin spawning and fry rearing habitat in winter and early spring, and decreases of the habitat in summer. The FAHCE-plus Alternative flow measures benefit migratory and anadromous species, and would result in similar effects to riffle sculpin as those discussed above. Implementing the non-flow measures would result in the same impacts and benefits to riffle sculpin between the Proposed Project and FAHCE-plus Alternative. As a result, the FAHCE-plus Alternative would result in similar benefits to riffle sculpin as those resulting from the Proposed Project.

Mitigation

No mitigation would be required for Impact AQUA-1b.

4.11 Impact Analysis on Terrestrial Biological Resources

This section assesses the impacts on terrestrial biological resources from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. The alternatives impact assessment for terrestrial biological resources follows the same methodology as laid out for the Proposed Project analysis in Section 3.8.3.

Table 4.11-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.8, *Terrestrial Biological Resources*.

Table 4.11-1. Alternative Impacts Comparison Summary for Terrestrial Biological Resources

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	Non-flow Measures	S/M	NI (-)	S/M (=)	S/M (=)
Impact TERR-2: Have a substantial adverse effect on riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS	Flow Measures	NI (beneficial)	NI (=)	NI (=)	NI (beneficial) (=)
Impact TERR-2: have a substantial adverse effect on riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS	Non-flow Measures	S/M	NI (-)	S/M (=)	S/M (=)

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means	Flow Measures	NI (beneficial)	NI (=)	NI (=)	NI (beneficial) (=)
Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means	Non-flow Measures	S/M	NI (-)	S/M (=)	S/M (=)
Impact TERR-4: Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites	Flow Measures	NI (beneficial)	NI (=)	NI (=)	NI (beneficial) (=)
Impact TERR-4: Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites	Non-flow Measures	LTS (beneficial)	NI (-)	LTS (beneficial) (=)	LTS (beneficial) (=)
Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance	Non-flow Measures	S/M	NI (-)	S/M (=)	S/M (=)
Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan	Flow Measures	NI	NI (=)	NI (=)	NI (=)

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan	Non-flow Measures	NI	NI (=)	NI (=)	NI (=)

Notes: LTS = less-than-significant impact, NI = no impact, S/M = significant but mitigable to less-than-significant impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.11.1 No Project Alternative

Under the No Project Alternative, there would be no changes to the managed flow volumes within the two watersheds, and the non-flow measures of the Proposed Project would not be implemented. There would be no monitoring implemented under the No Project Alternative. This section evaluates the impacts associated with the No Project Alternative on terrestrial biological resources.

4.11.1.1 Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (no impact)

Flow Measures Impact Analysis

Because there would be no change in managed flow volumes, there would be no impacts from Impact TERR-1 under the No Project Alternative.

Non-flow Measures Impact Analysis

Because no non-flow measures would be implemented under the No Project Alternative, there would be no impact from Impact TERR-1.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, maintenance, or adaptive management under the No Project Alternative; therefore, there would be no impact from Impact TERR-1.

Significance Conclusion Summary

The No Project Alternative would have no substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS. There would be **no impact** under the No Project Alternative.

4.11.1.2 Impact TERR-2: Have a substantial adverse effect on riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS (no impact)

Flow Measures Impact Analysis

Because there would be no change in managed flow volumes, there would be no impacts from Impact TERR-2 under the No Project Alternative.

Non-flow Measures Impact Analysis

Because no non-flow measures would be implemented under the No Project Alternative, there would be no impacts from Impact TERR-2.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, maintenance, or adaptive management under the No Project Alternative; therefore, there would be no impact from Impact TERR-2.

Significance Conclusion Summary

The No Project Alternative would have no substantial adverse effect on riparian habitat or any other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS. There would be **no impact** under the No Project Alternative.

4.11.1.3 Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means (no impact)

Flow Measures Impact Analysis

Because there would be no change in managed flow volumes, there would be no impacts from Impact TERR-3 under the No Project Alternative.

Non-flow Measures Impact Analysis

Because no non-flow measures would be implemented under the No Project Alternative, there would be no impacts from Impact TERR-3.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, maintenance, or adaptive management under the No Project Alternative; therefore, there would be no impact from Impact TERR-3.

Significance Conclusion Summary

The No Project Alternative would have no substantial adverse effect on state or federally protected wetlands as defined by Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means. There would be **no impact** under the No Project Alternative.

4.11.1.4 Impact TERR-4: Interfere substantially with the movement of any native resident or migratory terrestrial species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites (no impact)

Flow Measures Impact Analysis

Because there would be no change in managed flow volumes, there would be no impacts from Impact TERR-4 under the No Project Alternative.

Non-flow Measures Impact Analysis

Because no non-flow measures would be implemented under the No Project Alternative, there would be no impacts from Impact TERR-4.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, maintenance, or adaptive management under the No Project Alternative; therefore, there would be no impact from Impact TERR-4.

Significance Conclusion Summary

The No Project Alternative would not interfere substantially with the movement of any native resident or migratory species, or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites. There would be **no impact** under the No Project Alternative.

4.11.1.5 Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance (no impact)

Flow Measures Impact Analysis

Because there would be no change in managed flow volumes, there would be no impacts from Impact TERR-5 under the No Project Alternative.

Non-flow Measures Impact Analysis

Because no non-flow measures would be implemented under the No Project Alternative, there would be no impacts from Impact TERR-5.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, maintenance, or adaptive management under the No Project Alternative; therefore, there would be no impact from Impact TERR-5.

Significance Conclusion Summary

The No Project Alternative would not conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance. There would be **no impact** under the No Project Alternative.

4.11.1.6 Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan (no impact)

Flow Measures Impact Analysis

Because there would be no change in managed flow volumes, there would be no impacts from Impact TERR-6 under the No Project Alternative.

Non-flow Measures Impact Analysis

Because no non-flow measures would be implemented under the No Project Alternative, there would be no impacts from Impact TERR-6.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, maintenance, or adaptive management under the No Project Alternative; therefore, there would be no impact from Impact TERR-6.

Significance Conclusion Summary

The No Project Alternative would not conflict with the provisions of an adopted HCP/NCCP or other approved local, regional, or state HCP. There would be **no impact** under the No Project Alternative.

4.11.2 Non-flow Measures Only Alternative

The impacts of the Non-flow Measures Only Alternative to terrestrial biological resources would be the same as the non-flow measure impacts identified in Section 3.8.4; that is, impacts on terrestrial biological resources could result from the non-flow measures, monitoring, and maintenance of habitat improvements. These elements of the Non-flow Measures Only Alternative include such actions as ground disturbance; soil compaction; disturbances to channel beds and banks; weir installation; channel modification; construction staging and access; and the removal of culverts, riprap, or other structures that could impact a variety of terrestrial biological resources, as described below. There would be no change in reservoir flow volumes; therefore, the Non-flow Measures Only Alternative would have no impact to terrestrial biological resources from flow measures.

4.11.2.1 Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (less than significant with mitigation)[3]

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact from Impact TERR-1.

Non-flow Measures Impact Analysis

This section assesses the impacts from the Non-flow Measures Only Alternative. Impacts from the Non-flow Measures Only Alternative would be the same as the Proposed Project. The non-flow measures included in the Non-flow Measures Only Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow

[3] Impact conclusion provided after consideration of mitigation.

measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation could affect riparian vegetation needed to access the work area. The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. However, as stated above, there are no serpentine habitat types in Stevens Creek; therefore, there would be no impacts to any serpentine-associated special-status plant species. The Fremont Fish Ladder area is located in urban-suburban land cover types with some areas of Valley foothill riparian habitat upstream and downstream. Given the developed nature of the two areas, the likely presence of special-status plant species is low. However, species like *Dirca occidentalis* are found in riparian habitat and could occur as well as species like LBV.

The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe Creek in annual grasslands, blue oak woodlands, and coastal oak and coastal live oak forest and woodlands. On Alamitos Creek, the projects would likely occur in mixed riparian forest and woodland and coastal live oak forest and woodland. Special-status plant species like *Balsamorhiza macrolepis* var. *macrolepis*, *Hoita strobilina*, and *Dirca occidentalis* could occur in these habitat types. There is one small area of serpentine bunchgrass habitat near the Old Dam barrier remediation site on Guadalupe Creek; however, it would be avoided. Therefore, there would be no impact to any serpentine-associated special-status plant species.

Species most likely to be affected by fish barrier remediation projects include the Foothill yellow-legged frog, Western pond turtle, California giant salamander, California red-legged frog, and Santa Cruz black salamander. All of these species rely on water for breeding, and most could be found in study area streams at the proposed locations. Species like the LBV that use dense riparian shrubs and small trees could also occur at all the proposed locations. Grassland species like Bay checkerspot butterflies, badgers, burrowing owls, grasshopper sparrows, California tiger salamander, and Northern harrier could occur near the projects on Guadalupe Creek. Two species of special-status bats may be affected by proposed fish barrier remediation projects if they occur near bridges or similar roosting structures, or in native habitat.

Undocumented special-status plant or wildlife species could be affected by construction equipment and workers necessary for the projects. These activities could result in death, altered growth, or reduced seed set through physically breaking, crushing, wilting, or uprooting plants, and the compaction of soil by heavy equipment could damage plant roots. In addition, the creation of access routes and staging areas could result in the mechanical or physical removal of vegetation and modification of the seed bank as a result of grading, although these areas would be sited outside sensitive resource areas to the extent possible. Furthermore, minor fuel and oil spills could occur during equipment or vehicle operation or refueling, in addition to the risk of larger accidental releases. Without rapid containment and cleanup, these materials could kill or impair the health of special-status plants and wildlife.

All attempts would be made to avoid protected species. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Project's effects on plants and vegetation by ensuring that, prior to Project activities and during the appropriate bloom period to detect plants, a qualified botanist would perform a survey of the Project area(s), identify special-status plant species and sensitive natural vegetation communities, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Project's effects on plants and vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory. Implementation of Valley Water BMPs would also reduce impacts on plants and vegetation by using local ecotypes of native plants for revegetation and erosion control and by using appropriate equipment when working in streams. Lastly, implementation of BMPs GEN-30, GEN-31, and GEN-32 would reduce impacts on terrestrial biological resources by implementing multiple actions to limit the effects of dewatering, refueling, and equipment maintenance on native plants.

In addition to these BMPs, adherence to VHP conditions 3, 4, 5, 7, 8, 11, and 14, where applicable, would minimize and reduce the Non-flow Measures Only Alternative's effects from non-flow-measures on non-serpentine special-status plants by avoiding direct impacts on special-status plants and their habitats. Valley Water also would add measures similar to the applied Valley Water BMPs as conditions of funding agreements for those projects owned by others. Although impacts could be minimized, there is a potential for disturbance and other adverse impacts, though they would be less than significant as they would not likely be substantial to the species.

Implementation of BMPs GEN-12, GEN-13, and GEN-14 would protect special-status amphibian and reptile species, bat colonies, and San Francisco dusky footed woodrats by requiring a Valley Water-qualified biologist to conduct a desk audit to determine whether suitable habitat for any of these species is present in or adjacent to a Project activity. If it is determined that a special-status species could occur in the activity area, a qualified biologist would conduct species-specific surveys prior to the onset of construction and maintenance activities. If one of these species, or the eggs or larvae of a special-status amphibian or reptile, are found in the activity area, the qualified biologist would implement a series of work-specific activities to reduce impacts on the species. These minimization and avoidance actions are specific to each species and generally include, but are not limited to, establishing a buffer, implementing exclusion barriers, capturing and removing the individual to a safe location if allowable, and rescheduling work activities to avoid the species.

Implementation of Valley Water BMPs GEN-4, GEN-9, GEN-10, and GEN-21 would minimize the Project's effects on the Bay checkerspot butterfly and similar species as well as critical habitat by minimizing the area of disturbance and ensuring that, prior to implementation of non-flow measures, a qualified botanist would perform a survey of the Project area(s) and identify larval host plants. These host plants would be protected from disturbance to the extent feasible by establishing buffer zones around individual plants or populations and restricting herbicides and maintenance personnel and equipment. Implementation of Valley Water BMP GEN-7 would apply a 250-foot-radius no work buffer zone around occupied burrowing owl burrows.

Implementation of Valley Water's BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Project's effects on Bay checkerspot butterfly and similar species by avoiding or minimizing impacts on host plants and associated vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory.

Valley Water would also implement Valley Water BMPs to avoid, minimize, and reduce impacts on special-status wildlife species, including BMPs GEN-2, GEN-4, GEN-8, GEN-15, GEN-20, GEN-23, GEN-26, GEN-30, GEN-32, GEN-33, GEN-35, SED-2, VEG-1, and VEG-3. These BMPs would reduce impacts on special-status wildlife species by limiting and restricting herbicide application via the establishment of buffer areas; minimizing the area of disturbance; protecting sensitive fauna species from herbicide use and the salvage of native aquatic vertebrates from dewatered channels; implementing erosion and sediment control measures; accessing streams via existing access ramps; avoiding large mature trees, native vegetation, or other significant habitat features during stream access; minimizing impacts from temporary access points; preventing the accidental release of chemicals, fuels, lubricants, and non-storm-drainage water; preventing vehicle and equipment maintenance and fueling from occurring in sensitive habitats, buffer zones, and waterways; diverting streamflow around the work area by construction of a temporary dam and/or bypass while implementing additional measures to avoiding and minimize impacts on water quality and aquatic wildlife; maintaining and operating pumps and generators in a manner that minimizes impacts on water quality and aquatic species; preventing scour downstream of sediment removal areas; minimizing local erosion from in-channel vegetation removal; using appropriate equipment for instream removal to minimize ground disturbance and water quality impacts; using bank stabilization design to prevent erosion downstream; restricting concrete use near waterways to prevent water quality impacts; and restricting fumigants, bait traps, and live traps in sensitive amphibian habitat to minimize impacts on these species from their use.

The Bay checkerspot butterfly, California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle, western burrowing owl, LBV, and tricolored blackbird are covered species under the VHP. The VHP does not provide species level avoidance and minimization measures for all special-status species (for example, tiger salamander and red-legged frog) that could be affected by the Non-flow Measures Only Alternative. However, Goal 17 of the VHP is to conserve existing populations of California red-legged frog, California tiger salamander, and western pond turtle where possible, to increase the number of individuals and expand the overall distribution of populations of these species in biologically appropriate locations in the study area, and to maintain viable populations and contribute to the regional recovery of these species.

VHP conditions 3 through 5, 7, 8, 10, 12, and 14 through 17 would benefit all species in the project area by including management actions and requirements to avoid and/or minimize adverse impacts on covered species and their habitats. These include measures to maintain hydrologic conditions and protect water quality, avoid and minimize disturbance during instream projects, avoid and minimize disturbance during operations and maintenance, increase rural development design and construction requirements, avoid and minimize disturbance during rural road operations and maintenance, establish stream and riparian setbacks, avoid and minimize impacts during activities within or adjacent to wetlands and ponds, and provide specific minimization measures for covered species.

For example, VHP condition 4 requires implementation of more than 100 avoidance and minimization measures described in Table 6-2 of the VHP, which requires that all instream projects avoid and/or minimize adverse impacts on stream morphology, aquatic and riparian habitat, and flow conditions. In addition, the VHP requires all instream projects, including projects in dewatered reservoirs, to adopt design requirement and construction avoidance and minimization measures to minimize impacts on covered species, natural communities, and wildlife movement; to ramp increases and decreases in flows during dewatering to avoid washing covered species downstream or drying back the channel faster than covered species can adapt and move to new locations; and to develop an aquatic vertebrate relocation plan for use when cofferdams and water bypass structures are employed. A qualified biologist would determine whether relocation of native species is appropriate during dewatering and implementation of the Non-flow Measures Only Alternative, and USFWS and CDFW, as applicable, would review the relocation plan to determine whether relocation of VHP-covered species is appropriate.

The VHP provides species-level avoidance and minimization measures for some species, including Bay checkerspot butterfly, western burrowing owls, LBV, and tricolored blackbird. The conditions, although specific for each species, all require habitat surveys, preconstruction surveys, implementation of species-specific avoidance and minimization measures, and construction monitoring to avoid and reduce impacts.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions; however, there is a potential for disturbance and other adverse impacts that could be significant as they could be substantial for special-status species.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Representative sites identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. One of the proposed general locations on Guadalupe Creek is near a small area of serpentine bunchgrass habitat, which would be avoided during habitat construction activities. Therefore, there would be no impact to any serpentine-associated special-status plant species.

Impacts to other special-status plants and wildlife would be the same as described for fish barrier remediation. Impacts from these non-flow measures would be temporary and related to restoration construction activities as described above for fish barrier remediation. These projects would also benefit species by enhancing stream habitat, and adding additional cover and complexity. Wildlife species that feed on aquatic species may experience an increase in prey availability over time.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions; however, there is a potential for disturbance and other adverse impacts that could be significant as they could be substantial for special-status species.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact, as serpentine habitat is absent from Stevens Creek. Also, given its location, it is unlikely that other special-status species would be present. Therefore, there would be no impacts.

Implementation of non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, the little serpentine habitat in the Guadalupe River study area would be avoided and not affected by geomorphic restoration projects. Therefore, there would be no impact to any serpentine-associated special-status plant species. Impacts and benefits to special-status plant and wildlife could occur if they are within the restoration areas. All attempts would be made to avoid protected species as described for other non-flow measures. Although impacts could be minimized, there is a potential for disturbance and other adverse impacts. Valley Water would implement the same BMPs and VHP conditions to further reduce adverse impacts. Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions; however, there is a potential for disturbance and other adverse impacts that could be significant as they could be substantial for special-status species.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would likely only require foot access to areas, and all special-status species would be avoided. Those wildlife species present would likely move to adjacent habitat temporarily while monitors are in the area. Therefore, no adverse impacts are expected from monitoring. Maintenance and AMP measures are anticipated to be similar in nature to the proposed non-flow measures; therefore, impacts could occur but would likely be less than significant given any initial impacts from construction. Valley Water would apply the same BMPs and VHP conditions, applied during measure construction, as appropriate

Significance Conclusion Summary

As non-flow measures identified in the Non-flow Measures Only Alternative are further planned and designed, project-specific environmental review would be conducted by Valley Water or other agencies responsible for implementing such projects. Nevertheless, this alternative could have adverse impacts to special-status species if present. Valley Water would apply the BMPs and VHP conditions, as appropriate, to minimize impacts. Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions; however, there is a potential for disturbance and other adverse impacts that could be **significant** as they could be substantial for special-status species.

Mitigation

To reduce impacts of the Non-flow Measures Only Alternative to an identified candidate, sensitive, listed, or special-status species, Valley Water would implement the following mitigation measures as detailed in Sections 3.8.4 of this EIR. These mitigation measures may be adjusted in the future to better address project-specific environmental resources.

- **MM TERR-1a:** Biological Resources Screening and Assessment Payment of VHP Impact Fees
- **MM TERR-1b:** Endangered/Threatened Species Habitat Assessment and Protocol Surveys
- **MM TERR-1ca:** Nesting Avian Species Avoidance and Minimization
- **MM TERR-1d:** Payment of VHP Impact Fees
- **MM TERR-1e:** Implement Compensatory Mitigation for Special-status Plant Species for Areas Outside or Activities Not Covered by the VHP

Significance after Mitigation

With the implementation MM TERR-1a, MM TERR-1b, MM TERR-1c, MM TERR-1d, and MM TERR-1e, actions would be taken to substantially avoid or minimize impacts to special-status species during implementation of non-flow measures. Impact TERR-1 would be reduced to a **less-than-significant** level with mitigation because substantial adverse effects on these species would be prevented.

4.11.2.2 Impact TERR-2: Have a substantial adverse effect on riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS (less than significant with mitigation)[4]

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact from Impact TERR-2.

Non-flow Measures Impact Analysis

This section assesses the impacts from the Non-flow Measures Only Alternative. Impacts from the Non-flow Measures Only Alternative would be the same as the Proposed Project. The non-flow measures included in the Non-flow Measures Only Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow

[4] Impact conclusion provided after consideration of mitigation.

measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land cover types. The Fremont Fish Ladder area is located in urban-suburban land cover types with some areas of valley foothill riparian habitat upstream and downstream.

The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe Creek in annual grasslands, blue oak woodlands, and coastal oak and coastal live oak forest and woodlands. On Alamitos Creek, the projects would likely occur in mixed riparian forest and woodland and coastal live oak forest and woodland.

Sensitive natural communities would be temporarily affected by construction equipment for the project. Access would be developed to move equipment to the specific area requiring work. Access development and construction activities could result in vegetation clearing; tree removal for access and construction; pruning; trampling of vegetation by equipment; and fill, dust, and alteration of microhabitat conditions during restoration and enhancement activities. In addition, the creation of staging areas could result in the mechanical or physical removal of vegetation and modification of the seed bank as a result of grading, although these areas would be sited outside sensitive resource areas to the extent possible. Furthermore, minor fuel and oil spills could occur during equipment or vehicle operation or refueling, in addition to the risk of larger accidental releases. Without rapid containment and cleanup, these materials could kill or impair the health of plants in these sensitive communities.

The use of vehicles could transport invasive plants or their seed to the location, which could spread in the disturbed area. Because many invasive plants are able to easily colonize recently disturbed areas and/or tolerate repeated disturbance better than many native plants, construction activities associated with non-flow measures, such as clearing and grading, might create conditions suitable for additional spreading of invasive plant species. In addition, bare upland soils left after construction of temporary staging areas might encourage growth of weedy species and mulching or erosion-control mixes might include, and thus introduce, invasive, nonnative plant species. Further, nonnative plant species could temporarily benefit from any dewatering associated with the measures.

All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Project's effects on plants and vegetation by ensuring that, prior to Project activities and during the appropriate bloom period to detect plants, a qualified botanist would perform a survey of the Project area(s), identify sensitive natural vegetation communities, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Project's effects on plants and vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory. Implementation of Valley Water BMPs would also reduce impacts on plants and vegetation by using local ecotypes of native plants for revegetation and erosion control and by using appropriate equipment when working in streams. Lastly, implementation of BMPs GEN-30, GEN-31, and GEN-32 would reduce impacts on terrestrial biological resources by implementing multiple actions to limit the effects of dewatering, refueling, and equipment maintenance on native plants.

In addition to these BMPs, adherence to VHP conditions 4, 5, 7, 8, 11, and 14, where applicable, would minimize and reduce the Non-flow Measures Only Alternative effects from non-flow-measures on non-serpentine special-status plants by avoiding direct impacts on special-status plants and their habitats. Valley Water also would add measures similar to the applied Valley Water BMPs as conditions of funding agreements for those projects owned by others.

Implementation of Valley Water BMPs VEG-1, VEG-2, VEG-3, VEG-6, WQ-9, and HM-1 would reduce the potential for invasive species to spread or become established. BMP BIO-9 requires Valley Water to consult with a qualified biologist or vegetation specialist to determine what planting seed options are ecologically appropriate and effective whenever native species are prescribed for installation. This measure would minimize the introduction of ecologically inappropriate seed mixes (for example, ones that could include nonnative invasive plant seeds) into areas of the Project site(s) that are revegetated following completion of construction activities (for example, work related to development of construction laydown areas, construction staging areas, and access roads). BMPs VEG-1, VEG-2, VEG-3, and VEG-6 would reduce areas where exotic species could become established though proper use of equipment, removal of invasive plant species, and prevention of unwanted grazing in stream areas. BMP HM-1 requires vehicles (for example, construction vehicles and equipment) to be washed only at approved areas and not at work areas. This measure would minimize the spread of nonnative invasive plants (for example, via seeds and flowers) or wildlife (for example, nonnative mussel species) into the Project site.

In applicable areas, the Non-flow Measures Only Alternative would adhere to VHP condition 7, which would “minimize the potential direct and indirect impacts of rural development in areas that would remain primarily rural on covered species and natural communities most likely to be affected by rural development” (ICF 2012). However, a secondary goal of this VHP condition is to minimize construction-related impacts of VHP-covered projects, including minimizing the introduction of nonnative, invasive species. This condition requires that all temporarily disturbed soils in the areas of VHP-covered projects, including most of the Non-flow Measures Only Alternative, be revegetated with native plants and/or grasses, or sterile nonnative species suitable for the altered soil conditions upon completion of construction. Local watershed native plants would be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixes must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. All disturbed areas that have been compacted would be decompacted prior to planting or seeding (ICF 2012).

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be significant as they could be substantial.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Representative sites identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. The proposed Stevens Creek site is located within oak woodland and valley foothill riparian habitat. The Guadalupe Creek sites are located within annual grasslands and oak woodlands. The Guadalupe River site includes a small riparian habitat area surrounded by development. Finally, the Los Gatos Creek sites include valley foothill riparian and scrub, as well as urban development.

Impacts to sensitive natural communities would be the same as described above for fish barrier remediation projects. All attempts would be made to limit impacts to sensitive areas. However, temporary impacts to riparian and other habitats will be unavoidable as they are the only way to access the project areas. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Project's effects on sensitive natural communities by ensuring that, prior to Non-flow Measures Only Alternative activities and during the appropriate bloom period to detect plants, a qualified botanist would perform a survey of the Project area(s), identify sensitive natural vegetation communities, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Non-flow Measures Only Alternative's effects on plants and vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory. Implementation of Valley Water BMPs would also reduce impacts on plants and vegetation by using local ecotypes of native plants for revegetation and erosion control and using appropriate equipment when working in streams. Lastly, implementation of BMPs GEN-30, GEN-31, and GEN-32 would reduce impacts on terrestrial biological resources by implementing multiple actions to limit the effects of dewatering, refueling, and equipment maintenance on native plants.

In addition to these BMPs, adherence to VHP conditions 3, 4, 5, 7, 8, 11, and 14, where applicable, would minimize and reduce the Non-flow Measures Only Alternative effects from non-flow-measures on non-serpentine special-status plants by avoiding direct impacts on special-status plants and their associated sensitive natural communities. Valley Water also would add measures similar to the applied Valley Water BMPs as conditions of funding agreements for those projects owned by others. Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be significant as they could be substantial.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact to special-status species, as the project would take place in disturbed areas related to the dam.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts to special-status plants could occur if they are within the restoration areas. All attempts would be made to avoid sensitive natural communities as described for other non-flow measures.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be significant as they could be substantial.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would likely only require foot access to areas, and impacts to sensitive natural communities would be avoided. Therefore, no impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed non-flow measures; therefore, impacts could occur but would likely be less than significant given any initial impacts from construction.

Significance Conclusion Summary

Non-flow measures could result in limited temporary impacts to riparian and other sensitive natural communities, where complete avoidance could not be accomplished, as well as temporal loss of riparian functions and values in the areas disturbed. However, after construction is completed, the areas would be replanted and restored. Implementation of Valley Water's BMPs and VHP conditions listed above would further reduce these impacts.

However, although most impacts could be reduced by using BMPs and VHP conditions; there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be **significant** as they could be substantial.

Mitigation

No mitigation is required for flow measures. Valley Water will implement MM TERR-1a and MM TERR-1b, and TERR-1d and TERR-1e (if necessary) for unavoidable construction impacts from non-flow measures on sensitive natural communities. These mitigation measures are described for Impact TERR-1. These mitigation measures may be adjusted in the future to better address project-specific environmental resources.

Significance after Mitigation

With the implementation of MM TERR-1a and MM TERR-1b, and TERR-1d and TERR-1e (if necessary), actions would be taken to substantially avoid or minimize impacts to sensitive natural communities during implementation of non-flow measures. Impact TERR-2 would be reduced to a **less-than-significant** level with mitigation because substantial adverse effects on these sensitive natural communities would be prevented. In the long term, these communities would benefit from habitat restoration and enhancement efforts.

4.11.2.3 Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means (less than significant with mitigation)[5]

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact from Impact TERR-3.

Non-flow Measures Impact Analysis

This section assesses the impacts from the Non-flow Measures Only Alternative. Impacts from the Non-flow Measures Only Alternative would be the same as the Proposed Project. The non-flow measures included in the Non-flow Measures Only Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The impacts from each of these non-flow measures are discussed in the sections below.

The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality. The impacts from each of these non-flow measures are discussed in the sections below. Any adverse impacts would be from construction and access to the area.

[5] Impact conclusion provided after consideration of mitigation.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land cover types. The Fremont Fish Ladder area is located in urban-suburban land cover types with some areas of valley foothill riparian habitat upstream, and downstream. The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe and Alamitos Creeks.

Any impacts to wetlands would be temporary in nature and occur only during construction. The placement of fill (for example, for cofferdams and temporary access roads), temporary hydrological interruption (for example, dewatering and diversion), degradation of water quality (for example, increased sedimentation and turbidity), removal of vegetation, and other ground-disturbing activities could have direct impacts on jurisdictional wetlands and other waters of the U.S. or state. Furthermore, minor fuel and oil spills could occur during equipment or vehicle operation or refueling, in addition to the risk of larger accidental releases. Without rapid containment and cleanup, these materials could kill or impair the wetlands.

The use of vehicles could transport invasive plants or their seed to the location, which could spread in the disturbed area. Because many invasive plants are able to easily colonize recently disturbed areas and/or tolerate repeated disturbance better than many native plants, construction activities associated with non-flow measures, such as clearing and grading, might create conditions suitable for additional spreading of invasive plant species. In addition, bare upland soils left after construction of temporary staging areas might encourage growth of weedy species, and mulching or erosion-control mixes might include, and thus introduce, invasive, nonnative plant species. Further, nonnative plant species could temporarily benefit from any dewatering associated with the measures.

All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Non-flow Measures Only Alternative’s effects on all vegetation that could be considered wetland vegetation. Prior to activities, a qualified botanist would perform a survey of sensitive natural vegetation communities and wetlands in the Project area, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-4, WQ-5, and WQ-9 would minimize the Non-flow Measures Only Alternative’s effects on wetlands by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds. Implementation of Valley Water BMPs BI-3, BI-7, BI-8, and VEG-3 would also reduce impacts on wetland habitat by removing any temporary fills, minimizing impacts on vegetation from survey work, using local ecotypes of native plants for revegetation and erosion control, and using appropriate equipment when working in or adjacent to streams.

The Non-flow Measures Only Alternative would adhere to VHP conditions 3, 4, 5, 7, 8, 11, and 12, where applicable, which would reduce impacts on waters and wetlands within the covered areas by minimizing impacts on these areas, avoiding and reducing impacts on instream biota and water quality, preventing the introduction or spread of invasive weeds, and avoiding wetland areas where feasible.

Prior to ground-disturbing activities occurring within or adjacent to wetlands or other areas that may fall under the jurisdiction of USACE or SWRCB, Valley Water will retain a qualified wetland scientist to complete a jurisdictional delineation of the area. The delineation will identify areas to be protected, permitted, or mitigated through implementation of project-specific mitigation measures. Where feasible and appropriate, all jurisdictional aquatic resources not directly affected by construction activities will be avoided and protected by establishing staking, flagging, or fencing between the identified construction areas and aquatic resources to be avoided and/or preserved.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Therefore, there is a potential that short-term adverse impacts could be significant as they could be substantial.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Representative sites identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. The proposed Stevens Creek site is located within oak woodland and valley foothill riparian habitat. The Guadalupe Creek sites are located within annual grasslands and oak woodlands. The Guadalupe River site includes a small riparian habitat area surrounded by development. Finally, the Los Gatos Creek sites include valley foothill riparian and scrub as well as urban development.

Impacts to wetlands would be the same as described above for fish barrier remediation projects. All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Non-flow Measures Only Alternative's effects on all vegetation that could be considered wetland vegetation. Prior to activities, a qualified botanist would perform a survey of sensitive natural vegetation communities and wetlands in the Project area, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-4, WQ-5, and WQ-9 would minimize the Non-flow Measures Only Alternative's effects on wetlands by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds. Implementation of Valley Water BMPs BI-3, BI-7, BI-8, and VEG-3 would also reduce impacts on wetland habitat by removing any temporary fills, minimizing impacts on vegetation from survey work, using local ecotypes of native plants for revegetation and erosion control, and using appropriate equipment when working in or adjacent to streams.

The Non-flow Measures Only Alternative would adhere to VHP conditions 3, 4, 5, 7, 8, 11, and 12, where applicable, which would reduce impacts on waters and wetlands within the covered areas by reducing impacts on these areas, avoiding and reducing impacts on instream biota and water quality, preventing the introduction or spread of invasive weeds, and avoiding wetland areas where feasible.

Prior to ground-disturbing activities occurring within or adjacent to wetlands or other areas that may fall under the jurisdiction of USACE or SWRCB, Valley Water will retain a qualified wetland scientist to complete a jurisdictional delineation of the area. The delineation will identify areas to be protected, permitted, or mitigated through implementation of project-specific mitigation measures. Where feasible and appropriate, all jurisdictional aquatic resources not directly affected by construction activities will be avoided and protected by establishing staking, flagging, or fencing between the identified construction areas and aquatic resources to be avoided and/or preserved.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Therefore, there is a potential that short-term adverse impacts could be significant as they could be substantial.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact to wetlands, as the project would take place in disturbed areas related to the dam.

Implementation of non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts to wetlands could occur if they are within the restoration areas. All attempts would be made to avoid wetlands as described for other non-flow measures.

Prior to ground-disturbing activities occurring within or adjacent to wetlands or other areas that may fall under the jurisdiction of USACE or SWRCB, Valley Water will retain a qualified wetland scientist to complete a jurisdictional delineation of the area. The delineation will identify areas to be protected, permitted, or mitigated through implementation of project-specific mitigation measures. Where feasible and appropriate, all jurisdictional aquatic resources not directly affected by construction activities will be avoided and protected by establishing staking, flagging, or fencing between the identified construction areas and aquatic resources to be avoided and/or preserved.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Therefore, there is a potential that short-term adverse impacts could be significant as they could be substantial.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would likely only require foot access to areas, and impacts to wetlands would be avoided. Therefore, no impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed non-flow measures; therefore, impacts could occur but would likely be less than significant given any initial impacts from construction.

Significance Conclusion Summary

The Non-flow Measure Only Alternative could result in temporary impacts to wetland functions and values. Even with the implementation of Valley Water BMPs and VHP conditions, it may not be possible to completely avoid impacts to jurisdictional waters and wetlands, so there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Although impacts could be reduced, there is a potential for disturbance and other temporary **significant** adverse impacts as they could be substantial to wetlands.

Mitigation

Valley Water would implement MM TERR-1d and MM TERR-2. MM TERR-2 may be adjusted in the future to better address project-specific environmental resources.

Significance after Mitigation

Non-flow Measure Only Alternative related impacts on wetlands and other waters of the U.S. and state would be reduced to a **less-than-significant** level through implementation of MM TERR-1d and MM TERR-2. After mitigation, the Non-flow Measures Only Alternative would not have a substantial adverse effect on jurisdictional wetlands and other waters, including federal and state protected wetlands.

4.11.2.4 Impact TERR-4: Interfere substantially with the movement of any native resident or migratory terrestrial species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact from Impact TERR-4.

Non-flow Measures Impact Analysis

This section assesses the impacts from the Non-flow Measures Only Alternative. Impacts from the Non-flow Measures Only Alternative would be the same as the Proposed Project. The non-flow measures included in the Non-flow Measures Only Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality. The impacts from each of these non-flow measures are discussed in the sections below. Any adverse impacts would be from construction and access to the area.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land cover types. The Fremont Fish Ladder area is located in urban-suburban land cover types, with some areas of valley foothill riparian habitat upstream and downstream. The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe Creek and Alamitos Creek.

By creating open areas or patches with unsuitable vegetation types, grading and excavation activities could temporarily restrict some wildlife species from moving between suitable habitat patches. In addition, noise and disturbance associated with construction activities could cause species that commonly use habitats on the project site(s) for dispersal to at least temporarily avoid dispersal through the project site(s). This would most likely occur with small mammals, amphibians, and reptiles with reduced range mobility. Once construction activities are complete, however, wildlife movement conditions would be similar to or better than pre-project conditions, and wildlife dispersal through the Project site would return to the existing condition, or one that better facilitates movement by eliminating hardscape and grade separation. Larger, more mobile wildlife species would likely avoid construction activities and skirt the areas of disturbance.

The impact area would be limited to only the area needed for project construction. These areas are discrete locations that would be subjected to limited construction activities and would not experience substantial permanent habitat removal or the introduction of structures that would block, remove, or otherwise substantially impact the ability of wildlife to disperse through the project site(s) and use existing wildlife corridors or breeding and rearing sites.

Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Project's effects on riparian vegetation that could be used as wildlife corridors by avoiding and/or minimizing disturbance. The Non-flow Measures Only Alternative would also adhere to VHP conditions 7 and 11, which would reduce Non-flow Measures Only Alternative impacts on wildlife corridors within the covered areas by minimizing impacts on sensitive land cover types, avoiding or reducing impacts on riparian habitat, preventing the introduction or spread of invasive weeds, and providing setbacks to riparian vegetation where possible. Although impacts could be minimized, there is a potential for disturbance and other temporary adverse impacts, though they would be less than significant as they would not likely interfere substantially with wildlife movement, established wildlife corridors, or impede the use of nursery sites.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Representative sites identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek.

Impacts to wildlife movement, established wildlife corridors, or the use of nursery sites would be the same as described above for fish barrier remediation projects. All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Project’s effects on riparian vegetation that could be used as wildlife corridors by avoiding and/or minimizing disturbance. The Non-flow Measures Only Alternative would also adhere to VHP conditions 7 and 11, which would reduce Non-flow Measures Only Alternative impacts on wildlife corridors within the covered areas by minimizing impacts on sensitive land cover types, avoiding or reducing impacts on riparian habitat, preventing the introduction or spread of invasive weeds, and providing setbacks to riparian vegetation where possible. Although impacts could be minimized, there is a potential for disturbance and other temporary adverse impacts, though they would be less than significant as they would not likely interfere substantially with wildlife movement, established wildlife corridors, or impede the use of nursery sites.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impacts on wildlife movement, established wildlife corridors, or the use of nursery sites, as the project would take place in disturbed areas related to the dam.

Implementation of non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts to wildlife movement, established wildlife corridors, or the use of nursery sites could occur if they are within the restoration areas. All attempts would be made to avoid impacts as described for other non-flow measures.

Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Non-flow Measures Only Alternative’s effects on riparian vegetation that could be used as wildlife corridors by avoiding and/or minimizing disturbance. The Non-flow Measures Only Alternative would also adhere to VHP conditions 7 and 11, which would reduce Non-flow Measures Only Alternative impacts on wildlife corridors within the covered areas by minimizing impacts on sensitive land cover types, avoiding or reducing impacts on riparian habitat, preventing the introduction or spread of invasive weeds, and providing setbacks to riparian vegetation where possible. Although impacts could be minimized, there is a potential for disturbance and other temporary adverse impacts, though they would be less than significant as they would not likely interfere substantially with wildlife movement, established wildlife corridors, or impede the use of nursery sites.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would likely only require foot access to areas, and impacts to wildlife movement, established wildlife corridors, or the use of nursery sites would be avoided. Therefore, no impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed non-flow measures; therefore, impacts could occur but would likely be less than significant given any initial impacts from construction.

Significance Conclusion Summary

Implementation of non-flow measures would impact terrestrial wildlife movement during construction; however, these impacts would be temporary, as animals would continue to move through the project site(s) following project completion. The ability of animals to move through the project site(s) following project completion would be similar to current conditions and would be improved by the channel-enhancement activities, including riparian restoration, creating a **beneficial** impact. Thus, the proposed non-flow measures would not interfere substantially with the movement of any native wildlife species or with established native terrestrial wildlife corridors, or impede the use of native wildlife breeding or rearing sites. In addition, implementation of the BMPs and VHP conditions would help reduce project impacts on wildlife movement. Based on the above analysis, Impact TERR-4 would be **less than significant**.

Mitigation

No mitigation would be required to reduce impacts to a less-than-significant level.

4.11.2.5 Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance (less than significant with mitigation)[6]

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact from Impact TERR-5.

Non-flow Measures Impact Analysis

This section assesses the impacts from the Non-flow Measures Only Alternative. Impacts from the Non-flow Measures Only Alternative would be the same as the Proposed Project. The non-flow measures included in the Non-flow Measures Only Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The impacts from each of these non-flow measures are discussed in the sections below.

This section assesses the impacts from non-flow measures. The non-flow measures included in the Non-flow Measures Only Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by

[6] Impact conclusion provided after consideration of mitigation.

enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality. The impacts from each of these non-flow measures are discussed in the sections below. Any adverse impacts would be from construction and access to the area.

Because of the programmatic consideration of the non-flow measure analysis provided in this EIR, a precise, project-level analysis of the specific impacts is not possible at this time, as only general locations and project concepts are known. As non-flow measures identified in the Non-flow Measures Only Alternative is further planned and designed, project-specific environmental review would be conducted by Valley Water or other agencies responsible for implementing such projects.

With the exception of tree removal related to construction of non-flow measures, the results of the non-flow measures would be a benefit to the biological resources that are the subject of local protection policies. The proposed non-flow measures would improve fish passage; stabilize and improve geomorphic functions of the watersheds; preserve and restore rare, sensitive, and special-status habitats and species; maintain the existing character of the specific project area(s); retain and/or enhance the existing form of existing creek channels; avoid excessive grading and disturbance of vegetation and soils; maintain natural drainage patterns; and enhance the functions and values of creeks and adjacent vegetation. These actions and the resulting biological benefits would inherently be consistent with applicable local policies designed to protect biological resources. As detailed in the section for Impact TERR-2a, the non-flow measures would only result in temporary impacts on trees in portions of the study area that are identified for construction activities.

In addition, Valley Water would implement BMP GEN-4, limiting impacts to the minimum area required, to address the impact of the Non-flow Measures Only Alternative on ordinance trees, and would comply with the applicable requirements of local tree ordinances. However, complete avoidance of these trees may not be practicable for individual projects; therefore, impacts could be significant.

Monitoring, Maintenance, and Adaptive Management

The effects of monitoring, maintenance, and AMP activities of habitat improvements would not conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance. Any impacts would be similar to those experienced during construction.

Significance Conclusion Summary

To limit impacts from non-flow measures, implementation of BMP GEN-4 would minimize the loss of ordinance trees where tree ordinances apply to Valley Water, but complete avoidance of these trees may not be practicable. Complete avoidance of these trees may not be practicable for individual projects; therefore, impacts could be **significant** with any applicable provisions of local policies or ordinances protecting trees.

Mitigation

Mitigation measures for trees would help meet applicable provisions of local policies and ordinances protecting trees. Valley Water would implement MM TERR-3: Tree Replacement, described in Section 3.8.4.5. This mitigation measure may be adjusted in the future to better address project-specific environmental resources.

Significance after Mitigation

Implementation of MM TERR-3, as detailed in Section 3.8.4.5 of this EIR, would mitigate impacts on ordinance-defined trees to a **less-than-significant** level by replacing trees that cannot be avoided, if required by applicable ordinances, so that the Non-flow Measures Only Alternative does not conflict with the applicable provisions of local tree ordinances.

4.11.2.6 Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact from Impact TERR-6.

Non-flow Measures Impact Analysis

All impacts on VHP-covered species that could be affected by the non-flow measures are discussed in this EIR. Similarly, impacts on sensitive habitats, such as stream, wetland, riparian, and serpentine habitats, for which the VHP requires specific impact fees, are discussed in this EIR. Valley Water would apply for VHP coverage for covered activities and would adhere to all applicable VHP conditions during Non-flow Measures Only Alternative implementation. Therefore, the Non-flow Measures Only Alternative would have no impact.

Monitoring, Maintenance, and Adaptive Management

The effects of monitoring, maintenance, and AMP activities of habitat improvements would not conflict with, but rather comply with, the VHP. Therefore, there would be no impact.

Significance Conclusion Summary

The Non-flow Measures Only Alternative non-flow measures and monitoring would not be in conflict with any adopted HCPs or NCCPs, or with any other approved local, regional, or state HCPs. Therefore, there would be **no impact** for Impact TERR 6.

Mitigation

No mitigation would be required for Impact TERR-6.

4.11.3 FAHCE-plus Alternative

Under the FAHCE-plus Alternative, there would be modifications in the pulse flows as compared to the Proposed Project. The impacts of this modification on terrestrial biological resources are discussed below. The non-flow measures of the FAHCE-plus Alternative would be identical to those of the Proposed Project and would involve ground disturbance; soil compaction; disturbances to channel beds and banks; weir installation; channel modification; construction staging and access; gravel augmentation; sediment removal; bank stabilization; minor maintenance; and the removal of culverts, riprap, or other structures. Any of these activities could have the potential for impacts on a variety of terrestrial biological resources, also described below. Effects of monitoring and maintenance of habitat improvements are included in the analysis.

4.11.3.1 Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (less than significant with mitigation)[7]

Flow Measures Impact Analysis

As detailed in Chapter 2, *Project Description*, the primary creeks in the study area show a pattern of high winter and spring flow peaks in excess of 1,000 cfs (USGS 2018). As discussed in Section 3.2.4 of this EIR, these flows are consistent with current flow regime and within channel capacity in the creeks, and Valley Water would ramp increases and decreases in flows during releases, thereby avoiding washing out species and eroding stream banks. The variations of flows under the FAHCE-plus Alternative would not result in different impacts to special-status species. As a result of this flow regime, no substantial adverse effects on the special-status plant and wildlife species listed in Section 3.8.1 would occur; rather, impacts would be limited to those species that are associated with the stream and riparian environment. If special-status plant species were present in areas of Calero Creek where waters exceeded channel capacity, given the ramping rates, amount of flow, and duration of exceedances over a 20-year period, it is unlikely they would be adversely affected. Although potentially present, it is unlikely that the changes in flows would have substantial adverse effects on special-status wildlife species, given the timing and ramping rates implemented. Aquatic special-status wildlife could be affected, but impacts would be less than significant. Overall, flow measures would result in at most less-than-significant impacts to special-status plants and wildlife.

Non-flow Measures Impact Analysis

This section assesses the impacts from the FAHCE-plus Alternative. Impacts from FAHCE-plus Alternative would be the same as the Proposed Project. The non-flow measures included in the FAHCE-plus Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The impacts from each of these non-flow measures are discussed in the sections below.

Fish Barrier Remediation

Construction and maintenance activities associated with fish passage barrier remediation could affect riparian vegetation needed to access the work area. The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. However, as stated above, there are no serpentine habitat types in Stevens Creek; therefore, there would be no impacts to any serpentine-associated special-status plant species. The Fremont Fish Ladder area is located in urban-suburban land cover types with some areas of Valley foothill riparian habitat upstream and downstream. Given the developed nature of the two areas, the likely presence of special-status plant species is low. However, species like *Dirca occidentalis* are found in riparian habitat and could occur as well as species like LBV.

The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe Creek in annual grasslands, blue oak woodlands, and coastal oak and coastal live oak forest and woodlands. On Alamitos Creek, the project would likely occur in mixed riparian forest and woodland and coastal live oak forest and woodland. Special-status plant species like *Balsamorhiza macrolepis* var. *macrolepis*, *Hoita strobilina*, and *Dirca occidentalis* could occur in these habitat types. There is one small area of serpentine bunchgrass habitat near the Old Dam barrier

[7] Impact conclusion provided after consideration of mitigation.

remediation site on Guadalupe Creek; however, it would be avoided. Therefore, there would be no impact to any serpentine-associated special-status plant species.

Species most likely to be affected by fish barrier remediation projects include the Foothill yellow-legged frog, Western pond turtle, California giant salamander, California red-legged frog, and Santa Cruz black salamander. All of these species rely on water for breeding, and most could be found in study area streams at the proposed locations. Species like the LBV that use dense riparian shrubs and small trees could also occur at all the proposed locations. Grassland species like Bay checkerspot butterflies, badgers, burrowing owls, grasshopper sparrows, California tiger salamander, and Northern harrier could occur near the projects on Guadalupe Creek. Two species of special-status bats may be affected by proposed non-flow measures if they occur near bridges or similar roosting structures, or in native habitat.

Undocumented special-status plant or wildlife species could be affected by construction equipment and workers necessary for the Project. These activities could result in death, altered growth, or reduced seed set through physically breaking, crushing, wilting, or uprooting plants, and the compaction of soil by heavy equipment could damage plant roots. In addition, the creation of access routes and staging areas could result in the mechanical or physical removal of vegetation and modification of the seed bank as a result of grading, although these areas would be sited outside sensitive resource areas to the extent possible. Furthermore, minor fuel and oil spills could occur during equipment or vehicle operation or refueling, in addition to the risk of larger accidental releases. Without rapid containment and cleanup, these materials could kill or impair the health of special-status plants and wildlife.

All attempts would be made to avoid protected species. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Project's effects on plants and vegetation by ensuring that, prior to Project activities and during the appropriate bloom period to detect plants, a qualified botanist would perform a survey of the Project area(s), identify special-status plant species and sensitive natural vegetation communities, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Project's effects on plants and vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory. Implementation of Valley Water BMPs would also reduce impacts on plants and vegetation by using local ecotypes of native plants for revegetation and erosion control, and by using appropriate equipment when working in streams. Lastly, implementation of BMPs GEN-30, GEN-31, and GEN-32 would reduce impacts on terrestrial biological resources by implementing multiple actions to limit the effects of dewatering, refueling, and equipment maintenance on native plants.

In addition to these BMPs, adherence to VHP conditions 3, 4, 5, 7, 8, 11, and 14, where applicable, would minimize and reduce the FAHCE-plus Alternative's effects from non-flow-measures on non-serpentine special-status plants by avoiding direct impacts on special-status plants and their habitats. Valley Water also would add measures similar to the applied Valley Water BMPs as conditions of funding agreements for those projects owned by others. Although impacts could be minimized, there is a potential for disturbance and other adverse impacts, though they would be less than significant as they would not likely be substantial to the species.

Implementation of BMPs GEN-12, GEN-13, and GEN-14 would protect special-status amphibian and reptile species, bat colonies, and San Francisco dusky footed woodrats by requiring a Valley Water-qualified biologist to conduct a desk audit to determine whether suitable habitat for any of these species is present in or adjacent to a Project activity. If it is determined that a special-status species could occur in the activity area, a qualified biologist would conduct species-specific surveys prior to the onset of construction and maintenance activities. If one of these species, or the eggs or larvae of a special-status amphibian or reptile, are found in the activity area, the qualified biologist would implement a series of work-specific activities to reduce impacts on the species. These minimization and avoidance actions are specific to each species and generally include, but are not limited to, establishing a buffer, implementing exclusion barriers, capturing and removing the individual to a safe location if allowable, and rescheduling work activities to avoid the species.

Implementation of Valley Water BMPs GEN-4, GEN-9, GEN-10, and GEN-21 would minimize the Project's effects on the Bay checkerspot butterfly and similar species and critical habitat by minimizing the area of disturbance and ensuring that, prior to implementation of non-flow measures, a qualified botanist would perform a survey of the Project area(s) and identify larval host plants. These host plants would be protected from disturbance to the extent feasible by establishing buffer zones around individual plants or populations, and restricting herbicides and maintenance personnel and equipment. Implementation of Valley Water BMP GEN-7 would apply a 250-foot-radius no-work buffer zone around occupied burrowing owl burrows.

Implementation of Valley Water's BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Project's effects on Bay checkerspot butterfly and similar species by avoiding or minimizing impacts on host plants and associated vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory.

Valley Water would also implement Valley Water BMPs to avoid, minimize, and reduce impacts on special-status wildlife species, including BMPs GEN-2, GEN-4, GEN-8, GEN-15, GEN-20, GEN-23, GEN-26, GEN-30, GEN-32, GEN-33, GEN-35, SED-2, VEG-1, and VEG-3. These BMPs would reduce impacts on special-status wildlife species by limiting and restricting herbicide application via the establishment of buffer areas; minimizing the area of disturbance; protecting sensitive fauna species from herbicide use and the salvage of native aquatic vertebrates from dewatered channels; implementing erosion and sediment control measures; accessing streams via existing access ramps; avoiding large mature trees, native vegetation, or other significant habitat features during stream access; minimizing impacts from temporary access points; preventing the accidental release of chemicals, fuels, lubricants, and non-storm-drainage water; preventing vehicle and equipment maintenance and fueling from occurring in sensitive habitats, buffer zones, and waterways; diverting streamflow around the work area by construction of a temporary dam and/or bypass while implementing additional measures to avoiding and minimize impacts on water quality and aquatic wildlife; maintaining and operating pumps and generators in a manner that minimizes impacts on water quality and aquatic species; preventing scour downstream of sediment removal areas; minimizing local erosion from in-channel vegetation removal; using appropriate equipment for instream removal to minimize ground disturbance and water quality impacts; using bank stabilization design to prevent erosion downstream; restricting concrete use near waterways to prevent water quality impacts; and restricting fumigants, bait traps, and live traps in sensitive amphibian habitat to minimize impacts on these species from their use.

The Bay checkerspot butterfly, California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle, western burrowing owl, LBV, and tricolored blackbird are covered species under the VHP. The VHP does not provide species-level avoidance and minimization measures for all special-status species (for example, tiger salamander and red-legged frog) that could be affected by the FAHCE-plus Alternative. However, Goal 17 of the VHP is to conserve existing populations of California red-legged frog, California tiger salamander, and western pond turtle where possible, and to increase the number of individuals and expand the overall distribution of populations of these species in biologically appropriate locations in the study area to maintain viable populations and contribute to the regional recovery of these species.

VHP conditions 3 through 5, 7, 8, 10, 12, and 14 through 17 would benefit all species in the project area by including management actions and requirements to avoid and/or minimize adverse impacts on covered species and their habitats. These include measures to maintain hydrologic conditions and protect water quality, avoid and minimize disturbance during instream projects, avoid and minimize disturbance during operations and maintenance, increase rural development design and construction requirements, avoid and minimize disturbance during rural road operations and maintenance, establish stream and riparian setbacks, avoid and minimize impacts during activities within or adjacent to wetlands and ponds, and provide specific minimization measures for covered species.

For example, VHP condition 4 requires implementation of more than 100 avoidance and minimization measures described in Table 6-2 of the VHP, which requires that all instream projects avoid and/or minimize adverse impacts on stream morphology, aquatic and riparian habitat, and flow conditions. In addition, the VHP requires all instream projects, including projects in dewatered reservoirs, to adopt design requirements and construction avoidance and minimization measures to minimize impacts on covered species, natural communities, and wildlife movement; to ramp increases and decreases in flows during dewatering to avoid washing covered species downstream or drying back the channel faster than covered species can adapt and move to new locations; and to develop an aquatic vertebrate relocation plan for use when cofferdams and water bypass structures are employed. A qualified biologist would determine whether relocation of a native species is appropriate during dewatering and implementation of the FAHCE-plus Alternative, and USFWS and CDFW, as applicable, would review the relocation plan to determine whether relocation of VHP-covered species is appropriate.

The VHP provides species-level avoidance and minimization measures for some species, including Bay checkerspot butterfly, western burrowing owls, LBV, and tricolored blackbird. The conditions, although specific for each species, all require habitat surveys, preconstruction surveys, implementation of species-specific avoidance and minimization measures, and construction monitoring to avoid and reduce impacts.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions; however, there is a potential for disturbance and other adverse impacts that could be significant as they could be substantial for special-status species.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Representative sites identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. One of the proposed general locations on Guadalupe Creek is near a small area of serpentine bunchgrass habitat, which would be avoided during habitat construction activities. Therefore, there would be no impact to any serpentine-associated special-status plant species.

Impacts to other special-status plants and wildlife would be the same as described for fish barrier remediation. Impacts from these non-flow measures would be temporary, related to restoration construction activities as described above for fish barrier remediation. These projects would also benefit species by enhancing stream habitat, and adding additional cover and complexity. Wildlife species that feed on aquatic species may experience an increase in prey availability over time.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions; however, there is a potential for disturbance and other adverse impacts that could be significant as they could be substantial to the special-status species.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact, as serpentine habitat is absent from Stevens Creek. Also, given its location, it is unlikely that other special-status species would be present. Therefore, there would be no impacts.

Implementation non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, the little serpentine habitat in the Guadalupe River study area would be avoided and not affected by geomorphic restoration projects. Therefore, there would be no impact to any serpentine-associated special-status plant species. Impacts and benefits to special-status plant and wildlife could occur if they are within the restoration areas. All attempts would be made to avoid protected species as described for other non-flow measures. Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions; however, there is a potential for disturbance and other adverse impacts that could be significant as they could be substantial for special-status species.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would likely only require foot access to areas, and all special-status species would be avoided. Those wildlife species present would likely move to adjacent habitat temporarily while monitors are in the area. Therefore, no adverse impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed non-flow measures; therefore, impacts could occur but would likely be less than significant, given any initial impacts from construction. Valley Water would apply the same BMPs and VHP conditions, applied during measure construction, as appropriate.

Significance Conclusion Summary

FAHCE-plus Alternative effects to special-status species are expected to be very rare. Although potentially present, it is unlikely that the changes in flows would have substantial adverse effects on special-status wildlife species, given the timing and ramping rates implemented. Aquatic special-status wildlife could be affected, but impacts would be less than significant. Overall, flow measures would result in at most **less-than-significant** impacts to special-status plants and wildlife.

As non-flow measures identified in the FAHCE-plus Alternative are further planned and designed, project-specific environmental review would be conducted by Valley Water or other agencies responsible for implementing such projects. Nevertheless, this alternative could have adverse impacts to special-status species if present. Valley Water would apply the BMPs and VHP conditions, as appropriate, to minimize impacts. Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions; however, there is a potential for disturbance and other adverse impacts that could be **significant** as they could be substantial for special-status species.

Mitigation

To reduce impacts of the FAHCE-plus Alternative to an identified candidate, sensitive, listed, or special-status species, Valley Water would implement the following mitigation measures as detailed in Section 3.8.4 of this EIR. These mitigation measures may be adjusted in the future to better address project-specific environmental resources.

- **MM TERR-1a:** Biological Resources Screening and Assessment Payment of VHP Impact Fees

- **MM TERR-1b:** Endangered/Threatened Species Habitat Assessment and Protocol Surveys
- **MM TERR-1c:** Nesting Avian Species Avoidance and Minimization
- **MM TERR-1d:** Payment of VHP Impact Fees
- **MM TERR-1e:** Implement Compensatory Mitigation for Special-status Plant Species for Areas Outside or Activities Not Covered by the VHP

Significance after Mitigation

With the implementation MM TERR-1a, MM TERR-1b, MM TERR-1c, MM TERR-1d, and MM TERR-1e, actions would be taken to substantially avoid or minimize impacts to special-status species during implementation of non-flow measures. Impact TERR-1 would be reduced to a **less-than-significant** level with mitigation because substantial adverse effects on these species would be prevented.

4.11.3.2 Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS (less than significant with mitigation)[8]

Flow Measures Impact Analysis

The effects of the flow measures on riparian natural communities would be limited to those rare occasions when flows exceed the channel capacity. The use of ramping rates to increase and decrease flows would limit the level of potential impacts as changes in the hydrology would be gradual. Riparian communities are adapted to flood events, and some plant species needing high water events to germinate or spread seeds could benefit from these flows. Also, summer base flows would help to keep water in streams during drier periods, maintaining associated groundwater. This availability will help certain species during periods of environmental stress, providing long-term benefits.

The effects of the flow measures on riparian species would be the same as the effects currently experienced by riparian species because proposed flows are similar to current flow regimes in the study area. The proposed flow measures could affect sensitive plant communities that are within and directly adjacent to the creeks that would be subject to flow regime changes. However, the proposed flow measures would be consistent with the historical seasonal changes in flow and inundation in the riparian and marsh communities. The potential for invasive species from upstream creeks and reservoirs to relocate to the study area with the flow measures would not differ from current conditions given that the source populations currently have the ability to move through the study area during high flows. Therefore, it is unlikely that flow measures associated with the FAHCE-plus Alternative would result in an increase in invasive species. Therefore, there would be no impact.

Non-flow Measures Impact Analysis

This section assesses the impacts from the FAHCE-plus Alternative. Impacts from the FAHCE-plus Alternative would be the same as the Proposed Project. The non-flow measures included in the FAHCE-plus Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The impacts from each of these non-flow measures are discussed in the sections below.

[8] Impact conclusion provided after consideration of mitigation.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land cover types. The Fremont Fish Ladder area is located in urban-suburban land cover types with some areas of valley foothill riparian habitat upstream and downstream.

The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe Creek in annual grasslands, blue oak woodlands, and coastal oak and coastal live oak forest and woodlands. On Alamitos Creek, the projects would likely occur in mixed riparian forest and woodland and coastal live oak forest and woodland.

Sensitive natural communities would be temporarily affected by construction equipment for the Project. Access would be developed to move equipment to the specific area requiring work. Access development and construction activities could result in vegetation clearing; tree removal for access and construction; pruning; trampling of vegetation by equipment; and fill, dust, and alteration of microhabitat conditions during restoration and enhancement activities. In addition, the creation of staging areas could result in the mechanical or physical removal of vegetation and modification of the seed bank as a result of grading, although these areas would be sited outside sensitive resource areas to the extent possible. Furthermore, minor fuel and oil spills could occur during equipment or vehicle operation or refueling, in addition to the risk of larger accidental releases. Without rapid containment and cleanup, these materials could kill or impair the health of plants in these sensitive communities.

The use of vehicles could transport invasive plants or their seed to the location, which could spread in the disturbed area. Because many invasive plants are able to easily colonize recently disturbed areas and/or tolerate repeated disturbance better than many native plants, construction activities associated with non-flow measures, such as clearing and grading, might create conditions suitable for additional spreading of invasive plant species. In addition, bare upland soils left after construction of temporary staging areas might encourage growth of weedy species, and mulching or erosion-control mixes might include, and thus introduce, invasive, nonnative plant species. Further, nonnative plant species could temporarily benefit from any dewatering associated with the measures.

All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Project's effects on plants and vegetation by ensuring that, prior to Project activities and during the appropriate bloom period to detect plants, a qualified botanist would perform a survey of the Project area(s), identify sensitive natural vegetation communities, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the Project's effects on plants and vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory. Implementation of Valley Water BMPs would also reduce impacts on plants and vegetation by using local ecotypes of native plants for revegetation and erosion control, and by using appropriate equipment when working in streams. Lastly, implementation of BMPs GEN-30, GEN-31, and GEN-32 would reduce impacts on terrestrial biological resources by implementing multiple actions to limit the effects of dewatering, refueling, and equipment maintenance on native plants.

In addition to these BMPs, adherence to VHP conditions 3, 4, 5, 7, 8, 11, and 14, where applicable, would minimize and reduce the FAHCE-plus Alternative effects from non-flow-measures on non-serpentine special-status plants by avoiding direct impacts on special-status plants and their habitats. Valley Water also would add measures similar to the applied Valley Water BMPs as conditions of funding agreements for those projects owned by others.

Implementation of Valley Water BMPs VEG-1, VEG-2, VEG-3, VEG-6, WQ-9, and HM-1 would reduce the potential for invasive species to spread or become established. BMP BIO-9 requires Valley Water to consult with a qualified biologist or vegetation specialist to determine what planting seed options are ecologically appropriate and effective whenever native species are prescribed for installation. This measure would minimize the introduction of ecologically inappropriate seed mixes (for example, ones that could include nonnative invasive plant seeds) into areas of the Project site(s) that are revegetated following completion of construction activities (for example, work related to development of construction laydown areas, construction staging areas, and access roads). BMPs VEG-1, VEG-2, VEG-3, and VEG-6 would reduce areas where exotic species could become established though proper use of equipment, removal of invasive plant species, and prevention of unwanted grazing in stream areas. BMP HM-1 requires vehicles (for example, construction vehicles and equipment) to be washed only at approved areas and not at work areas. This measure would minimize the spread of nonnative invasive plants (for example, via seeds and flowers) or wildlife (for example, nonnative mussel species) into the Project site.

In applicable areas, the FAHCE-plus Alternative would adhere to VHP condition 7, which would "minimize the potential direct and indirect impacts of rural development in areas that would remain primarily rural on covered species and natural communities most likely to be affected by rural development" (ICF 2012). However, a secondary goal of this VHP condition is to minimize construction-related impacts of VHP-covered projects, including minimizing the introduction of nonnative, invasive species. This condition requires that all temporarily disturbed soils in the areas of VHP-covered projects, including most of the FAHCE-plus Alternative, be revegetated with native plants and/or grasses, or sterile nonnative species suitable for the altered soil conditions upon completion of construction. Local watershed native plants would be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixes must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. All disturbed areas that have been compacted would be decompacted prior to planting or seeding (ICF 2012).

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be significant as they could be substantial.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Representative sites identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. The proposed Stevens Creek site is located within oak woodland and valley foothill riparian habitat. The Guadalupe Creek sites are located within annual grasslands and oak woodlands. The Guadalupe River site includes a small riparian habitat area surrounded by development. Finally, the Los Gatos Creek sites include valley foothill riparian and scrub, as well as urban development.

Impacts to sensitive natural communities would be the same as described above for fish barrier remediation projects. All attempts would be made to limit impacts to sensitive areas. However, temporary impacts to riparian and other habitats will be unavoidable as they are the only way to access the project areas. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the Project's effects on sensitive natural communities by ensuring that, prior to FAHCE-plus Alternative activities and during the appropriate bloom period to detect plants, a qualified botanist would perform a survey of the Project area(s), identify sensitive natural vegetation communities, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-5, WQ-6, WQ-13, and WQ-14 would minimize the FAHCE-plus Alternative's effects on plants and vegetation by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds within the understory. Implementation of Valley Water BMPs would also reduce impacts on plants and vegetation by using local ecotypes of native plants for revegetation and erosion control, and by using appropriate equipment when working in streams. Lastly, implementation of BMPs GEN-30, GEN-31, and GEN-32 would reduce impacts on terrestrial biological resources by implementing multiple actions to limit the effects of dewatering, refueling, and equipment maintenance on native plants.

In addition to these BMPs, adherence to VHP conditions 3, 4, 5, 7, 8, 11, and 14, where applicable, would minimize and reduce the FAHCE-plus Alternative effects from non-flow-measures on non-serpentine special-status plants by avoiding direct impacts on special-status plants and their associated sensitive natural communities. Valley Water also would add measures similar to the applied Valley Water BMPs as conditions of funding agreements for those projects owned by others. However, although most impacts could be reduced by using BMPs and VHP conditions, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be significant as they could be substantial.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact to special-status species, as the project would take place in disturbed areas related to the dam.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts to special-status plants could occur if they are within the restoration areas. All attempts would be made to avoid sensitive natural communities as described for other non-flow measures. However, although most impacts could be reduced by using BMPs and VHP conditions, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be significant as they could be substantial.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would likely only require foot access to areas, and impacts to sensitive natural communities would be avoided. Therefore, no impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed non-flow measures; therefore, impacts could occur but would likely be less than significant given any initial impacts from construction.

Significance Conclusion Summary

Overall, there would therefore be **no adverse impact** to riparian habitat and other sensitive natural communities as a result of the proposed flow measures. The effects of the flow measures on riparian natural communities would be limited to those rare occasions when flows exceed the channel capacity. The use of ramping rates to increase and decrease flows would limit the level of potential impacts as changes in the hydrology would be gradual. Riparian communities are adapted to flood events; some plant species need high water events to germinate or spread seeds and could benefit from these flows.

Non-flow measures could result in limited temporary impacts to riparian and other sensitive natural communities, where complete avoidance could not be accomplished, as well as temporal loss of riparian functions and values in the areas disturbed. However, after construction is completed, the areas would be replanted and restored. Implementation of Valley Water's BMPs and VHP conditions listed above would further reduce these impacts. However, there is a potential for disturbance and other adverse impacts to sensitive natural communities where impacts cannot be fully avoided. Therefore, there is a potential that adverse impacts could be **significant** as they could be substantial.

Mitigation

No mitigation would be required to reduce impacts to a less-than-significant level. Valley Water will implement MM TERR-1a and MM TERR-1b, and TERR-1d and TERR-1e (if necessary) for unavoidable construction impacts from non-flow measures on sensitive natural communities. These mitigation measures are described for Impact TERR-1. These mitigation measures may be adjusted in the future to better address project-specific environmental resources.

Significance after Mitigation

Impacts identified under Impact TERR-2 to riparian habitat and sensitive communities would be reduced to a **less-than-significant** level through implementation of MM TERR-1a and MM TERR-1b, and TERR-1d and TERR-1e (if necessary), which would provide for avoidance and compensatory mitigation for these impacts as detailed in Sections 3.8.4.1 and 3.8.4.2 of this EIR, assuring that substantial adverse effects on riparian habitat and sensitive communities would be prevented.

4.11.3.3 Impact TERR-3: Have a substantial adverse effect state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means (less than significant with mitigation)[9]

Flow Measures Impact Analysis

Impacts on wetlands and other waters of the U.S. and the state from the FAHCE-plus Alternative would be limited to those resulting from modification of the flows. The proposed flow measures would be similar to current flow regime in the creeks. The physical channel (bed and bank) and water column that make up the waters of the U.S. in the study area would not be dewatered, filled, reduced in size, or otherwise physically modified with the flow measure relative to current conditions. Winter and summer base flows would provide additional water to the stream and adjacent wetlands, providing additional water during drier periods and helping to sustain wetland functions seasonally. Overall, there would be no impact to state or federally protected wetlands from the proposed flow measures

Non-flow Measures Impact Analysis

This section assesses the impacts from the FAHCE-plus Alternative. Impacts from FAHCE-plus Alternative would be the same as the Proposed Project. The non-flow measures included in the FAHCE-plus Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The impacts from each of these non-flow measures are discussed in the sections below.

[9] Impact conclusion provided after consideration of mitigation.

The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality. The impacts from each of these non-flow measures are discussed in the sections below. Any adverse impacts would be from construction and access to the area.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land cover types. The Fremont Fish Ladder area is located in urban-suburban land cover types with some areas of valley foothill riparian habitat upstream and downstream. The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe and Alamitos Creeks.

Any impacts to wetlands would be temporary in nature and occur only during construction. The placement of fill (for example, for cofferdams and temporary access roads), temporary hydrological interruption (for example, dewatering and diversion), degradation of water quality (for example, increased sedimentation and turbidity), removal of vegetation, and other ground-disturbing activities could have direct impacts on jurisdictional wetlands and other waters of the U.S or state. Furthermore, minor fuel and oil spills could occur during equipment or vehicle operation or refueling, in addition to the risk of larger accidental releases. Without rapid containment and cleanup, these materials could kill or impair the wetlands.

The use of vehicles could transport invasive plants or their seed to the location, which could spread in the disturbed area. Because many invasive plants are able to easily colonize recently disturbed areas and/or tolerate repeated disturbance better than many native plants, construction activities associated with non-flow measures, such as clearing and grading, might create conditions suitable for additional spreading of invasive plant species. In addition, bare upland soils left after construction of temporary staging areas might encourage growth of weedy species, and mulching or erosion-control mixes might include, and thus introduce, invasive, nonnative plant species. Further, nonnative plant species could temporarily benefit from any dewatering associated with the measures.

All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the FAHCE-plus Alternative's effects on all vegetation that could be considered wetland vegetation. Prior to activities, a qualified botanist would perform a survey of sensitive natural vegetation communities and wetlands in the Project area, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-4, WQ-5, and WQ-9 would minimize the FAHCE-plus Alternative's effects on wetlands by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds. Implementation of Valley Water BMPs BI-3, BI-7, BI-8, and VEG-3 would also reduce impacts on wetland habitat by removing any temporary fills, minimizing impacts on vegetation from survey work, using local ecotypes of native plants for revegetation and erosion control, and using appropriate equipment when working in or adjacent to streams.

The FAHCE-plus Alternative would adhere to VHP conditions 3, 4, 5, 7, 8, 11, and 12, where applicable, which would reduce impacts on waters and wetlands within the covered areas by minimizing impacts on these areas, avoiding and reducing impacts on instream biota and water quality, preventing the introduction or spread of invasive weeds, and avoiding wetland areas where feasible.

Prior to ground-disturbing activities occurring within or adjacent to wetlands or other areas that may fall under the jurisdiction of USACE or SWRCB, Valley Water will retain a qualified wetland scientist to complete a jurisdictional delineation of the area. The delineation will identify areas to be protected, permitted, or mitigated through implementation of project-specific mitigation measures. Where feasible and appropriate, all jurisdictional aquatic resources not directly affected by construction activities will be avoided and protected by establishing staking, flagging, or fencing between the identified construction areas and aquatic resources to be avoided and/or preserved.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Therefore, there is a potential that short-term adverse impacts could be significant as they could be substantial.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Representative sites identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek. The proposed Stevens Creek site is located within oak woodland and valley foothill riparian habitat. The Guadalupe Creek sites are located within annual grasslands and oak woodlands. The Guadalupe River site includes a small riparian habitat area surrounded by development. Finally, the Los Gatos Creek sites include valley foothill riparian and scrub, as well as urban development.

Impacts to wetlands would be the same as described above for fish barrier remediation projects. All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the FAHCE-plus Alternative's effects on all vegetation that could be considered wetland vegetation. Prior to activities, a qualified botanist would perform a survey of sensitive natural vegetation communities and wetlands in the Project area, and clearly map or delineate them as needed to avoid and/or minimize disturbance. Implementation of Valley Water BMPs WQ-1, WQ-4, WQ-5, and WQ-9 would minimize the FAHCE-plus Alternative's effects on wetlands by limiting disturbance, preventing erosion and sedimentation, and minimizing the introduction or spread of invasive weeds. Implementation of Valley Water BMPs BI-3, BI-7, BI-8, and VEG-3 would also reduce impacts on wetland habitat by removing any temporary fills, minimizing impacts on vegetation from survey work, using local ecotypes of native plants for revegetation and erosion control, and using appropriate equipment when working in or adjacent to streams.

The FAHCE-plus Alternative would adhere to VHP conditions 3, 4, 5, 7, 8, 11, and 12, where applicable, which would reduce impacts on waters and wetlands within the covered areas by minimizing impacts on these areas, avoiding and reducing impacts on instream biota and water quality, preventing the introduction or spread of invasive weeds, and avoiding wetland areas where feasible.

Prior to ground-disturbing activities occurring within or adjacent to wetlands or other areas that may fall under the jurisdiction of USACE or SWRCB, Valley Water will retain a qualified wetland scientist to complete a jurisdictional delineation of the area. The delineation will identify areas to be protected, permitted, or mitigated through implementation of project-specific mitigation measures. Where feasible and appropriate, all jurisdictional aquatic resources not directly affected by construction activities will be avoided and protected by establishing staking, flagging, or fencing between the identified construction areas and aquatic resources to be avoided and/or preserved.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Therefore, there is a potential that short-term adverse impacts could be significant as they could be substantial.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impact to wetlands, as the project would take place in disturbed areas related to the dam.

Implementation of non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts to wetlands could occur if they are within the restoration areas. All attempts would be made to avoid wetlands as described for other non-flow measures.

Prior to ground-disturbing activities occurring within or adjacent to wetlands or other areas that may fall under the jurisdiction of USACE or SWRCB, Valley Water will retain a qualified wetland scientist to complete a jurisdictional delineation of the area. The delineation will identify areas to be protected, permitted, or mitigated through implementation of project-specific mitigation measures. Where feasible and appropriate, all jurisdictional aquatic resources not directly affected by construction activities will be avoided and protected by establishing staking, flagging, or fencing between the identified construction areas and aquatic resources to be avoided and/or preserved.

Based on the previous discussion, most impacts could be reduced by using BMPs and VHP conditions. However, there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Therefore, there is a potential that short-term adverse impacts could be significant as they could be substantial.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would likely only require foot access to areas, and impacts to wetlands would be avoided. Therefore, no impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed flow and non-flow measures; therefore, impacts could occur but would likely be less than significant given any initial impacts from construction.

Significance Conclusion Summary

The FAHCE-plus Alternative could result in temporary impacts to wetland functions and values. Winter and summer base flows would provide additional water to the stream and adjacent wetlands, providing additional water during drier periods and helping to sustain wetland functions seasonally. Even with the implementation of Valley Water BMPs and VHP conditions, it may not be possible to completely avoid impacts to jurisdictional waters and wetlands, so there is a potential for disturbance and other adverse impacts to wetlands where impacts cannot be fully avoided. Although impacts could be reduced, there is a potential for disturbance and other temporary **significant** adverse impacts as they could be substantial to wetlands.

Mitigation

Valley Water would implement MM TERR-1d and MM TERR-2. These mitigation measures may be adjusted in the future to better address project-specific environmental resources.

Significance Conclusion Summary

FAHCE-plus Alternative-related impacts on wetlands and other waters of the U.S. and state would be reduced to a **less-than-significant** level through implementation of MM TERR-1d and MM TERR-2. After mitigation, the FAHCE-plus Alternative would not have a substantial adverse effect on jurisdictional wetlands and other waters, including federal and state protected wetlands.

4.11.3.4 Impact TERR-4: Interfere substantially with the movement of any native resident or migratory terrestrial species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites (less than significant)

Flow Measures Impact Analysis

Winter and summer base flows and spring pulse flows under the FAHCE-plus Alternative would not adversely affect wildlife movements or any known wildlife corridors, as flows would remain within the channel, and only rarely top the bank on Calero Creek. Ramping rates would increase and decrease flows slowly enough for wildlife to adjust travel if necessary. The increased flows would provide benefits to wildlife by providing additional water during dry periods. With respect to terrestrial nursery sites, there are no known sites within the portions of the study area that would be affected by flow measures. There would therefore be no impact to native wildlife movement or corridors or on the use of nursery sites as a result of the Proposed Project flow measures.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the FAHCE-plus Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality. The impacts from each of these non-flow measures are discussed in the sections below. Any adverse impacts would be from construction and access to the area.

Fish Barrier Remediation

The fish barrier projects to be implemented on Stevens Creek are located at the Moffett Fish Ladder and the Fremont Fish Ladder. The Moffett Fish Ladder location is just south of Highway 101 in urban-suburban land cover types. The Fremont Fish Ladder area is located in urban-suburban land cover types with some areas of valley foothill riparian habitat upstream and downstream. The barrier remediation projects proposed in the Guadalupe River portion of the study area are located in Guadalupe and Alamitos Creeks.

By creating open areas or patches with unsuitable vegetation types, grading and excavation activities could temporarily restrict some wildlife species from moving between suitable habitat patches. In addition, noise and disturbance associated with construction activities could cause species that commonly use habitats on the project site(s) for dispersal to at least temporarily avoid dispersal through the project site(s). This would most likely occur with small mammals, amphibians, and reptiles with reduced range mobility. Once construction activities are complete, however, wildlife movement conditions would be similar to or better than pre-project conditions, and wildlife dispersal through the Project site would return to the existing condition, or one that better facilitates movement by eliminating hardscape and grade separation. Larger, more mobile wildlife species would likely avoid construction activities and skirt the areas of disturbance.

The impact area would be limited to only the area needed for Project construction. These areas are discrete locations that would be subjected to limited construction activities and would not experience substantial permanent habitat removal or the introduction of structures that would block, remove, or otherwise substantially impact the ability of wildlife to disperse through the project site(s) and use existing wildlife corridors or breeding and rearing sites.

Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the FAHCE-plus Alternative's effects on riparian vegetation that could be used as wildlife corridors by avoiding and/or minimizing disturbance. The FAHCE-plus Alternative would also adhere to VHP conditions 7 and 11, which would reduce FAHCE-plus Alternative impacts on wildlife corridors within the covered areas by minimizing impacts on sensitive land cover types, avoiding or reducing impacts on riparian habitat, preventing the introduction or spread of invasive weeds, and providing setbacks to riparian vegetation where possible. Although impacts could be minimized, there is a potential for disturbance and other temporary adverse impacts, though they would be less than significant as they would not likely interfere substantially with wildlife movement, established wildlife corridors, or impede the use of nursery sites.

Enhancement of Spawning and Rearing Habitat

Instream habitat enhancement projects include installation of rock or log weirs to improve habitat complexity or passage, installation of root wads or LWD to provide cover, and placement of appropriately sized gravels within the limits of the bank channel. Representative sites identified for these enhancement projects are in Stevens Creek, Guadalupe Creek, Guadalupe River, and Los Gatos Creek.

Impacts to wildlife movement, established wildlife corridors, or the use of nursery sites would be the same as described above for fish barrier remediation projects. All attempts would be made to limit impacts. Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the FAHCE-plus Alternative's effects on riparian vegetation that could be used as wildlife corridors by avoiding and/or minimizing disturbance. The FAHCE-plus Alternative would also adhere to VHP conditions 7 and 11, which would reduce FAHCE-plus Alternative impacts on wildlife corridors within the covered areas by minimizing impacts on sensitive land cover types, avoiding or reducing impacts on riparian habitat, preventing the introduction or spread of invasive weeds, and providing setbacks to riparian vegetation where possible. Although impacts could be minimized, there is a potential for disturbance and other temporary adverse impacts, though they would be less than significant as they would not likely interfere substantially with wildlife movement, established wildlife corridors, or impede the use of nursery sites.

Other Non-flow Measures

The Stevens Creek Multiport Project would have no impacts on wildlife movement, established wildlife corridors, or the use of nursery sites, as the project would take place in disturbed areas related to the dam.

Implementation of Phase 1 non-flow measures in the Guadalupe River watershed includes projects to restore geomorphic function, which may include, but not be limited to, modification of channel dimensions and shape, installation of rock or log weirs to improve habitat complexity or passage, and installation of root wads or LWD to provide cover. Similar to the spawning and rearing habitat enhancement and restoration measures, impacts to wildlife movement, established wildlife corridors, or the use of nursery sites could occur if they are within the restoration areas. All attempts would be made to avoid impacts as described for other non-flow measures.

Implementation of Valley Water BMPs GEN-4, GEN-9, and GEN-21 would minimize the FAHCE-plus Alternative's effects on riparian vegetation that could be used as wildlife corridors by avoiding and/or minimizing disturbance. The FAHCE-plus Alternative would also adhere to VHP conditions 7 and 11, which would reduce FAHCE-plus Alternative impacts on wildlife corridors within the covered areas by minimizing impacts on sensitive land cover types, avoiding or reducing impacts on riparian habitat, preventing the introduction or spread of invasive weeds, and providing setbacks to riparian vegetation where possible. Although impacts could be minimized, there is a potential for disturbance and other temporary adverse impacts, though they would be less than significant as they would not likely interfere substantially with wildlife movement, established wildlife corridors, or impede the use of nursery sites.

Monitoring, Maintenance, and Adaptive Management

Monitoring activities would likely only require foot access to areas, and impacts to wildlife movement, established wildlife corridors, or the use of nursery sites would be avoided. Therefore, no impacts are expected from monitoring. Maintenance and AMP measures would be similar in nature to the proposed flow and non-flow measures; therefore, impacts could occur but would likely be less than significant, given any initial impacts from construction.

Significance Conclusion Summary

The proposed flow measures would be similar to current flow regime in the creeks. Winter and summer base flows would provide additional water to the stream and adjacent wetlands, providing additional water during drier periods and helping to sustain wetland functions seasonally. Flow measures would not interfere substantially with the movement of any native resident or migratory species, with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife breeding or rearing sites; therefore, there would be **no impact** from flow measures, and no mitigation is required.

Implementation of non-flow measures would impact terrestrial wildlife movement during construction; however, these impacts would be temporary, as animals would continue to move through the project site(s) following project completion. The ability of animals to move through the project site(s) following project completion would be similar to current conditions and would be improved by the channel-enhancement activities, including riparian restoration, creating a **beneficial** impact. Thus, the proposed non-flow measures would not interfere substantially with the movement of any native wildlife species or with established native terrestrial wildlife corridors, or impede the use of native wildlife breeding or rearing sites. In addition, implementation of the BMPs and VHP conditions would help reduce Project impacts on wildlife movement. Based on the above analysis, Impact TERR-4 would be **less than significant**.

Mitigation

No mitigation would be required for Impact TERR-4.

4.11.3.5 Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance (less than significant with mitigation)[10]

Flow Measures Impact Analysis

The proposed flow measures of the FAHCE-plus Alternative would not conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance. Increases in flows would be ramped up and down at rates primarily to reduce impacts to aquatic species. These ramping rates would also avoid eroding stream banks and washing out or stranding aquatic species. These ramping rates would be slower than what would be experienced naturally in a storm event. The proposed flows would also not reduce water availability but could increase water sources during dry times. There would therefore be no impact to local policies or ordinances protecting biological resources as a result of the proposed flow measures.

Non-flow Measures Impact Analysis

This section assesses the impacts from non-flow measures. The non-flow measures included in the FAHCE-plus Alternative analyzed in this section are fish barrier remediation, enhancement of spawning and rearing habitat, and implementation of other non-flow measures specific to each of the Stevens Creek and Guadalupe River watershed study areas. The proposed non-flow measures are intended to improve the quality of aquatic habitat in the two watersheds by enhancing physical conditions in the channels, improving water quality, removing fish-passage barriers, and ensuring proper maintenance of key facilities to improve functionality. The impacts from each of these non-flow measures are discussed in the sections below. Any adverse impacts would be from construction and access to the area.

With the exception of tree removal related to construction of non-flow measures, the results of the non-flow measures would be a benefit to the biological resources that are the subject of local protection policies. The proposed non-flow measures would improve fish passage; stabilize and improve geomorphic functions of the watersheds; preserve and restore rare, sensitive, and special-status habitats and species; maintain the existing character of the specific project area(s); retain and/or enhance the existing form of existing creek channels; avoid excessive grading and disturbance of vegetation and soils; maintain natural drainage patterns; and enhance the functions and values of creeks and adjacent vegetation. These actions and the resulting biological benefits would inherently be consistent with applicable local policies designed to protect biological resources.

As detailed in the section for Impact TERR-2a, the non-flow measures would only result in temporary impacts on trees in portions of the study area that are identified for construction activities. In addition, Valley Water would implement BMP GEN-4, limiting impacts to the minimum area required, to address the impact of the FAHCE-plus Alternative on ordinance trees, and would comply with the applicable requirements of local tree ordinances. However, complete avoidance of these trees may not be practicable for individual projects; therefore, impacts could be significant.

Monitoring, Maintenance, and Adaptive Management

The effects of monitoring, maintenance, and AMP activities of habitat improvements would not conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance. Any impacts would be similar to those experienced during construction.

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[10] Impact conclusion provided after consideration of mitigation.

Significance Conclusion Summary

The proposed flow measures would be similar to current flow regime in the creeks. Winter and summer base flows would provide additional water to the stream and adjacent wetlands, providing additional water during drier periods and helping to sustain wetland functions seasonally. Flow measures would not conflict with any applicable provisions of local policies or ordinances protecting biological resources. Impact TERR-5 would be **no impact**, and no mitigation is required.

To limit impacts from non-flow measures, implementation of BMP GEN-4 would minimize the loss of ordinance trees where tree ordinances apply to Valley Water, but complete avoidance of these trees may not be practicable. Complete avoidance of these trees may not be practicable for individual projects; therefore, impacts could be **significant** with any applicable provisions of local policies or ordinances protecting trees.

Mitigation

No mitigation would be required to reduce flow measures impacts.

Mitigation measures for trees related to non-flow measures would help meet applicable provisions of local policies and ordinances protecting trees. Valley Water would implement MM TERR-3: Tree Replacement, described in Section 3.8.4.5. These mitigation measures may be adjusted in the future to better address Project-specific environmental resources.

Significance after Mitigation

Implementation of MM TERR-3, as detailed in Section 3.8.4.5 of this EIR, would mitigate impacts on ordinance-defined trees to a **less-than-significant** level by replacing trees that cannot be avoided, if required by applicable ordinances, so that the FAHCE-plus Alternative does not conflict with the applicable provisions of local tree ordinances.

4.11.3.6 Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan (less than significant)

Flow Measures Impact Analysis

The FAHCE-plus Alternative's flow activities would not be in conflict with any adopted HCPs or NCCPs, or with any other approved local, regional, or state HCPs. As a result, there would be no impact.

Non-flow Measures Impact Analysis

All impacts on VHP-covered species that could be affected by the non-flow measures are discussed in this EIR. Similarly, impacts on sensitive habitats, such as stream, wetland, riparian, and serpentine habitats, for which the VHP requires specific impact fees, are discussed in this EIR. Valley Water would apply for VHP coverage for covered activities, and would adhere to all applicable VHP conditions during Project implementation. Therefore, the Proposed Project would have no impact.

Monitoring, Maintenance, and Adaptive Management

The effects of monitoring, maintenance, and AMP activities of habitat improvements would not conflict with, but rather comply with, the VHP. Therefore, there would be no impact.

Significance Conclusion Summary

The FAHCE-plus Alternative’s flow measures, non-flow measures, and monitoring would not be in conflict with any adopted HCPs or NCCPs, or with any other approved local, regional, or state HCPs. Therefore, Impact TERR-6 would be **no impact**.

Mitigation

No mitigation would be required for Impact TERR-6.

4.12 Impact Analysis on Cultural Resources

This section assesses the impacts on cultural resources from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. The alternatives impact assessment for cultural resources follows the same methodology as laid out for the Proposed Project analysis in Section 3.9.3.

Table 4.12-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.9, *Cultural Resources*.

Table 4.12-1. Alternative Impacts Comparison Summary for Cultural Resources

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built-Environment Resources	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built-Environment Resources	Non-flow Measures	S/U	NI (-)	S/U (=)	S/U (=)
Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources	Non-flow Measures	S/U	NI (-)	S/U (=)	S/U (=)
Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)

Notes: LTS = less-than-significant impact, NI = no impact, S/U = significant and unavoidable impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.12.1 No Project Alternative

Under the No Project Alternative, there would be no changes to the managed flow volumes in the Stevens Creek and Guadalupe River watersheds, and the non-flow measures of the Proposed Project would not be implemented. There would be no monitoring implemented under the No Project Alternative. This section evaluates the impacts associated with the No Project Alternative on cultural resources.

4.12.1.1 Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built-Environment Resources (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no substantial adverse change in the significance of a historical built-environment resource. As a result, there would be no impact.

Non-flow Measures Impact Analysis

No non-flow measures would be implemented under the No Project Alternative. For this reason, under the No Project Alternative, there would be no substantial adverse change in the significance of a historical built-environment resource. As a result, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

No monitoring, maintenance, or adaptive management measures would be implemented under the No Project Alternative. For this reason, under the No Project Alternative, there would be no substantial adverse change in the significance of a historical built-environment resource. As a result, there would be no impact.

Significance Conclusion Summary

Under the No Project Alternative, there would be no substantial adverse change in the significance of a historical built-environment resource. The No Project Alternative would have **no impact** to historical built-environment resources.

4.12.1.2 Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no substantial adverse change in the significance of an archaeological resource. As a result, there would be no impact.

Non-flow Measures Impact Analysis

Under the No Project Alternative, the non-flow measures of the Proposed Project would not be implemented. For this reason, there would be no substantial adverse change in the significance of an archaeological resource. As a result, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

No monitoring, maintenance, or adaptive management measures would be implemented under the No Project Alternative. For this reason, under the No Project Alternative, there would be no substantial adverse change in the significance of an archaeological resource. As a result, there would be no impact.

Significance Conclusion Summary

Under the No Project Alternative, there would be no substantial adverse change in the significance of an archaeological resource. The No Project Alternative would have **no impact** to archaeological resources.

4.12.1.3 Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no disturbance to any human remains, including those interred outside of dedicated cemeteries. As a result, there would be no impact.

Non-flow Measures Impact Analysis

Under the No Project Alternative, the non-flow measures of the Proposed Project would not be implemented. For this reason, there would be no disturbance to any human remains, including those interred outside of dedicated cemeteries. As a result, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

No monitoring, maintenance, or adaptive management measures would be implemented under the No Project Alternative. For this reason, under the No Project Alternative, there would be no substantial adverse change in the significance of human remains, including those interred outside of dedicated cemeteries. As a result, there would be no impact.

Significance Conclusion Summary

Under the No Project Alternative, there would be no disturbance to any human remains, including those interred outside of dedicated cemeteries. The No Project Alternative would have **no impact** to any human remains.

4.12.2 Non-flow Measures Only Alternative

The impacts of the Non-flow Measures Only Alternative to built-environment and archaeological resources would be the same as the non-flow measures impacts identified in Section 3.9.4; that is, impacts on cultural resources could result from the non-flow measures, monitoring, and maintenance of habitat improvements. These elements of the Non-flow Measures Only Alternative include actions that cause ground disturbance that could affect built-environment and archaeological resources, as described below. There would be no change in managed flow volumes; therefore, the Non-flow Measures Only Alternative would have no impact to built-environment and archaeological resources from flow measures.

4.12.2.1 Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built-Environment Resources (significant and unavoidable)[11]

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to cultural resources.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.9.3 for the non-flow measures, actions associated with the non-flow measures could cause significant impacts on CRHR-eligible resources that are part of the built environment as a result of removal, construction, or barrier maintenance activities that could either destroy or modify elements that contribute to the eligibility of a particular resource.

Monitoring, Maintenance, and Adaptive Management

Impacts of monitoring, maintenance, and adaptive management measures would be the same as for the Proposed Project. As discussed in Section 3.9.3, these measures implemented under the Non-flow Measures Only Alternative could cause significant impacts on CRHR-eligible resources that are part of the built environment, possibly via removal, construction, or barrier maintenance activities that could either destroy or modify elements that contribute to the eligibility of a particular resource. While monitoring and adaptive management would not affect historic resources, maintenance could cause significant impacts on historic resources as these activities could mirror those of the Non-flow Measures Only Alternative.

Significance Conclusion Summary

A substantial adverse change in the significance of a historic built-environment resources from the Non-flow Measures Only Alternative would be **significant**.

Mitigation

To reduce impacts of the Non-flow Measures Only Alternative on historical built-environment resources, Valley Water would implement the following mitigation measures as detailed in Section 3.9.4 of this EIR:

- **MM-CUL-1a:** Conduct Cultural Resources Studies and Avoid Impacts on Built Environment Resources
- **MM-CUL-1b:** Follow the Secretary of the Interior's Standards for the Treatment of Historic Properties
- **MM-CUL-1c:** Record Built Environment Resources to Historic American Buildings Survey and Historic American Engineering Record Standards

Significance after Mitigation

Implementing MMs CUL-1a or CUL-1b will reduce Impact CUL-1 to a **less-than-significant** level.

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[11] Impact conclusion provided after consideration of mitigation.

Where a built-environment resource can be modified or relocated consistent with the Secretary of the Interior's standards and no further mitigation is required, implementing MM CUL-1b will reduce Impact CUL-1 to a **less-than-significant** level.

Recording a building or structure to HABS/HAER standards as described for MM CUL-1c may not reduce the impact to significant historic buildings and structures to a less-than-significant level; although information about the building or structure would be recorded, the building or structure would still be removed. Where MM CUL-1c must be implemented, Impact CUL-1 would be **significant and unavoidable**. However, HABS/HAER is the current professional standard for mitigating impacts on significant historic structures.

4.12.2.2 Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources (significant and unavoidable)[12]

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to archaeological resources.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.9.3 for the non-flow measures, actions associated with the non-flow measures could cause significant impacts on CRHR-eligible archaeological resources during ground-disturbing activities.

Monitoring, Maintenance, and Adaptive Management

Impacts of monitoring, maintenance, and adaptive management measures would be the same as for the Proposed Project. As discussed in Section 3.9.3, these measures implemented under the Non-flow Measures Only Alternative could cause significant impacts on CRHR-eligible archaeological resources during ground-disturbing activities. While monitoring and adaptive management would not affect archaeological resources, maintenance could cause significant impacts on these resources as these activities could mirror those of the Non-flow Measures Only Alternative.

Significance Conclusion Summary

A substantial adverse change in the significance of an archaeological resource from the Non-flow Measures Only Alternative would be **significant**.

Mitigation

To reduce impacts of the Non-flow Measures Only Alternative on archaeological resources, Valley Water would implement the following mitigation measures as detailed in Section 3.9.4 of this EIR:

- **MM-CUL-2a:** Conduct Cultural Resources Studies and Avoid Impacts on Archaeological Resources
- **MM-CUL-2b:** If Cultural Resources Are Discovered, Immediately Halt Construction and Implement an Accidental Discovery Plan

[12] Impact conclusion provided after consideration of mitigation.

Significance after Mitigation

Implementing BMPs CU-1, GEN-40, and GEN-41 and MMs CUL-2a and CUL-2b will reduce impacts on archaeological resources. However, because this EIR evaluates impacts at the programmatic level, all Project circumstances are not foreseeable; therefore, even with implementation of BMPs CU-1, GEN-40, and GEN-41 and MMs CUL-2a and CUL-2b, Impact CUL-2 would remain **significant and unavoidable**.

4.12.2.3 Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to human remains.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.9.3 for the non-flow measures, actions associated with the non-flow measures have the potential to yield previously undiscovered human remains, including those interred outside of dedicated cemeteries. However, Sections 7050.5 and 8011 of the CHSC and Section 5097 of the California PRC provide measures to protect historic-era and Native American human burials, skeletal remains, and items associated with Native American interments from vandalism and inadvertent destruction. Because Valley Water, as well as all other local and regional agencies, must enforce and abide by the rules and regulations of both the CHSC and the PRC, the non-flow measures, when evaluated with BMPs CU-1, GEN-40, and GEN-41 are considered to have a less-than-significant impact in the case of the discovery of human remains, and no mitigation is required.

Monitoring, Maintenance, and Adaptive Management

Impacts of monitoring, maintenance, and adaptive management measures for the Non-flow Measures Only Alternative would be the same as for the Proposed Project non-flow measures. As discussed in Section 3.9.3, these measures have the potential to yield previously undiscovered human remains, including those interred outside of dedicated cemeteries. While monitoring and adaptive management would not disturb human remains, maintenance could involve ground disturbance and so has the potential to encounter human remains as these activities could mirror those of the FAHCE-plus Alternative. However, Sections 7050.5 and 8011 of the CHSC and Section 5097 of the California PRC provide measures to protect historic-era and Native American human burials, skeletal remains, and items associated with Native American interments from vandalism and inadvertent destruction. Because Valley Water, as well as all other local and regional agencies, must enforce and abide by the rules and regulations of both the CHSC and the PRC, these actions, when evaluated with BMPs CU-1, GEN-40, and GEN-41, are considered to have a less-than-significant impact in the case of the discovery of human remains, and no mitigation is required.

Significance Conclusion Summary

Disturbance to any human remains, including those interred outside of dedicated cemeteries, would be **less than significant**.

Mitigation

No mitigation is required because the impact is less than significant.

4.12.3 FAHCE-plus Alternative

Under the FAHCE-plus Alternative, there would be modifications in the pulse flows as compared to the Proposed Project. The impacts of this modification on cultural resources are discussed below. The non-flow measures of the FAHCE-plus Alternative would be identical to those of the Proposed Project and could affect cultural resources as a result of ground disturbance, as described below. The effects of monitoring and maintenance of habitat improvements are included in the analysis.

4.12.3.1 Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built-Environment Resources (significant and unavoidable)[13]

Flow Measures Impact Analysis

Implementation of the flow measures under the FAHCE-plus Alternative is not associated with modifying, altering, or removing any historical built-environment resources. Although operational changes to nonemergency flow releases could increase sedimentation and erosion in some creeks, these changes in stream flow are based primarily on the seasonal timing of water releases and would not increase sedimentation and erosion beyond the yearly norm. As a result, there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.9.3 for the Proposed Project non-flow measures, non-flow measures implemented under the FAHCE-plus Alternative could cause significant impacts on CRHR-eligible resources that are part of the built environment, possibly via removal, construction, or barrier maintenance activities that could either destroy or modify elements that contribute to the eligibility of a particular resource.

Monitoring, Maintenance, and Adaptive Management

Impacts of monitoring, maintenance, and adaptive management measures would be the same as for the Proposed Project. As discussed in Section 3.9.3, these measures implemented under the FAHCE-plus Alternative could cause significant impacts on CRHR-eligible resources that are part of the built environment, possibly via removal, construction, or barrier maintenance activities that could either destroy or modify elements that contribute to the eligibility of a particular resource. While monitoring and adaptive management would not affect historic resources, maintenance could cause significant impacts on historic resources as these activities could mirror those of the FAHCE-plus Alternative.

Significance Conclusion Summary

A substantial adverse change in the significance of a historical built-environment resources from the FAHCE-plus Alternative would be **significant**.

Mitigation

To reduce impacts of the FAHCE-plus Alternative on historical built-environment resources, Valley Water would implement the following mitigation measures as detailed in Section 3.9.4 of this EIR:

- **MM-CUL-1a:** Conduct Cultural Resources Studies and Avoid Impacts on Built Environment Resources
- **MM-CUL-1b:** Follow the Secretary of the Interior's Standards for the Treatment of Historic Properties

[13] Impact conclusion provided after consideration of mitigation.

- **MM-CUL-1c:** Record Built Environment Resources to Historic American Buildings Survey and Historic American Engineering Record Standards

Significance after Mitigation

Implementing MMs CUL-1a or CUL-1b will reduce Impact CUL-1 to a **less-than-significant** level.

Where a built-environment resource can be modified or relocated consistent with the Secretary of the Interior's standards and no further mitigation is required, implementing MM CUL-1c will reduce Impact CUL-1 to a **less-than-significant** level.

Recording a building or structure to HABS/HAER standards as described for MM CUL-1c may not reduce the impact to significant historic buildings and structures to a less-than-significant level; although information about the building or structure would be recorded, the building or structure would still be removed. Where MM CUL-1c must be implemented, Impact CUL-1 would be **significant and unavoidable**. However, HABS/HAER is the current professional standard for mitigating impacts on significant historic structures.

4.12.3.2 Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources (significant and unavoidable)[14]

Flow Measures Impact Analysis

Implementation of the flow measures under the FAHCE-plus Alternative would not disturb a previously recorded or newly discovered archaeological resource given that ground-disturbing activities are not proposed. Although operational changes to nonemergency flow releases could increase sedimentation and erosion in some creeks, these changes in stream flow are based primarily on the seasonal timing of water releases and would not increase sedimentation and erosion beyond the yearly norm. As a result, there would be no impact to archaeological resources from flow measures.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.9.3 for the Proposed Project non-flow measures, non-flow measures implemented under the FAHCE-plus Alternative could cause significant impacts on CRHR-eligible archaeological resources during ground-disturbing activities.

Monitoring, Maintenance, and Adaptive Management

Impacts of monitoring, maintenance, and adaptive management measures would be the same as for the Proposed Project. As discussed in Section 3.9.3, these measures implemented under the FAHCE-plus Alternative could cause significant impacts on CRHR-eligible archaeological resources during ground-disturbing activities. While monitoring and adaptive management would not affect archaeological resources, maintenance could cause significant impacts on these resources as these activities could mirror those of the FAHCE-plus Alternative.

Significance Conclusion Summary

A substantial adverse change in the significance of an archaeological resource from the FAHCE-plus Alternative would be **significant**.

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[14] Impact conclusion provided after consideration of mitigation.

Mitigation

To reduce impacts of the FAHCE-plus Alternative on archaeological resources, Valley Water would implement the following mitigation measures as detailed in Section 3.9.4 of this EIR:

- **MM-CUL-2a:** Conduct Cultural Resources Studies and Avoid Impacts on Archaeological Resources
- **MM-CUL-2b:** If Cultural Resources Are Discovered, Immediately Halt Construction and Implement an Accidental Discovery Plan

Significance after Mitigation

Implementing MMs CUL-2a and CUL-2b and BMPs CU-1, GEN-40, and GEN-41 will reduce impacts on archaeological resources. However, because this EIR evaluates impacts at the programmatic level, all Project circumstances are not foreseeable; therefore, even with implementation of MMs CUL-2a and CUL-2b, and BMPs CU-1, GEN-40, and GEN-41, Impact CUL-2 would remain **significant and unavoidable**.

4.12.3.3 Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries (less than significant)

Flow Measures Impact Analysis

Implementation of the flow measures under the FAHCE-plus Alternative would not disturb human remains, including those interred outside of dedicated cemeteries given that ground-disturbing activities are not proposed. Although operational changes to nonemergency flow releases could increase sedimentation and erosion in some creeks, these changes in stream flow are based primarily on the seasonal timing of water releases and would not increase sedimentation and erosion beyond the yearly norm. As a result, there would be no impact to human remains.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.9.3 for the Proposed Project non-flow measures, actions associated with the FAHCE-plus Alternative have the potential to yield previously undiscovered human remains, including those interred outside of dedicated cemeteries. However, Sections 7050.5 and 8011 of the CHSC and Section 5097 of the California PRC provide measures to protect historic-era and Native American human burials, skeletal remains, and items associated with Native American interments from vandalism and inadvertent destruction. Because Valley Water, as well as all other local and regional agencies, must enforce and abide by the rules and regulations of both the CHSC and the PRC, the non-flow measures, when evaluated with BMPs CU-1, GEN-40, and GEN-41, are considered to have a less-than-significant impact in the case of the discovery of human remains, and no mitigation is required.

Monitoring, Maintenance, and Adaptive Management

Impacts of monitoring, maintenance, and adaptive management measures for the FAHCE-plus Alternative would be the same as for the Proposed Project non-flow measures. As discussed in Section 3.9.3, these measures have the potential to yield previously undiscovered human remains, including those interred outside of dedicated cemeteries. While monitoring and adaptive management would not disturb human remains, maintenance could involve ground disturbance and so has the potential to encounter human remains as these activities could mirror those of the FAHCE-plus Alternative. However, Sections 7050.5 and 8011 of the CHSC and Section 5097 of the California PRC provide measures to protect historic-era and Native American human burials, skeletal remains, and items associated with Native American interments from vandalism and inadvertent destruction. Because Valley Water, as well as all other local and regional agencies, must enforce and abide by the rules and regulations of both the CHSC and the PRC, these actions, when evaluated with BMPs CU-1, GEN-40, and GEN-41, are considered to have a less-than-significant impact in the case of the discovery of human remains, and no mitigation is required.

Significance Conclusion Summary

While there would be no impact to human remains from flow measures, non-flow measures could disturb human remains, including those interred outside of dedicated cemeteries. Impacts on human remains under the FAHCE-plus Alternative would be **less than significant**.

Mitigation

No mitigation is required because the impact is less than significant.

4.13 Impact Analysis on Tribal Cultural Resources

This section assesses the impacts on tribal cultural resources from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. The alternatives impact assessment for tribal cultural resources follows the same methodology as laid out for the Proposed Project analysis in Section 3.10.3.

Table 4.13-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.10, *Tribal Cultural Resources*.

Table 4.13-1. Alternative Impacts Comparison Summary for Tribal Cultural Resources

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed, or eligible for listing, in the CRHR or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed, or eligible for listing, in the CRHR or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant	Non-flow Measures	S/U	NI (-)	S/U (=)	S/U (=)

Notes: LTS = less-than-significant impact, NI = no impact, S/U = significant and unavoidable, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.13.1 No Project Alternative

Under the No Project Alternative, there would be no changes to the managed flow volumes in the Stevens Creek and Guadalupe River watersheds, and non-flow measures of the Proposed Project would not be implemented. There would be no monitoring or adaptive management implemented under the No Project Alternative. This section evaluates the impacts associated with the No Project Alternative on tribal cultural resources.

4.13.1.1 Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed, or eligible for listing, in the CRHR or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, there would be no change to current flow regimes. For this reason, there would be no change in the significance of a tribal cultural resource and no impact to tribal cultural resources.

Non-flow Measures Impact Analysis

Under the No Project Alternative, the non-flow measures of the Proposed Project would not be implemented. For this reason, there would be no impact to tribal cultural resources.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, the monitoring, maintenance, and adaptive management measures of the Proposed Project would not be implemented. For this reason, there would be no impact to tribal cultural resources.

Significance Conclusion Summary

The No Project Alternative would cause no change in the significance of a tribal cultural resource; therefore, it would have **no impact** to tribal cultural resources.

4.13.2 Non-flow Measures Only Alternative

The impacts of the Non-flow Measures Only Alternative to tribal cultural resources would be the same as the non-flow measures impacts identified in Section 3.10.4; that is, impacts on tribal cultural resources could result from the non-flow measures, monitoring, and maintenance of habitat improvements. These elements of the Non-flow Measures Only Alternative include actions that cause ground disturbance that could affect tribal cultural resources, as described below. There would be no change in managed flow volumes; therefore, the Non-flow Measures Only Alternative would have no impact to tribal cultural resources from flow measures.

4.13.2.1 Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed, or eligible for listing, in the CRHR or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant (significant and unavoidable)[15]

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to tribal cultural resources.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.10.4 for the non-flow measures, the Non-flow Measures Only Alternative could cause significant impacts on tribal cultural resources during ground-disturbing activities. Construction activities associated with the non-flow measures could impact native soils, traditional gathering areas, and/or ceremonial locations and, by extension, affect prehistoric archaeological resources that are listed in, or eligible for listing in, the NRHP and/or the CRHR. These resources may also be further considered as tribal cultural resources. Valley Water actions associated with non-flow measures such as disturbing channel beds and banks; installing weirs; modifying channels; removing culverts, riprap, or other structures; and future actions not yet identified would result in a significant impact to tribal cultural resources.

[15] Impact conclusion provided after consideration of mitigation.

Monitoring, Maintenance, and Adaptive Management

Impacts from monitoring, maintenance, and adaptive management measures would be the same as for the Proposed Project. As discussed in Section 3.10.4 for the non-flow measures, the Non-flow Measures Only Alternative could cause significant impacts on tribal cultural resources during ground-disturbing activities. Maintenance activities associated with the non-flow measures could impact native soils, traditional gathering areas, and/or ceremonial locations and, by extension, affect prehistoric archaeological resources that are listed in, or eligible for listing in, the NRHP and/or the CRHR. These resources may also be further considered as tribal cultural resources. Valley Water maintenance actions, as well as future actions not yet identified, would result in a significant impact to tribal cultural resources.

Monitoring and adaptive management measures would be minimally invasive and would therefore have no impact to previously identified or newly discovered tribal cultural resources. Like the analysis of the non-flow measures, however, maintenance and could include similar improvements as the proposed non-flow measures, which could result in similarly significant impacts on tribal cultural resources.

Significance Conclusion Summary

Non-flow measure impacts under the Non-flow Measures Only Alternative would be **significant**.

Mitigation

To reduce impacts of the Non-flow Measures Only Alternative on tribal cultural resources, Valley Water would implement the following mitigation measures as detailed in Section 3.10.4 of this EIR:

- **MM-TRI-1a:** Conduct Cultural Resources Studies and Avoid Effects on TCRs
- **MM-TRI-1b:** Consult with Native American Communities and Implement Appropriate Measures to Mitigate Effects on TCRs

Significance after Mitigation

Implementing MM TRI-1a and MM TRI-1b, as necessary, would reduce Impact TRI-1, substantial adverse change in the significance of a tribal cultural resource, to a less-than-significant level in most cases, but may not necessarily reduce impacts on some categories of TCR, such as sacred sites, to less-than-significant levels. In such instances, Impact TRI-1 would be **significant and unavoidable**.

4.13.3 FAHCE-plus Alternative

Under the FAHCE-plus Alternative, there would be modifications in the pulse flows as compared to the Proposed Project. The impacts of this modification on tribal cultural resources are discussed below. The non-flow measures of the FAHCE-plus Alternative would be identical to those of the Proposed Project and could affect tribal cultural resources as a result of ground disturbance, as described below. The effects of monitoring and maintenance of habitat improvements are included in the analysis.

4.13.3.1 Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed, or eligible for listing, in the CRHR or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant (significant and unavoidable)[16]

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, implementation of flow measures could increase sedimentation and erosion potential in some creeks associated with the water temperature requirements and necessary reservoir volumes for the pulse flows. Likewise, associated measures, which would be similar to the FAHCE-plus flow measures, could result in similar impacts. However, variations in water temperature and the timing of the reservoir fluctuations would not significantly impact tribal cultural resources. Implementation of flow measures under the FAHCE-plus Alternative would not disturb tribal cultural resources. As a result, impacts would be less than significant.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.10.3 for the Proposed Project non-flow measures, non-flow measures implemented under the FAHCE-plus Alternative could result in significant impacts on CRHR-eligible archaeological resources, which may also be considered tribal cultural resources, during ground-disturbing activities. Construction activities associated with the non-flow measures under the FAHCE-plus Alternative are consistent with the analysis of the non-flow measures under the Proposed Project and could impact native soils, traditional gathering areas, and/or ceremonial locations and, by extension, affect prehistoric or historical resources that are listed in, or eligible for listing in, the NRHP and/or the CRHR. These resources may also be further considered as tribal cultural resources. Significant impacts on tribal cultural resources could result from such actions as disturbances to channel beds and banks; weir installation; channel modification; the removal of culverts, riprap, or other structures; and other Valley Water actions not yet determined.

Monitoring, Maintenance, and Adaptive Management

Impacts from monitoring, maintenance, and adaptive management measures would be the same as for the Proposed Project. As discussed in Section 3.10.4 for the non-flow measures, the FAHCE-plus Alternative could cause significant impacts on tribal cultural resources during ground-disturbing activities. Maintenance activities associated with the non-flow measures could impact native soils, traditional gathering areas, and/or ceremonial locations and, by extension, affect prehistoric archaeological resources that are listed in, or eligible for listing in, the NRHP and/or the CRHR. These resources may also be further considered as tribal cultural resources. Valley Water maintenance actions, as well as future actions not yet identified, would result in a significant impact to tribal cultural resources.

Monitoring and adaptive management measures under the FAHCE-plus Alternative would be minimally invasive and would therefore have no impact to previously identified or newly discovered tribal cultural resources. Like the analysis of the FAHCE-plus Alternative flow and non-flow measures, however, maintenance could include similar improvements, which could result in similarly significant impacts on tribal cultural resources.

[16] Impact conclusion provided after consideration of mitigation.

Significance Conclusion Summary

Impacts on tribal cultural resources would be **less than significant** under the flow measures for the FAHCE-plus Alternative. Non-flow measure impacts on tribal cultural resources under the FAHCE-plus Alternative would be **significant**.

Mitigation

To reduce impacts of the FAHCE-plus Alternative on tribal cultural resources, Valley Water would implement the following mitigation measures as detailed in Section 3.10.4 of this EIR:

- **MM-TRI-1a:** Conduct Cultural Resources Studies and Avoid Effects on TCRs
- **MM-TRI-1b:** Consult with Native American Communities and Implement Appropriate Measures to Mitigate Effects on TCRs

Significance after Mitigation

Implementing MMs TRI-1a and TRI-1b, as necessary, would reduce Impact TRI-1, substantial adverse change in the significance of a tribal cultural resource, to a less-than-significant level in most cases but may not reduce impacts on some categories of TCRs. For example, a tribe's sacred site that is regularly visited for ceremonies could be destroyed during the construction phase. In this situation, the direct impacts of the action could not be fully mitigated, even though some form of mitigation may be negotiated with the tribe to ameliorate the action. In such instances, Impact TRI-1 would be **significant and unavoidable**.

4.14 Impact Analysis on Geology and Soils

This section assesses the impacts on geology and soils from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. The alternatives impact assessment for geology and soils follows the same methodology as laid out for the Proposed Project analysis in Section 3.11.3.

Table 4.14-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.11, *Geology and Soils*.

Table 4.14-1. Alternative Impacts Comparison Summary for Geology and Soils

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact GEO-1: Result in substantial soil erosion or the loss of topsoil	Flow Measures	LTS	NI (-)	NI (-)	LTS (=)
Impact GEO-1: Result in substantial soil erosion or the loss of topsoil	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)
Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site	Non-flow Measures	S/M	NI (-)	S/M (=)	S/M (=)

Notes: LTS = less-than-significant impact, NI = no impact, S/M = significant but mitigable to less-than-significant impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.14.1 No Project Alternative

Under the No Project Alternative, there would be no changes to the managed flow volumes in the Guadalupe River and Stevens Creek watersheds, and the non-flow measures of the Proposed Project would not be implemented. There would be no monitoring or adaptive management implemented under the No Project Alternative. This section evaluates the impacts associated with the No Project Alternative on geology and soils.

4.14.1.1 Impact GEO-1: Result in substantial soil erosion or the loss of topsoil (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, there would be no changes in managed flow volumes. For this reason, the No Project Alternative would not result in substantial soil erosion or loss of topsoil, and there would be no impact.

Non-flow Measures Impact Analysis

No non-flow measures would be implemented under the No Project Alternative. For this reason, the No Project Alternative would not result in substantial soil erosion and loss of topsoil, and there would be no impact.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, no monitoring, maintenance, and adaptive management would be implemented. Therefore, there would be no impact**.**

Significance Conclusion Summary

There would be **no impact** to substantial soil erosion or loss of topsoil under the No Project Alternative.

4.14.1.2 Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, there would be no changes in managed flow volumes. For this reason, the No Project Alternative would not directly or indirectly destroy a unique paleontological resource or site. Therefore, there would be no impact.

Non-flow Measures Impact Analysis

Under the No Project Alternative, no non-flow measures would be implemented. For this reason, the No Project Alternative would not directly or indirectly destroy a unique paleontological resource or site. Therefore, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, no monitoring, maintenance, and adaptive management would be implemented. Therefore, there would be no impact**.**

Significance Conclusion Summary

There would be **no impact** from destruction of a unique paleontological resource or site from the No Project Alternative.

4.14.2 Non-flow Measures Only Alternative

The impacts of the Non-flow Measures Only Alternative to geology and soils would be the same as the non-flow measure impacts identified in Section 3.11.4; that is, impacts on geology and soils could result from the non-flow measures, monitoring, and maintenance of habitat improvements. These elements of the Non-flow Measures Only Alternative include actions that cause ground disturbance; soil compaction; and other earthwork that could affect geology, soils, and paleontological resources, as described below. There would be no change in managed flow volumes; therefore, the Non-flow Measures Only Alternative would have no impact to geology and soils from flow measures.

4.14.2.1 Impact GEO-1: Result in substantial soil erosion or the loss of topsoil (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to soil erosion or loss of topsoil.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.11.4.1, non-flow measures would require construction activities involving ground disturbance and demolition, work within the channel or stream bed, vehicle and equipment staging, vegetation removal, and alteration of flows associated with the implementation of non-flow measures. These activities could result in short-term impacts on erosion and loss of topsoil. Implementation of BMPs GEN-20, SED-1, SED-2, SED-3, VEG-1, GEN-21, GEN-22, and GEN-23 would reduce impacts on erosion and loss of topsoil to a less-than-significant level.

Monitoring, Maintenance, and Adaptive Management

Implementing the monitoring protocols and the AMP would not require ground disturbance but could result in changes in flow, which could result in erosion or loss of topsoil. Maintenance activities would involve similar activities as laid out in the non-flow measures for the Proposed Project, with additional riprap, restoring, or operation repair of a facility. These activities would require ground disturbance and would have potential to result in erosion and loss of topsoil. With implementation of the BMPs described above, impacts on erosion and loss of topsoil would be less than significant.

Significance Conclusion Summary

Impacts on erosion and loss of topsoil would be **less than significant** under the Non-flow Measures Only Alternative.

Mitigation

No mitigation would be required to reduce impacts to a less-than-significant level.

4.14.2.2 Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site (less than significant with mitigation)[17]

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to paleontological resources.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.11.4.2, construction activities associated with non-flow measures, including demolition and removal of structures, excavations, and installations, could directly or indirectly destroy a unique paleontological resource or site. For this reason, impacts related to the non-flow measures could include significant impacts on paleontological resources.

Monitoring, Maintenance, and Adaptive Management

Implementing the monitoring protocols and the AMP would have no impact to paleontological resources as these efforts have no associated ground-disturbing activity. Maintenance activities, however, would involve similar activities as laid out in the non-flow measures for the Proposed Project, with additional riprap, restoring, or operation repair of a facility. These activities would require ground disturbance and would have potential to disturb a unique paleontological resource or site. Impacts on a unique paleontological resource or site are therefore considered significant.

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[17] Impact conclusion provided after consideration of mitigation.

Significance Conclusion Summary

The Non-flow Measures Only Alternative could directly or indirectly destroy a unique paleontological resource and result in a **significant** impact.

Mitigation

To reduce impacts of the Non-flow Measures Only Alternative on paleontological resources, Valley Water would implement the following mitigation measure as detailed in Section 3.11.4 of this EIR:

- **MM-GEO-1**: Follow the Society of Vertebrate Paleontology Standard Procedures for the Assessment and Mitigation of Adverse Impacts on Paleontological Resources

Significance after Mitigation

After mitigation, impacts on paleontological resources under Impact GEO-2 would be reduced to a **less-than-significant** level.

4.14.3 FAHCE-plus Alternative

Under the FAHCE-plus Alternative, there would be modifications in the reservoir flows as compared to the Proposed Project. The impacts of this modification on geology, soils, and paleontological resources are discussed below. This alternative also includes the non-flow measures, monitoring, and maintenance of habitat improvements identified in the Proposed Project, which could also affect geology, soils, and paleontological resources, as described below. The effects of monitoring and maintenance of habitat improvements are included in the analysis.

4.14.3.1 Impact GEO-1: Result in substantial soil erosion or the loss of topsoil (less than significant)

Flow Measure Impact Analysis

Under the FAHCE-plus Alternative, implementation of flow measures could result in increased sedimentation and erosion potential in the Guadalupe River and Stevens Creek watersheds. However, erosion potential would likely be minimal given that flow changes would be within the historic range of flows in the Guadalupe River and Stevens Creek watersheds. For this reason, impacts related to the FAHCE-plus Alternative could include less-than-significant impacts from erosion and loss of topsoil.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.11.4.1, non-flow measures would require construction activities involving ground disturbance and demolition, work within the channel or stream bed, vehicle and equipment staging, vegetation removal, and alteration of flows associated with the implementation of non-flow measures. These activities could result in short-term impacts on erosion and loss of topsoil. Implementation of BMPs GEN-20, SED-1, SED-2, SED-3, VEG-1, GEN-21, GEN-22, and GEN-23 would reduce impacts on erosion and loss of topsoil to a less-than-significant level.

Monitoring, Maintenance, and Adaptive Management

Implementing the monitoring protocols and the AMP would not require ground disturbance but could result in changes in flow, which could result in erosion or loss of topsoil. Maintenance activities would involve similar activities as laid out in the non-flow measures for the Proposed Project, with additional riprap, restoring or operation repair of a facility. These activities would require ground disturbance and would have potential to result in erosion and loss of topsoil. With implementation of BMPs GEN-20,

SED-1, SED-2, SED-3, VEG-1, GEN-21, GEN-22, and GEN-23, impacts on erosion and loss of topsoil would be less than significant.

Significance Conclusion Summary

Impacts on erosion and loss of topsoil would be **less than significant** under the FAHCE-plus Alternative.

Mitigation

No mitigation would be required to reduce impacts to a less-than-significant level.

4.14.3.2 Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site (less than significant with mitigation)[18]

Flow Measure Impact Analysis

Implementation of flow measures under the FAHCE-plus Alternative would not unearth or result in the inadvertent disturbance of a unique paleontological resource or site because ground-disturbing activities are not proposed. As a result, there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. Construction activities associated with non-flow measures under the FAHCE-plus Alternative would include demolition and removal of structures, excavations, installations, and other ground-disturbing activities. These activities could directly or indirectly destroy a unique paleontological resource or site. As a result, impacts on a unique paleontological resource or site would be significant because a unique paleontological resource could be damaged or destroyed.

Monitoring, Maintenance, and Adaptive Management

Implementing the monitoring protocols and the AMP would have no impact to paleontological resources as these efforts have no associated ground-disturbing activity. Maintenance activities, however, would involve similar activities as laid out in the non-flow measures for the Proposed Project, with additional riprap, restoring, or operation repair of a facility. These activities would require ground disturbance and would have potential to disturb a unique paleontological resource or site. Impacts on a unique paleontological resource or site are therefore considered significant.

Significance Conclusion Summary

There would be **no impact** to paleontological resources from flow measures under the FAHCE-plus Alternative. Non-flow measures under the FAHCE-plus Alternative would result in **significant impacts** on paleontological resources.

[18] Impact conclusion provided after consideration of mitigation.

Mitigation

To reduce impacts of the FAHCE-plus Alternative on paleontological resources, Valley Water would implement the following mitigation measure as detailed in Section 3.11.4 of this EIR:

- **MM-GEO-1:** Follow the Society of Vertebrate Paleontology Standard Procedures for the Assessment and Mitigation of Adverse Impacts on Paleontological Resources

Significance after Mitigation

After mitigation, impacts on paleontological resources for non-flow measures would be reduced to a **less-than-significant** level.

4.15 Impact Analysis on Air Quality

This section assesses the impacts on air quality from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. The alternatives impact assessment for air quality follows the same methodology as laid out for the Proposed Project analysis in Section 3.12.3.

Table 4.15-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.12, *Air Quality*.

Table 4.15-1. Alternative Impacts Comparison Summary for Air Quality

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)
Impact AIR-2: Violate any air quality standards or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact AIR-2: Violate any air quality standards or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)
Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)
Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)

Notes: LTS = less-than-significant impact, NI = no impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.15.1 No Project Alternative

Under the No Project Alternative, there would be no changes to managed flow volumes in the Stevens Creek and Guadalupe River watersheds, and non-flow measures of the Proposed Project would not be implemented. There would be no monitoring under the No Project Alternative.

4.15.1.1 Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no conflict with or obstruction of implementation of the BAAQMD 2017 Clean Air Plan from flow measures. As a result, there would be no impact.

Non-flow Measures Impact Analysis

No non-flow measures would be implemented under the No Project Alternative. For this reason, there would be no change in emissions that would conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan. As a result, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, maintenance, or adaptive management implemented under the No Project Alternative. For this reason, there would be no conflict with or obstruction of implementation of the BAAQMD 2017 Clean Air Plan. As a result, there would be no impact.

Significance Conclusion Summary

There would be no flow measures or non-flow measures to conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan; therefore, there would be **no impact** under the No Project Alternative.

4.15.1.2 Impact AIR-2: Violate any air quality standards or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no change in emissions that would violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants. As a result, there would be no impact.

Non-flow Measures Impact Analysis

No non-flow measures would be implemented under the No Project Alternative. For this reason, there would be no change in emissions that would violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants. As a result, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, maintenance, or adaptive management implemented under the No Project Alternative. For this reason, there would be no change in emissions that would violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants. As a result, there would be no impact.

Significance Conclusion Summary

There would be no flow measures or non-flow measures to violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants. Therefore, there would be **no impact** under the No Project Alternative.

4.15.1.3 Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, the local sensitive receptors would not be exposed to substantial pollutant concentrations. As a result, there would be no impact.

Non-flow Measures Impact Analysis

No non-flow measures would be implemented. For this reason, the local sensitive receptors would not be exposed to substantial pollutant concentrations. As a result, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, maintenance, or adaptive management implemented under the No Project Alternative. For this reason, the local sensitive receptors would not be exposed to substantial pollutant concentrations. As a result, there would be no impact.

Significance Conclusion Summary

There would be no flow measures or non-flow measures to expose sensitive receptors to substantial pollutant concentrations; therefore, there would be **no impact** under the No Project Alternative.

4.15.1.4 Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no odors or dust that would adversely affect a substantial number of people. As a result, there would be no impact.

Non-flow Measures Impact Analysis

No non-flow measures would be implemented. For this reason, there would be no odors or dust that would adversely affect a substantial number of people. As a result, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

There would be no monitoring, maintenance, or adaptive management implemented under the No Project Alternative. For this reason, there would be no odors or dust that would adversely affect a substantial number of people. As a result, there would be no impact.

Significance Conclusion Summary

There would be no flow measures or non-flow measures that could result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people. There would be **no impact** under the No Project Alternative.

4.15.2 Non-flow Measures Only Alternative

The impacts of the Non-flow Measures Only Alternative to air quality would be the same as the non-flow measure impacts identified in Section 3.12.4; that is, impacts on air quality could result from the non-flow measures, monitoring, and maintenance of habitat improvements. These elements of the Non-flow Measures Only Alternative include such actions as would increase emissions and have an effect on air quality, as described below. There would be no change in flow volumes; therefore, the Non-flow Measures Only Alternative would have no impact to air quality from flow measures.

4.15.2.1 Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact from conflict with or obstruction of the BAAQMD 2017 Clean Air Plan.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. Consistent with the analysis in Section 3.12.4.1, the Non-flow Measures Only Alternative would not conflict with the 2017 Clean Air Plan. This impact would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts of monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. Consistent with the analysis in Section 3.12.4.1, maintenance, monitoring, and adaptive management would not conflict with the 2017 Clean Air Plan. This impact would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under AIR-1 with the Non-flow Measures Only Alternative. Impacts during implementation of non-flow measures, including associated maintenance, monitoring, and adaptive management would be **less than significant**.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.15.2.2 Impact AIR-2: Violate any air quality standards or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to air quality.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.12.4.2, the construction exhaust emissions associated with non-flow measure implementation would be less than the BAAQMD thresholds. The fugitive-dust emissions from these activities would be minimized and controlled through the implementation of BMP AQ-1. For this reason, the air quality impact from the non-flow measures of this alternative would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts of monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. Emissions from these activities would likewise generate emissions similar to those listed in Table 3.12-6, spread over subsequent years. As a result, impacts would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under AIR-2 with the Non-flow Measures Only Alternative. Impacts during implementation of non-flow measures, including associated maintenance, monitoring, and adaptive management would be **less than significant**.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.15.2.3 Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to sensitive receptors.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.12.4.3, non-flow measures included in the Non-flow Measures Only Alternative would not expose sensitive receptors to substantial air pollutant concentrations. As a result, impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts of monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.12.4.3, maintenance, monitoring, and adaptive management would not expose sensitive receptors to substantial air pollutant concentrations. As a result, impacts would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under AIR-3 with the Non-flow Measures Only Alternative. Exposure of sensitive receptors to substantial pollutant concentrations during implementation of non-flow measures, including associated maintenance, monitoring, and adaptive management, would be **less than significant**.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.15.2.4 Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact from odors.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.12.4.4, the construction odor emissions associated with non-flow measure implementation would not affect a substantial number of individuals. The fugitive-dust emissions from these activities would be minimized and controlled through the implementation of BMP AQ-1. As a result, impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts of monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.12.4.4, the odor emissions associated with maintenance, monitoring, and adaptive management would not affect a substantial number of individuals. As a result, impacts would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under AIR-4 with the Non-flow Measures Only Alternative. Non-flow measures, including associated maintenance, monitoring, and adaptive management, would have **less-than-significant** impacts because they would not result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.15.3 FAHCE-plus Alternative

Under the FAHCE-plus Alternative, there would be modifications in reservoir flows as compared to the Proposed Project. The impacts of this modification on air quality are discussed below. The non-flow measures of the FAHCE-plus Alternative would be identical to those of the Proposed Project. Effects of monitoring and maintenance of habitat improvements are included in the analysis.

4.15.3.1 Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan (less than significant)

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, the proposed flow measures would not disturb native soil and/or built-environment resources. For this reason, there would be no change in emissions that would conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan. As a result, there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.12.4.1, non-flow measures included in the FAHCE-plus Alternative would not conflict with the 2017 Clean Air Plan. This impact would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the FAHCE-plus Alternative, impacts of monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.12.4.1, maintenance, monitoring, and adaptive management would not conflict with the 2017 Clean Air Plan. This impact would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under Impact AIR-1 with the FAHCE-plus Alternative. The flow measures would not conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan. Emissions resulting from implementation of non-flow measures, including associated maintenance, monitoring, and adaptive management, would not conflict with the 2017 Clean Air Plan. Impact AIR-1 would be **less than significant**.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.15.3.2 Impact AIR-2: Violate any air quality standards or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants (less than significant)

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, the proposed flow measures would not disturb native soil and/or built-environment resources. For this reason, there would be no change in emissions that would violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants; therefore, there would be no impact from the FAHCE-plus Alternative.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.12.4.2, the construction exhaust emissions associated with non-flow measure implementation would be less than the BAAQMD thresholds, and the fugitive-dust emissions from these activities would be minimized and controlled through the implementation of BMP AQ-1. For this reason, the air quality impact from the non-flow measures of this alternative would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the FAHCE-plus Alternative, impacts of monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. Emissions from these activities would likewise generate emissions similar to those listed in Table 3.12-6, spread over subsequent years. As a result, impacts would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under Impact AIR-2 with the FAHCE-plus Alternative. Emissions from the implementation of the non-flow measures, including associated maintenance, monitoring, and adaptive management, would be less than the BAAQMD thresholds. The fugitive dust emissions from these activities would be minimized and controlled through the implementation of BMP AQ-1. Impact AIR-2 during implementation of non-flow measures, including associated maintenance and monitoring, would be **less than significant**.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.15.3.3 Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations (less than significant)

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, the proposed flow measures would not disturb native soil and/or built-environment resources. For this reason, the local sensitive receptors would not be exposed to substantial pollutant concentrations, and there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.12.4.3 and shown in Figure 3.12-1, non-flow measures included in the FAHCE-plus Alternative would not expose sensitive receptors to substantial pollutant concentrations. As a result, impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the FAHCE-plus Alternative, impacts of monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.12.4.3, maintenance, monitoring and adaptive management would not expose sensitive receptors to substantial air pollutant concentrations. As a result, impacts would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under Impact AIR-3 with the FAHCE-plus Alternative. Impact AIR-3 during implementation of non-flow measures, including associated maintenance, monitoring, and adaptive management, would be **less than significant**.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.15.3.4 Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people (less than significant)

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, the proposed flow measures would not disturb native soil and/or built-environment resources. For this reason, there would be no odors or dust that would adversely affect a substantial number of people, and there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.12.4.4, the construction odor emissions associated with non-flow measure implementation would not affect a substantial number of individuals, and the fugitive-dust emissions from these activities would be minimized and controlled through the implementation of BMP AQ-1. Operational odors would be minimized and controlled through the implementation of BMP AQ-2. As a result, impacts from odors would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the FAHCE-plus Alternative, impacts of monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.12.4.4, the odor emissions associated with maintenance, monitoring, and adaptive management would not affect a substantial number of individuals. As a result, impacts would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under Impact AIR-4 with the FAHCE-plus Alternative. Non-flow measures, including associated maintenance, monitoring, and adaptive management, would have **less-than-significant** impacts because they would not result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.16 Impact Analysis on Greenhouse Gas Emissions and Energy

This section assesses the impacts on GHG emissions and energy from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. The alternatives impact assessment for GHG emissions and energy follows the same methodology as laid out for the Proposed Project analysis in Section 3.13.3.

Table 4.16-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.13, *Greenhouse Gas Emissions and Energy*.

Table 4.16-1. Alternative Impacts Comparison Summary for Greenhouse Gas Emissions and Energy

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)
Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs	Non-flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)

Notes: LTS = less-than-significant impact, NI = no impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.16.1 No Project Alternative

Under the No Project Alternative, there would be no changes to managed flow volumes in the Stevens Creek or Guadalupe River watersheds, and non-flow measures of the Proposed Project would not be implemented. There would be no monitoring implemented under the No Project Alternative.

4.16.1.1 Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no change in GHG emissions from flow measures, and there would be no impact.

Non-flow Measures Impact Analysis

Under the No Project Alternative, no non-flow measures would be implemented. Therefore, there would be no change in GHG emissions from non-flow measures, and there would be no impact.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, no monitoring, maintenance, or adaptive management would be implemented. Therefore, there would be no change in GHG emissions, and there would be no impact.

Significance Conclusion Summary

There would be no flow measures or non-flow measures to generate GHG emissions, either directly or indirectly; therefore, there would be **no impact** under Impact GHG-1 with the No Project Alternative.

4.16.1.2 Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no change in GHG emissions that would conflict with the GHG reduction targets of AB 32, SB 32, or EO S-3-05 from flow measures, and there would be no impact.

Non-flow Measures Impact Analysis

Under the No Project Alternative, no non-flow measures would be implemented. Therefore, they would not emit additional GHGs. The No Project Alternative would not conflict with the GHG reduction targets of AB 32, SB 32, or EO S-3-05 from non-flow measures, and there would be no impact.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, no monitoring, maintenance, or adaptive management would be implemented. As a result, there would be no change in GHG emissions. Monitoring, maintenance, and adaptive management would not conflict with the GHG reduction targets of AB 32, SB 32, or EO S-3-05, and there would be no impact.

Significance Conclusion Summary

There would be no flow measures or non-flow measures to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs; therefore, there would be **no impact** under Impact GHG-2 with the No Project Alternative.

4.16.1.3 Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no impact due to wasteful, inefficient, or unnecessary consumption of energy resources from flow measures.

Non-flow Measures Impact Analysis

Under the No Project Alternative, no non-flow measures would be implemented. For this reason, there would be no impact due to wasteful, inefficient, or unnecessary consumption of energy resources from non-flow measures.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, monitoring, maintenance, or adaptive management would not be implemented. For this reason, there would be no impact due to wasteful, inefficient, or unnecessary consumption of energy resources.

Significance Conclusion Summary

There would be no flow measures or non-flow measures that would result in significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources; therefore, there would be **no impact** under Impact GHG-3 with the No Project Alternative.

4.16.1.4 Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no conflict with any state or local plan for renewable energy or energy efficiency from flow measures; therefore, there would be no impact.

Non-flow Measures Impact Analysis

Under the No Project Alternative, no non-flow measures would be implemented. For this reason, there would be no conflict with any state or local plan for renewable energy or energy efficiency from non-flow measures; therefore, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, monitoring, maintenance, or adaptive management would not be implemented. For this reason, there would be no conflict with any state or local plan for renewable energy or energy efficiency from non-flow measures; therefore, there would be no impact.

Significance Conclusion Summary

There would be no flow measures or non-flow measures that would result in a conflict with any state or local plan for renewable energy or energy efficiency from non-flow measures; therefore, there would be **no impact** under Impact GHG-4 with the No Project Alternative.

4.16.2 Non-flow Measures Only Alternative

The impacts of the Non-flow Measures Only Alternative to GHG and energy would be the same as the non-flow measure impacts identified in Section 3.13.4; that is, impacts on GHG and energy could result from the non-flow measures, monitoring, and maintenance of habitat improvements. These elements of the Non-flow Measures Only Alternative include such actions that would increase emissions and have an effect on GHG and energy as described below. There would be no change in managed flow volumes; therefore, the Non-flow Measures Only Alternative would have no impact to GHG and energy from flow measures.

4.16.2.1 Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to GHG emissions.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. Consistent with the analysis in Section 3.13.4.1, non-flow measures included in the Non-flow Measures Only Alternative would involve activities that would generate GHG emissions. The GHG emissions associated with implementing the non-flow measures would be isolated to those of crew vehicles accessing Valley Water facilities and watershed features to gather data. GHG emissions from these activities would generate emissions similar to those listed in Table 3.12-6, spread over subsequent years, and would be less than the BAAQMD GHG significance threshold. For this reason, the GHG impact from non-flow measures would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. Consistent with the analysis in Section 3.13.4.1, maintenance, monitoring, and adaptive management would involve activities that would generate GHG emissions. GHG emissions from these activities would generate emissions similar to those listed in Table 3.12-6, spread over subsequent years, and would be less than the BAAQMD GHG significance threshold. As a result, this impact would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under GHG-1 with the Non-flow Measures Only Alternative. Non-flow measures, including associated maintenance, monitoring, and adaptive management, would generate GHG emissions, either directly or indirectly, that may have an impact to the environment; the impact under GHG-1 would be **less than significant**.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.16.2.2 Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs (no impact)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact from conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. Consistent with the analysis in Section 3.13.4.2, the Non-flow Measures Only Alternative would result in GHG emissions, but they would not conflict with the GHG reduction targets of AB 32, SB 32, or EO S-3-05. As a result, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. Consistent with the analysis in Section 3.13.4.2, maintenance, monitoring, and adaptive management would result in GHG emissions, but they would not conflict with the GHG reduction targets of AB 32, SB 32, or EO S-3-05. As a result, there would be no impact.

Significance Conclusion Summary

There would be **no impact** from flow measures under GHG-2 with the Non-flow Measures Only Alternative. Non-flow measures, including associated maintenance, monitoring, and adaptive management, would generate GHG emissions. However, these emissions would not conflict with the applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. There would be **no impact** under GHG-1 with the Non-flow Measures Only Alternative.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.16.2.3 Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact due to wasteful, inefficient, or unnecessary consumption of energy resources.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.13.4.3, energy consumption would occur for the construction of non-flow measures. These activities would not result in wasteful, inefficient, or unnecessary use of energy. This impact would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.13.4.3, energy consumption would occur for the monitoring, maintenance, and adaptive management activities. These activities would not result in wasteful, inefficient, or unnecessary use of energy. This impact would be less than significant.

Significance Conclusion Summary

There would be no flow measures to require energy consumption. Non-flow measures, including associated maintenance, monitoring, and adaptive management, would not result in significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources. The impact under GHG-3 would be **less than significant** with the Non-flow Measures Only Alternative.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.16.2.4 Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact from conflict with or obstruction of any state or local plan for renewable energy or energy efficiency.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.13.4.4, non-flow measures would have a negligible effect on local energy consumption and would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The impact of the non-flow measures on renewable energy plans or energy efficiency would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.13.4.4, maintenance, monitoring, and adaptive management activities would have a negligible effect on local energy consumption and would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. This impact would be less than significant.

Significance Conclusion Summary

There would be no flow measures to require energy consumption. Energy consumption for non-flow measures, including associated maintenance, monitoring, and adaptive management, would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The impact under GHG-4 would be **less than significant** with the Non-flow Measures Only Alternative.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.16.3 FAHCE-plus Alternative

Under the FAHCE-plus Alternative, there would be modifications in reservoir flows as compared to the Proposed Project. The impacts of this modification on GHG and energy are discussed below. The non-flow measures of the FAHCE-plus Alternative would be identical to those of the Proposed Project. Effects of monitoring and maintenance of habitat improvements are included in the analysis.

4.16.3.1 Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment (less than significant)

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, the proposed flow measures would not disturb native soil and/or built-environment resources. For this reason, there would be no change in GHG emissions that may have a significant impact to the environment; therefore, there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. Consistent with the analysis in Section 3.13.4.1, the FAHCE-plus Alternative would involve activities that would generate GHG emissions. The GHG emissions associated with implementing the non-flow measures would be isolated to those of crew vehicles accessing Valley Water facilities and watershed features to gather data. GHG emissions from these activities would generate emissions similar to those listed in Table 3.12-6, spread over subsequent years, and would be less than the BAAQMD GHG significance threshold. For this reason, the GHG impact from non-flow measures would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the FAHCE-plus Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. Consistent with the analysis in Section 3.13.4.1, maintenance, monitoring, and adaptive management would involve activities that would generate GHG emissions. GHG emissions from these activities would generate emissions similar to those listed in Table 3.12-6, spread over subsequent years, and would be less than the BAAQMD GHG significance threshold. As a result, this impact would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under GHG-1 with the FAHCE-plus Alternative. Non-flow measures, including associated maintenance, monitoring, and adaptive management, would generate GHG emissions, either directly or indirectly, that may have an impact to the environment; however, the impact under GHG-1 would be **less than significant**.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.16.3.2 Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs (no impact)

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, the proposed flow measures would not disturb native soil and/or built-environment resources. For this reason, there would be no change in GHG emissions that would conflict with the GHG reduction targets of AB 32, SB 32, or EO S-3-05. As a result, there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. Consistent with the analysis in Section 3.13.4.2, the non-flow measures under the FAHCE-plus Alternative would result in GHG emissions but would not conflict with the GHG reduction targets of AB 32, SB 32, or EO S-3-05. As a result, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. Consistent with the analysis in Section 3.13.4.2, maintenance, monitoring, and adaptive management would result in GHG emissions but would not conflict with the GHG reduction targets of AB 32, SB 32, or EO S-3-05. As a result, there would be no impact.

Significance Conclusion Summary

There would be **no impact** from flow measures under Impact GHG-2 with the FAHCE-plus Alternative. Non-flow measures, including associated maintenance and monitoring, would generate GHG emissions, but would not conflict with the applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. There would be **no impact** under GHG-2 with the FAHCE-plus Alternative.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.16.3.3 Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources (less than significant)

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, the proposed flow measures would not disturb native soil and/or built-environment resources. For this reason, there would be no consumption of energy resources; therefore, there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.13.4.3, the non-flow measures would consume energy; however, they would not result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources. This impact would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.13.4.3, energy consumption would occur for the monitoring, maintenance, and adaptive management activities; however, these activities would not result in wasteful, inefficient, or unnecessary use of energy. This impact would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under Impact GHG-3 with the FAHCE-plus Alternative. Non-flow measures, including associated maintenance, monitoring, and adaptive management, would have a negligible effect on local energy consumption and would not result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources. The impact under GHG-3 would be **less than significant** with the FAHCE-plus Alternative.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.16.3.4 Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency (no impact)

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, the proposed flow measures would not disturb native soil and/or built-environment resources. For this reason, there would be no conflict with any state or local plan for renewable energy or energy efficiency; therefore, there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.13.4.4, the non-flow measures would have a negligible effect on the local energy consumption and would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The impact of the non-flow measures on renewable energy plans or energy efficiency would be less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.13.4.4, maintenance, monitoring, and adaptive management activities would have a negligible effect on local energy consumption and would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. This impact would be less than significant.

Significance Conclusion Summary

There would be **no impact** from flow measures under Impact GHG-4 with the FAHCE-plus Alternative. Non-flow measures, including associated maintenance, monitoring, and adaptive management, would not result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources. The impact under GHG-4 would be **less than significant** with the FAHCE-plus Alternative.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.17 Impact Analysis on Noise

This section assesses the impacts on noise from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. The alternatives impact assessment for noise follows the same methodology as laid out for the Proposed Project analysis in Section 3.14.3.

Table 4.17-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.14, *Noise*.

Table 4.17-1. Alternative Impacts Comparison Summary for Noise

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies, or cause a substantial incremental increase in noise levels	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies, or cause a substantial incremental increase in noise levels	Non-flow Measures	S/U	NI (-)	S/U (=)	S/U (=)
Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels	Flow Measures	NI	NI (=)	NI (=)	NI (=)
Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels	Non-flow Measures	LTS	NI (-)	LTS (=)	LTS (=)

Notes: LTS = less-than-significant impact, NI = no impact, S/U = significant and unavoidable impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.17.1 No Project Alternative

Under the No Project Alternative, there would be no changes to managed flow volumes in the Stevens Creek and Guadalupe River watersheds, and non-flow measures of the Proposed Project would not be implemented. There would be no monitoring implemented under the No Project Alternative.

4.17.1.1 Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies, or cause a substantial incremental increase in noise levels (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies from flows; therefore, there would be no impact.

Non-flow Measures Impact Analysis

Under the No Project Alternative, no non-flow measures would be implemented. Therefore, there would be no temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies from non-flow measures; therefore, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, no monitoring, maintenance, or adaptive management would be implemented. Therefore, there would be no temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; therefore, there would be no impact

Significance Conclusion Summary

There would be no flow or non-flow measures to cause a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; therefore, there would be **no impact** under Impact NOISE-1 with the No Project Alternative.

4.17.1.2 Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, the managed flow volumes would not change. For this reason, there would be no ground-borne vibration or ground-borne noise levels from flow changes under the No Project Alternative; therefore, there would be no impact.

Non-flow Measures Impact Analysis

Under the No Project Alternative, no non-flow measures would be implemented. There would be no change to the ground-borne vibration or ground-borne noise levels from non-flow measures under the No Project Alternative; therefore, there would be no impact.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, no monitoring, maintenance, or adaptive management would be implemented. There would be no change to the ground-borne vibration or ground-borne noise levels; therefore, there would be no impact.

Significance Conclusion Summary

There would be no flow or non-flow measures to cause excessive ground-borne vibration or ground-borne noise levels; therefore, there would be **no impact** under Impact NOISE-2 with the No Project Alternative.

4.17.2 Non-flow Measures Only Alternative

The impacts of the Non-flow Measures Only Alternative to noise would be the same as the non-flow measure impacts identified in Section 3.14.4; that is, noise impacts could result from the non-flow measures, monitoring, and maintenance of habitat improvements. These elements of the Non-flow Measures Only Alternative include such actions that would increase noise, as described below. There would be no change in managed flow volumes; therefore, the Non-flow Measures Only Alternative would have no impact to noise from flow measures.

4.17.2.1 Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies, or cause a substantial incremental increase in noise levels (significant and unavoidable)[19]

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to noise levels.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.14.4, compliance with the local noise ordinances and implementation of BMP GEN-38 would reduce construction noise impacts. However, the construction noise levels associated with the non-flow measures would exceed the noise standards within certain jurisdictions. For this reason, the impact of NOISE-1 would be significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.14.4, monitoring, maintenance, and adaptive management could generate noise levels in excess of local noise standards. For this reason, the impact of NOISE-1 would be significant.

Significance Conclusion Summary

Because non-flow measures, including associated maintenance, monitoring, and adaptive management, could cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, the Non-flow Measures Only Alternative would have a **significant** impact (Impact NOISE-1).

[19] Impact conclusion provided after consideration of mitigation.

Mitigation

As described in Section 3.14.4.1, MM NOISE-1 would be implemented to reduce potential construction and maintenance noise impacts on nearby sensitive receptors.

Significance after Mitigation

Implementation of MM NOISE-1 would reduce the construction and maintenance noise impacts to the extent feasible. However, because this EIR evaluates impacts at the programmatic level, all project circumstances are not foreseeable. Therefore, even with implementation of MM NOISE-1, noise levels may exceed the local noise standards, and Impact NOISE-1 remains **significant and unavoidable**.

4.17.2.2 Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to ground-borne vibration or ground-borne noise levels.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.14.4.2, the non-flow measures could involve additional improvements that could cause excessive ground-borne vibration or heightened noise levels. Limiting pile driving to daytime hours, compliance with the local noise ordinances, and implementation of BMP GEN-38 would reduce the vibration impacts to less than significant.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.14.4.2, maintenance, monitoring, and adaptive management would involve equipment that could cause excessive ground-borne vibration or excessive noise. Restricting these activities to daytime hours would reduce the vibration impacts to less than significant.

Significance Conclusion Summary

Compliance with local noise ordinances; implementation of BMP GEN-38; and limiting construction, monitoring, maintenance, and adaptive management activities to daytime hours would reduce the vibration impacts to **less than significant**.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.17.3 FAHCE-plus Alternative

Under the FAHCE-plus Alternative, there would be modifications in the pulse flows as compared to the Proposed Project. The impacts of this modification on noise are discussed below. The non-flow measures of the FAHCE-plus Alternative would be identical to those of the Proposed Project. Effects of monitoring and maintenance of habitat improvements are included in the analysis.

4.17.3.1 Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies, or cause a substantial incremental increase in noise levels (significant and unavoidable)[20]

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, the proposed flow measures would not disturb native soil and/or built-environment resources. For this reason, there would be no temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies from flows; therefore, there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As discussed in Section 3.14.4, compliance with the local noise ordinances and implementation of BMP GEN-38 would reduce construction noise impacts. However, the construction noise levels associated with the non-flow measures would exceed the noise standards within certain jurisdictions. For this reason, the impact of NOISE-1 would be significant.

Monitoring, Maintenance, and Adaptive Management

Under the FAHCE-plus Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.14.4, monitoring, maintenance, and adaptive management could generate noise levels in excess of local noise standards. For this reason, the impact of NOISE-1 would be significant.

Significance Conclusion Summary

Because noise generation would exceed local noise standards, the noise from the construction and maintenance activities would be **significant** (Impact NOISE-1).

Mitigation

As described in Section 3.14.4.1, MM NOISE-1 would be implemented to reduce potential construction and maintenance noise impacts on nearby sensitive receptors.

Significance after Mitigation

Implementation of MM NOISE-1 would reduce construction noise impacts to the extent feasible. However, because this EIR evaluates impacts at the programmatic level, all project circumstances are not foreseeable. Therefore, even with implementation of MM NOISE-1, noise levels may exceed the local noise standards, and Impact NOISE 1 remains **significant and unavoidable**.

4.17.3.2 Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels (less than significant)

Flow Measures Impact Analysis

Under the FAHCE-plus Alternative, the proposed flow measures would not disturb native soil and/or built-environment resources. For this reason, there would be no ground-borne vibration or ground-

[20] Impact conclusion provided after consideration of mitigation.

borne noise levels from flow changes under the FAHCE-plus Alternative; therefore, there would be no impact.

Non-flow Measures Impact Analysis

As discussed in Section 3.14.4.2, non-flow measures could involve additional improvements that could cause excessive ground-born vibration or heightened noise levels. Limiting pile driving to daytime hours, compliance with the local noise ordinances, and implementation of BMP GEN-38 would reduce the vibration impacts to a less-than-significant level.

Monitoring, Maintenance, and Adaptive Management

Under the Non-flow Measures Only Alternative, impacts on monitoring, maintenance, and adaptive management would be the same as for the Proposed Project. As discussed in Section 3.14.4.2, maintenance, monitoring, and adaptive management would involve equipment that could cause excessive ground-borne vibration or excessive noise. Restricting these activities to daytime hours would reduce the vibration impacts to less than significant.

Significance Conclusion Summary

Compliance with local noise ordinances; implementation of BMP GEN-38; and limiting construction, monitoring, and maintenance activities to daytime hours would reduce the vibration impacts to **less than significant**.

Mitigation

No mitigation would be necessary to reduce these impacts to a less-than-significant level.

4.18 Impact Analysis on Utilities

This section assesses the impacts on utilities, and specifically solid waste generation, from implementation of the No Project Alternative, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. The alternatives impact assessment for utilities follows the same methodology as laid out for the Proposed Project analysis in Section 3.15.3.

Table 4.18-1 summarizes alternative impact conclusions and a comparison to the Proposed Project, as analyzed in Section 3.15, *Utilities*.

Table 4.18-1. Alternative Impacts Comparison Summary for Utilities

Impact	Measure Type	Proposed Project	No Project Alternative	Non-flow Measures Only Alternative	FAHCE-plus Alternative
Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure	Flow measures	NI	NI (=)	NI (=)	NI (=)
Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure	Non-flow measures	LTS	NI (-)	LTS (=)	LTS (=)

Notes: LTS = less-than-significant impact, NI = no impact, (+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project

4.18.1 No Project Alternative

Under the No Project Alternative, there would be no changes to the managed flow volumes in the Guadalupe River and Stevens Creek watersheds, and no implementation of the non-flow measures of the Proposed Project. There would be no monitoring implemented under the No Project Alternative. This section evaluates the impacts on utilities, specifically solid waste generation, associated with the No Project Alternative.

4.18.1.1 Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure (no impact)

Flow Measures Impact Analysis

Under the No Project Alternative, there would be no change in managed flow volumes and no change in water rights in Stevens Creek and the Guadalupe River watersheds. Therefore, there would be no impact to solid waste generation related to flow under the No Project Alternative.

Non-flow Measures Impact Analysis

Under the No Project Alternative, there would be no implementation of the non-flow measures included in the Proposed Project. Therefore, there would be no impact to solid waste generation related to non-flow measures under the No Project Alternative.

Monitoring, Maintenance, and Adaptive Management

Under the No Project Alternative, monitoring, maintenance, and adaptive management would not be implemented, and no impact would occur.

Significance Conclusion Summary

There would be **no impact** to the generation of solid waste under the No Project Alternative for flow measures and non-flow measures.

4.18.2 Non-flow Measures Only Alternative

The impacts of the Non-flow Measures Only Alternative to solid waste generation would be the same as the non-flow measure impacts identified in Section 3.15.4.1; that is, impacts could result from the non-flow measures, monitoring, and maintenance of habitat improvements. There would be no change in managed flow volumes; therefore, the Non-flow Measures Only Alternative would have no impact to solid waste generation from flow measures.

4.18.2.1 Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure (less than significant)

Flow Measures Impact Analysis

Under the Non-flow Measures Only Alternative, flow measures would not be implemented, and flow measures would not change current and future baseline conditions; therefore, there would be no impact to utilities.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. Project activities that could generate solid waste, construction debris, and/or green waste include removal of fish barriers, vegetation removal, installation of root wads and LWD, installation of rock or log weirs, removal of culverts, and installation of riprap or other structures. Installation of approved habitat materials in channel or along banks could also generate hazardous waste. Landfills serving the Project area include Newby Island Sanitary Landfill, Kirby Canyon Recycling and Disposal Facility, Guadalupe Sanitary Landfill, and Zanker Material Processing Facility (see Table 3.15-1). These landfills have the capacity to receive waste generated by the Non-flow Measures Only Alternative.

Ground disturbing activities under the Non-flow Measures Only Alternative would also have the potential to disturb soils with mercury. Implementation of BMP GEN-3 would involve treatment, remediation, and proper disposal of contaminated soil at a Class I landfill, following established work practices and hazard control measures. Further, the Non-flow Measures Only Alternative would comply with federal, state, and local regulations for solid waste and hazardous waste. Therefore, impacts from solid waste would be less than significant, as discussed in Section 3.15.4.1.

Monitoring, Maintenance, and Adaptive Management

AMP and implementation of monitoring protocols would require pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. These activities would not result in the generation of solid waste. Maintenance activities and adaptive measures, however, would involve similar activities as laid out in the non-flow measures for the Proposed Project, with additional riprap, restoring, or operation repair of a facility, and would generate limited amounts of solid waste that could be supported by existing landfills. Impacts would be less than significant.

Significance Conclusion Summary

The Non-flow Measures Only Alternative would not generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure. Impacts from solid waste generation under the Non-flow Measures Only Alternative would be **less than significant**.

Mitigation

No mitigation would be required to reduce impacts to a less-than-significant level.

4.18.3 FAHCE-plus Alternative

Under the FAHCE-plus Alternative, there would be modifications in the pulse flows as compared to the Proposed Project. The non-flow measures of the FAHCE-plus Alternative would be identical to those of the Proposed Project and would involve ground disturbance activities as well as the removal of culverts, riprap, or other structures. These activities would generate solid waste, as described below. Effects of monitoring and maintenance of habitat improvements are included in the analysis of the FAHCE-plus Alternative.

4.18.3.1 Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure (less than significant)

Flow Measures Impact Analysis

Implementation of flow measures under the FAHCE-plus Alternative would not require construction, ground disturbance, installations, vegetation removal, or any other activities likely to generate solid or hazardous waste. Therefore, there would be no impact.

Non-flow Measures Impact Analysis

Impacts of non-flow measures would be the same as for the Proposed Project. As with the Proposed Project and the Non-flow Measures Only Alternative, activities under the FAHCE-plus Alternative could generate solid waste, such as construction debris and waste from removal of fish barriers, vegetation removal, installation of root wads and LWD, installation of rock weirs, removal of culverts, and installation of riprap or other structures. Installation of approved habitat materials in channels or along banks could also generate hazardous waste. Landfills serving the Project area, listed in Table 3.15-1, would have the capacity to accommodate Project-related solid waste. The FAHCE-plus Alternative would not generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure.

Ground-disturbing activities under the FAHCE-plus Alternative would also have the potential to disturb soils with mercury. Implementation of BMP GEN-3 would involve treatment, remediation, and proper disposal of contaminated soil at a Class I landfill, following established work practices and hazard control measures. Further, the FAHCE-plus Alternative would comply with federal, state, and local regulations for solid waste and hazardous waste. As a result, impacts would be less than significant.

Monitoring, Maintenance, and Adaptive Management

AMP and implementation of monitoring protocols would require pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. These activities would not result in the generation of solid waste. Maintenance activities and adaptive measures, however, would involve similar activities as laid out in the non-flow measures for the Proposed Project, with additional riprap, restoring, or operation repair of a facility, and would generate limited amounts of solid waste that could be supported by existing landfills. Impacts would be less than significant.

Significance Conclusion Summary

The FAHCE-plus Alternative would not generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure. Solid waste impacts would be **less than significant** under the FAHCE-plus Alternative.

Mitigation

No mitigation would be required to reduce impacts to a less-than-significant level.

4.19 Comparison of Alternative Impacts

Table 4.19-1 summarizes impacts of the alternatives.

Table 4.19-1. Comparison of Alternative Impacts

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Hydrology								
Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of a course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site	LTS	LTS	S/U (+)	NI (-)	NI (-)	LTS (=)	LTS (=)	LTS (=)
Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream runoff in a manner that would result in flooding on or off site	LTS	LTS	S/U (+)	NI (-)	NI (-)	LTS (=)	LTS (=)	LTS (=)
Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff	LTS	LTS	S/U (+)	NI (-)	NI (-)	LTS (=)	LTS (=)	LTS (=)
Groundwater Resources								
Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin	LTS	NI	NI (-)	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality	LTS	NI	NI (-)	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)
Water Supply								
Impact WS-1: Substantially alter or reduce Valley Water's ability to have sufficient water supplies available to serve its retailers from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years	LTS	NI	NI (-)	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)
Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects	NI	NI	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)
Water Quality								
Impact WQ-1: Impair beneficial uses of surface waters	LTS (beneficial)	LTS (beneficial)	NI (-)	NI (-)	NI (-)	LTS (beneficial) (=)	LTS (beneficial) (=)	LTS (beneficial) (=)
Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality	LTS (beneficial)	LTS (beneficial)	NI (-)	NI (-)	NI (-)	LTS (beneficial) (=)	LTS (beneficial) (=)	LTS (beneficial) (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Recreation								
Impact REC-1: Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated	LTS	LTS	NI (-)	NI (-)	NI (-)	LTS (=)	LTS (=)	LTS (=)
Aquatic Biological Resources								
Impact AQUA-1a: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Stevens Creek watershed portion of the study area – *Steelhead*	Current: NI (beneficial)	Short-term: LTS	Current: NI (=)	Short-term: NI (-)	Current: NI (=)	Short-term: LTS (=)	Current: NI (beneficial) (=)	Short-term: LTS (=)
	Future: NI (beneficial)	Long-term: NI (beneficial)	Future: NI (=)	Long-term: NI (=)	Future: NI (=)	Long-term: NI (beneficial) (=)	Future: NI (beneficial) (=)	Long-term: NI (beneficial) (=)
Impact AQUA-1a: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Stevens Creek watershed portion of the study area – *Pacific Lamprey*	Current: NI (beneficial)	Short-term: LTS	Current: NI (=)	Short-term: NI (-)	Current: NI (=)	Short-term: LTS (=)	Current: NI (beneficial) (=)	Short-term: LTS (=)
	Future: NI (beneficial)	Long-term: NI (beneficial)	Future: NI (=)	Long-term: NI (=)	Future: NI (=)	Long-term: NI (beneficial) (=)	Future: NI (beneficial) (=)	Long-term: NI (beneficial) (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area – *Steelhead*	Current: NI (beneficial)	Short-term: LTS	Current: LTS (+)	Short-term: NI (-)	Current: NI (=)	Short-term: NI (beneficial) (=)	Current: NI (beneficial) (=)	Short-term: LTS (=)
	Future: NI (beneficial)	Long-term: NI (beneficial)	Future: LTS (+)	Long-term: NI (=)	Future: NI (=)	Long-term: NI (beneficial) (=)	Future: NI (beneficial) (=)	Long-term: NI (beneficial) (=)
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area – *Chinook Salmon*	Current: LTS (beneficial)	Short-term: LTS	Current: LTS (=)	Short-term: NI (-)	Current: NI (-)	Short-term: LTS (=)	Current: LTS (=)	Short-term: LTS (=)
	Future: LTS (beneficial)	Long-term: NI (beneficial)	Future: LTS (=)	Long-term: NI (=)	Future: NI (-)	Long-term: NI (beneficial) (=)	Future: LTS (=)	Long-term: NI (beneficial) (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area – *Pacific Lamprey*	Current: NI (beneficial)	Short-term: LTS	Current: LTS (+)	Short-term: NI (-)	Current: NI (=)	Short-term: LTS (=)	Current: NI (beneficial) (=)	Short-term: LTS (=)
	Future: NI (beneficial)	Long-term: NI (beneficial)	Future: LTS (+)	Long-term: NI (=)	Future: NI (=)	Long-term: NI (beneficial) (=)	Future: NI (beneficial) (=)	Long-term: NI (beneficial) (=)
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area – *Sacramento Hitch*	Current: NI (beneficial)	Short-term: LTS	Current: NI (=)	Short-term: NI (-)	Current: NI (=)	Short-term: LTS (=)	Current: NI (beneficial) (=)	Short-term: LTS (=)
	Future: NI (beneficial)	Long-term: NI (beneficial)	Future: NI (=)	Long-term: NI (=)	Future: NI (=)	Long-term: NI (beneficial) (=)	Future: NI (beneficial) (=)	Long-term: NI (beneficial) (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact AQUA-1b: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS in the Guadalupe River watershed portion of the study area – *Riffle Sculpin*	Current: NI	Short-term: LTS	Current: LTS (+)	Short-term: NI (-)	Current: N/A	Short-term: LTS (=)	Current: NI (=)	Short-term: LTS (=)
	Future: NI	Long-term: NI (beneficial)	Future: LTS (+)	Long-term: NI (=)	Future: N/A	Long-term: NI (beneficial) (=)	Future: NI (=)	Long-term: NI (beneficial) (=)
Terrestrial Biological Resources								
Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	NI	S/M	NI (=)	NI (-)	NI (=)	S/M (=)	NI (=)	S/M (=)
Impact TERR-2: Have a substantial adverse effect on riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS	NI (beneficial)	S/M	NI (=)	NI (-)	NI (=)	S/M (=)	NI (beneficial) (=)	S/M (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means	NI (beneficial)	S/M	NI (=)	NI (-)	NI (=)	S/M (=)	NI (beneficial) (=)	S/M (=)
Impact TERR-4: Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites	NI (beneficial)	LTS (beneficial)	NI (=)	NI (-)	NI (=)	LTS (beneficial) (=)	NI (beneficial) (=)	LTS (beneficial) (=)
Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance	NI	S/M	NI (=)	NI (-)	NI (=)	S/M (=)	NI (=)	S/M (=)
Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan	NI	NI	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)
Cultural Resources								
Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built-Environment Resources	NI	S/U	NI (=)	NI (-)	NI (=)	S/U (=)	NI (=)	S/U (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources	NI	S/U	NI (=)	NI (-)	NI (=)	S/U (=)	NI (=)	S/U (=)
Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Tribal Cultural Resources								
Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed, or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant	NI	S/U	NI (=)	NI (-)	NI (=)	S/U (=)	NI (=)	S/U (=)
Geology and Soils								
Impact GEO-1: Result in substantial soil erosion or the loss of topsoil	LTS	LTS	NI (-)	NI (-)	NI (-)	LTS (=)	LTS (=)	LTS (=)
Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site	NI	S/M	NI (=)	NI (-)	NI (=)	S/M (=)	NI (=)	S/M (=)
Air Quality								
Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact AIR-2: Violate any air quality standards or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
GHG Emissions and Energy								
Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs	NI	NI	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)	NI (=)
Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)

Alternative Impact	Proposed Project		No Project Alternative		Non-flow Measures Only Alternative		FAHCE-plus Alternative	
	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures	Flow Measures	Non-flow Measures
Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Noise								
Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels	NI	S/U	NI (=)	NI (-)	NI (=)	S/U (=)	NI (=)	S/U (=)
Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)
Utilities								
Impact UTIL-1: Generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure	NI	LTS	NI (=)	NI (-)	NI (=)	LTS (=)	NI (=)	LTS (=)

Notes: N/A = not applicable, NI = no impact, LTS = less than significant, S/M = significant but mitigable to a less-than-significant impact, S/U = significant and unavoidable
(+) = higher adverse impact than Proposed Project, (-) = lower adverse impact than Proposed Project, (=) = equal adverse impact as Proposed Project
Current = current baseline, Future = future baseline, beneficial = beneficial impact

4.20 Environmentally Superior Alternative

CEQA Guidelines Section 15126.6(e)(2) requires the identification of an environmentally superior alternative to the proposed project. If the environmentally superior alternative is the no project alternative, the EIR shall also identify an environmentally superior alternative among the action alternatives. For this EIR, the No Project Alternative is not considered environmentally superior because it would not achieve the Project objectives, which emphasize taking actions to retore and maintain healthy steelhead and Chinook salmon populations.

As noted in the Project and action alternative descriptions, the non-flow measures in each Project and action alternative description are identical. The variation in the Proposed Project (FAHCE) and FAHCE-plus Alternative focuses primarily on the pulse flows.

Based on the analysis of the proposed flow measures under both the Proposed Project and FAHCE-plus Alternative, the FAHCE-plus Alternative was found to improve habitat conditions and migration potential for steelhead to the largest extent. The FAHCE and FAHCE-plus Alternatives otherwise both improved habitat conditions overall and migration potential for Chinook salmon. Other resources, including hydrology, water quality, groundwater, and water supply, showed differences between the Proposed Project and FAHCE-plus Alternative; however, given the importance of steelhead impacts to achieving Project objectives, those differences were not at a level that would sway the selection of an environmentally superior alternative.

The proposed non-flow measures, common to the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative, were found to improve habitat conditions overall for both steelhead and Chinook salmon. However, the Non-flow Measures Only Alternative would forego benefits to fisheries habitat and migration potential achieved by the flow measures included in the Proposed Project and the FAHCE-plus Alternative.

Based on this analysis, while the Proposed Project and FAHCE-plus Alternative achieve the Project objectives and requirements of the Settlement Agreement and have similar levels of impact significance after the implementation of mitigation, the FAHCE-plus Alternative is the environmentally superior alternative because it has the greatest benefits to steelhead habitat conditions and migration potential.

Chapter 5 – Other Statutory Considerations

5 Other Statutory Considerations

5.1 Introduction

In addition to identifying the effects of the Proposed Project and measures to mitigate significant effects (Chapter 3, *Environmental Setting and Impact Analysis*), and project alternatives and their effects (Chapter 4, *Alternatives*), the CEQA Guidelines list the following other topics:

- significant irreversible environmental changes [CEQA Guidelines Section 15126.2(c)]
- significant and unavoidable impacts [CEQA Guidelines Section 15126.2(b)]
- growth-inducing impacts [CEQA Guidelines Section 15126(d)]
- cumulative impacts [CEQA Guidelines Section 15130]

5.2 Irreversible Impacts

Section 15126.2(d) of the CEQA Guidelines requires that an EIR must identify any irreversible impacts (also referred to as irreversible environmental changes) that may be caused by a project if it is implemented. Irretrievable commitments of resources should be evaluated to ensure that current consumption is justified. Examples noted by the CEQA Guidelines include:

- Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible because a large commitment of such resources makes removal or nonuse thereafter unlikely.
- Primary impacts and, particularly, secondary impacts (such as a highway improvement that provides access to a previously inaccessible area) generally commit future generations to similar uses.
- Irreversible damage can result from environmental accidents associated with the project.

For this analysis, the irreversible impacts described below could occur as a result of the Proposed Project, the Non-flow Measures Only Alternative, and/or the FAHCE-plus Alternative.

The Proposed Project and alternatives considered in this EIR would include activities primarily at existing Valley Water-owned or -maintained sites. Habitat-improvement projects in streams and channels would involve the use of vehicles and heavy equipment that would use nonrenewable fossil fuels to transport construction materials, equipment, and construction workers to and from the work sites; these same vehicles would be used to construct the proposed modifications. Natural resources such as iron (for example, steel) and gravel (for cement work) would likely be used at some sites for new construction or modifications to existing structures.

Overall, construction activity included as part of both the Proposed Project and each action alternative would not consume a substantial quantity of resources such as fossil fuel energy because work sites would be limited in size and duration. During construction, Valley Water would use fossil fuels and materials in an efficient manner, thus reducing cost and potential environmental effects (such as temporary air quality effects that could result from prolonged engine idling).

Long-term operation of new or modified structures would not require fossil fuel consumption, but maintenance-related travel of Valley Water personnel to and from sites would use small amounts of fossil fuels such as petroleum products and natural gas.

Project- and alternative-related construction would occur mainly at sites already owned and managed by Valley Water; the affected sites are already disturbed. Neither the Proposed Project nor the alternatives would commit additional (new) land to Valley Water uses. Valley Water intends to continue using the existing facilities, so the sites are not likely to be abandoned or converted to or available for another type of use.

In summary, vehicle and equipment operation associated with project and alternative activities and vehicle use associated with construction and site maintenance would require using nonrenewable fossil fuels. Construction would also require using materials such as steel and gravel. The limited quantity of these resources that would be used for the Proposed Project and action alternatives would not noticeably reduce the availability of these resources for other projects or uses.

Flow changes would not cause irreversible environmental impacts because the changes would be within the historic range of variability and would not require the acquisition and commitment of additional water supplies beyond those already planned to meet future demand. Those have been considered as part of the hydrologic model scenario for the future baseline conditions.

5.3 Significant and Unavoidable Impacts

Section 15126.2(c) of the CEQA Guidelines requires an EIR to discuss significant effects, including those that can be mitigated but not reduced to a level of insignificance. For this analysis, all of these identified significant and unavoidable impacts could occur as a result of the Proposed Project, the Non-flow Measures Only Alternative, or the FAHCE-plus Alternative. These impacts are as follows.

- Cultural Resources
    - **Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources.** Even with the implementation of Mitigation Measure CUL-1c (Recording a building or structure to HABS/HAER), pending consideration at a project-level, the removal of the historic structure might still occur and be considered significant and unavoidable.
    - **Impact CUL-2: Result in a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources.** For non-flow measures, even with implementation of Mitigation Measures CUL-2a (Conduct Cultural Resources Studies) and CUL-2b (Halt Construction and Implement an Accidental-Discovery Plan upon Accidental Discovery), all non-flow project circumstances are not foreseeable, and impacts could remain significant and unavoidable.
- Tribal Cultural Resources
    - **Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant.** For non-flow measures, implementing Mitigation Measure TRI-1a (Conduct Cultural Resources Studies and Avoid Effects on TCR) and Mitigation Measure TRI-1b (Consult with Native American Communities and Implement Appropriate Measures to Mitigate Effects on TCRs) would reduce Impact TRI-1 to a less than significant level in most cases, but may not necessarily reduce impacts to some categories of TCRs. In such instances, Impact TRI-1 would be significant and unavoidable.
- Noise
    - **Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels.** Implementation of BMP

GEN-38 would reduce the non-flow measure construction and maintenance noise impacts to the extent feasible. However, because all non-flow project circumstances are not foreseeable, and noise levels may continue to exceed the local noise standards, Impact NOISE-1 remains significant and unavoidable.

5.4 Growth-inducing Impacts

Section 15126(e) of the CEQA Guidelines requires an EIR to include an analysis of the growth-inducing impacts of the project. Section 15126.2(d) of the CEQA Guidelines states that the analysis of growth-inducing impacts should discuss the ways in which the program could foster economic or population growth (such as by removing obstacles to growth) or the construction of additional housing, either directly or indirectly, in the surrounding environment.

In general, a project can be considered growth inducing if it meets one or more of the following criteria:

- removes an obstacle to growth
- induces population growth
- induces economic expansion
- establishes precedent-setting actions (such as an innovation or expansion beyond the existing limits of the proposed project area)
- results in the development or encroachment in an isolated or adjacent area of open space

The Proposed Project, the Non-flow Measures Only Alternative, or the FAHCE-plus Alternative would not result in increases in water supply that would support population growth or remove water supply as a limiting factoring in local development in Santa Clara County. The Proposed Project, the Non-flow Measures Only Alternative, or the FAHCE-plus Alternative activities would not result in new development or encroachment in undeveloped or open space areas. Neither the Proposed Project nor its alternatives would meet any of the growth-inducing criteria, and therefore they would not induce growth in the Project area.

5.5 Approach to Cumulative Impact Analysis

Section 15130 of the CEQA Guidelines requires that EIRs include a discussion of cumulative impacts. Cumulative impacts are two or more individual effects which, when considered together, are considerable or compound or increase other environmental impacts (CEQA Guidelines Section 15355). The individual effects can be changes resulting from a single project or a number of separate projects. The cumulative effect from several projects is the change in the environment that results from the incremental impact of the project when added to other reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Two methods can be used for cumulative impact analysis (CEQA Guidelines Section 15130). In the list approach, the lead agency identifies related projects or activities that could add to the proposed project's environmental impacts. In the projection, or plan, approach, the lead agency relies on projections in an adopted planning document (for example, a General Plan EIR) or prior environmental document. This EIR uses the list approach.

5.5.1 Methods Used in This Analysis

The potential for project-related impacts to cause or contribute to cumulative effects depends on the extent of the effects of other past, present, and reasonably foreseeable probable future projects, plans, and programs. This EIR's cumulative analysis relies on the following approach:

- The geographic study area for the cumulative impact analysis is specific to each resource topic. The geographic study areas for the cumulative impact analysis encompass the Stevens Creek and Guadalupe River watersheds and the areas surrounding other relevant Valley Water and non-Valley Water projects and plans in northern Santa Clara County for all resources except for the following resources:
  - Air Quality – the geographic study area for air quality encompasses the SFBAAB.
  - GHG and Energy – The geographic study area for GHG covers the state of California.
  - Utilities – The geographic study area for utilities includes Santa Clara County.
- Past and present activities are assumed to be part of the current baseline conditions.
- Reasonably foreseeable probable future projects, plans, and programs in each area that could affect or be affected by the resources identified are provided and defined (Section 5.6.1).[1]
- Existing information was used to help determine whether a Project-related impact could cause or contribute to a significant cumulative impact.
- For the cumulative impact analyses for those resources that incorporated model-driven analysis (namely hydrology, groundwater resources, water supply, water quality, recreation, and aquatic biological resources), cumulative impacts from certain probable future projects are already included in the future baseline conditions, including the potential future rule curves in the Coyote Creek watershed associated with the ADSRP. These projects include lifting dam seismic safety restrictions through the ADSRP and implementing Valley Water's UWMP.

For this EIR, this cumulative impact analysis is provided for the Proposed Project, the Non-flow Measures Only Alternative, and the FAHCE-plus Alternative. The following terminology is used in this EIR to describe the various levels and types of environmental impacts associated with the Proposed Project:

- **Cumulative impact**: Under CEQA, a cumulative impact refers to an impact created as a result of the project evaluated in the EIR, together with impacts of other reasonably foreseeable probable projects causing similar impacts. A significant cumulative impact is one in which the cumulative effect would exceed the applicable significance threshold.
- **Significance threshold**: Like that used to evaluate the impacts resulting from the Proposed Project and alternatives, this is the criterion used in the EIR to determine whether the magnitude of a cumulative environmental impact would be significant.
- **Significant cumulative impact**: A cumulative impact is considered significant if it would result in a substantial adverse change in the physical conditions of the environment, as determined by whether it exceeds the applicable significance threshold.
- **Cumulatively considerable:** Incremental project impacts are cumulatively considerable, and thus significant, when they are significant when viewed in connection with the effects of other projects [CEQA Guidelines Section 15064(h)(1)]. CEQA Guidelines Section 15130(a) states that, if the contribution of the project to a significant cumulative impact is less than considerable, the incremental impact is less than significant.

5.5.2 Projects, Plans, and Programs Considered in the Cumulative Impact Analysis

Table 5.5-1 lists and describes the reasonably foreseeable probable future projects, plans, and programs considered for the cumulative impact analysis. Constructions schedules are estimated for the purpose of informing a cumulative analysis and would be refined as project planning proceeds.

[1] Model-driven section also considers as part of the reasonably foreseeable future analysis the cumulative effects related to the future baseline conditions.

Table 5.5-1. Probable Future Projects, Programs, and Plans Considered for Cumulative Impact Analysis

Project Name	Description	Citation	Activity Location	Sponsor	Timeframe	Affected Resources
Stevens Creek Watershed Flood Protection	See below	See below	See below	See below	See below	See below
Permanente Creek, San Francisco Bay to Foothill Expressway	This project involves the planning, design and construction of improvements along 10.6 miles of Permanente Creek, from San Francisco Bay to Foothill Expressway, Hale Creek from Foothill Expressway to its confluence with Permanente Creek, and the diversion structure between Permanente and Stevens Creeks, to accomplish the following objectives: provide flood protection to 1,664 parcels, including Middlefield Road and Central Expressway; reduce erosion and sedimentation, reduce maintenance costs, and improve safety and stability of the failing channel on Permanente Creek from the San Francisco Bay to Foothill Expressway; provide environmental restoration and enhancement benefits, where opportunities exist; provide recreation enhancements, where opportunities exist; and provide natural flood protection by taking a multiple-objective approach.	Valley Water 2021d	Stevens Creek	Valley Water	Completion in 2021	Water Quality Recreation Aquatic Biological Resources Terrestrial Biological Resources Cultural Resources Tribal Cultural Resources Geology and Soils Air Quality GHG Emissions and Energy Noise Utilities
Palo Alto Flood Basin Tide Gate Structure Improvements	This project involves the planning, design and construction of a replacement of the existing Palo Alto Flood Basin tide gate structure to accomplish the following objectives: maintain flood protection in the communities surrounding the flood basin and along the US-101 corridor; prevent failure of the existing tide gate structure, which would result in increased risk of tidal and fluvial flooding; upsize the tide gate structure to function with 2 feet of future sea-level rise; and maintain or improve the level of flood protection for Matadero, Adobe, and Barron Creeks, including during construction and operation.	Valley Water 2021e	Stevens Creek	Valley Water	Completion in 2025	Water Quality Aquatic Biological Resources
San Francisquito Creek, San Francisco Bay through Searsville Dam	This project provides coordination and support to the San Francisquito Joint Powers Authority, in partnership with USACE, to complete planning and design documents for an approved project alternative on San Francisquito Creek, from San Francisco Bay through Searsville Dam. This project will accomplish the following objectives: provide flood protection; reduce bank erosion and sedimentation-related impacts along San Francisquito Creek; avoid potential adverse impacts on fish and wildlife habitats; and minimize impacts on the creek's environmental resources and restore the riparian corridor where feasible. The project will also replace two bridges between Highway 101 and Middlefield Road.	Valley Water 2021f	Stevens Creek	Valley Water, USACE	Completion in 2020	Water Quality Aquatic Biological Resources
Guadalupe River Watershed Flood Protection	See below	See below	See below	See below	See below	
Downtown Guadalupe River Flood Protection Project/Lower Guadalupe Project	The Downtown Guadalupe River Flood Protection Project was completed in 2004 by Valley Water and USACE for flood control purposes and extends from Highway 880 south to Highway 280. The project incorporates park elements and trails developed by the San José Redevelopment Agency and the City of San José. The Downtown Guadalupe River Flood Protection Project and Lower Guadalupe Project, located along the Upper and Lower Guadalupe, involve public access and environmental restoration along the Guadalupe River from Almaden Valley to Alviso. The Lower Guadalupe Project in Alviso was also completed in December 2004 and involved designing a system that ensured that floodwaters from the upper reaches of the river could be carried successfully through the Guadalupe River to San Francisco Bay. Together, these projects were intended to safeguard hundreds of homes, schools, and businesses from flooding and also enhance habitat for endangered fish.	Valley Water 2021g	Guadalupe River	Valley Water, USACE	Completed in 2004	Water Quality Aquatic Biological Resources Geology and Soils

Project Name	Description	Citation	Activity Location	Sponsor	Timeframe	Affected Resources
Guadalupe River-Upper, SPRR-Blossom Hill	This project partners with USACE to plan, design, and construct improvements along approximately 6 miles of the Guadalupe River, from I-280 to Blossom Hill Road, to accomplish the following objectives: provide one-percent flood protection to nearly 7,000 parcels along the Guadalupe River, from I-280 to Blossom Hill Road, including portions of Ross Creek and Canoas Creek; provide long-term net gains of 15 acres in riparian forest acreage, quality, and continuity of wildlife habitat, and conditions favoring Chinook salmon and steelhead trout; provide access to an additional 19 miles of suitable upstream spawning and rearing habitat, which would result in significant long-term beneficial impacts on fisheries resources; coordinate with the City of San José and the community to establish a continuous maintenance road suitable for trail development between I-280 and Los Alamitos Creek; and improve water quality by reducing bank erosion and sedimentation-related impacts along the river and tributaries. Reaches 6 and 10B have been completed. Reaches 7, 8, 9, 10A, 10C, 11, and 12 are in the design phase.	Valley Water 2021h	Guadalupe River	Valley Water, USACE	Completion in 2025	Water Quality Aquatic Biological Resources
Guadalupe River Flood Protection Project Adaptive Management	Annual monitoring of riparian vegetation, fisheries, and channel morphology. Adaptive management actions, as agreed to by the AMT, may be implemented. Actions that may have environmental impacts undergo environmental review and acquire permits as necessary. Fisheries monitoring includes passage assessment through the concrete section of the project. Sediment is cleared from the low-flow channel as needed when fish passage criteria are not met.	USACE and Valley Water 2001	Guadalupe River	Valley Water	Ongoing/ long-term per project permit requirements	Aquatic Biological Resources
Guadalupe River Watershed Water Supply and Water Quality Improvements	See below	See below	See below	See below	See below	See below
10-year Pipeline Rehabilitation (FY 2018 to FY 2027)	This project involves the inspection, planning, design, and renewal of Valley Water's pipelines and tunnels to accomplish the following objectives: perform dewatering and internal inspections of Valley Water's pipelines and tunnels; renew distressed pipe sections as required (renewal encompasses the actions of repair, rehabilitation, and replacement); perform maintenance and repair activities as required; replace old valves, flow meters, pipeline appurtenance assemblies, and piping as appropriate; and modify failure prone pipeline appurtenance connections. The first five years will include inspection and renewal work along the various pipelines and tunnels as identified below: 2018: Almaden Valley Pipeline; 2019: Cross Valley Pipeline and Calero Pipeline; 2021: Santa Clara Conduit; 2022: Pacheco Tunnel Reach 2, Santa Clara Tunnel, South Clara Tunnel, South Bay Aqueduct Retrofit Inspection.	Valley Water 2021i	Guadalupe River	Valley Water	Completion in 2027	Hydrology Groundwater Resources Water Supply Water Quality Recreation Terrestrial Biological Resources Cultural Resources Tribal Cultural Resources Geology and Soils Air Quality GHG Emissions and Energy Noise
Vasona Pumping Plant Upgrade	This project involves the planning, design, and construction of improvements to the Vasona Pump Station, including replacing aging pumps, motors, drives, valves, actuators, and electrical and control systems that have reached the end of their useful life; and adding one redundant pump. The project will accomplish the following objectives: eliminate the risk of failure by replacing assets that have reached the end of their useful life, including four pumps (two 200 horsepower, two 400 horsepower) and associated motors, drives, electrical and control systems, as well as pump discharge and suction valves and actuators; and increase operational flexibility and prepare for future capacity needs by adding one redundant pump and increasing the size of the two 200 horsepower pumps.	Valley Water 2021j	Guadalupe River	Valley Water	Completion in 2023	Hydrology Groundwater Water Supply Water Quality

Project Name	Description	Citation	Activity Location	Sponsor	Timeframe	Affected Resources
Guadalupe River Watershed Facility/Dam Seismic Retrofitting and Safety	See below	See below	See below	See below	See below	See below
Almaden Dam Improvements Project	The project involves modification or construction of a new intake structure to meet DSOD regulatory standards; reconfiguration of the spillway as a result of potential findings from the reservoir's future probably maximum flood investigation; and correction of ongoing operation and maintenance issues to aging hydraulic lines, valves and energy dissipaters. The project also includes a separate future element to fix the Almaden-Calero Canal to restore operational capacity to the canal and stabilize and improve maintenance access; however, these improvements are on hold until Valley Water completes improvements at the Anderson, Calero, and Guadalupe Dams. Hydrology impacts of this project are integrated with the future baseline.	Valley Water 2018a	Guadalupe River	Valley Water	To be determined	Hydrology Groundwater Resources Water Supply Water Quality Aquatic Biological Resources
Calero Dam Seismic Retrofit	This project involves the planning, design, and construction of improvements to the Calero and Guadalupe Dams to accomplish the following objectives: stabilize the Calero Dam embankment to withstand a Maximum Credible Earthquake; modify or replace the outlet works if determined to be inadequate; modify the spillway or increase the freeboard of the dam for safe passage of the Probable Maximum Flood; provide modifications that do not preclude potential future expansion of dam and reservoir to provide additional reservoir storage; and remove or relocate the Bailey Ranch structures and breach Fellow's Dike. Hydrology impacts of this project are integrated with the future baseline.	Valley Water 2021k	Guadalupe River	Valley Water	Completion in 2023	Hydrology Groundwater Resources Water Supply Water Quality Recreation Aquatic Biological Resources Terrestrial Biological Resources
Guadalupe Dam Seismic Retrofit	This project involves the planning, design, and construction of improvements to the Calero and Guadalupe Dams to accomplish the following objectives: stabilize the embankment to withstand a Maximum Credible Earthquake; implement improvements as necessary for the Dam system to safely pass the Probable Maximum Flood; ensure that the outlet works and hydraulic control system meet DSOD requirements; relocate the intake structure out of the upstream berm in a timely manner; and incorporate other measures to address seismic and other dam safety deficiencies that are identified through the Project delivery process. Hydrology impacts of this project are integrated with the future baseline.	Valley Water 2021l	Guadalupe River	Valley Water	Completion in 2024	Groundwater Resources Water Supply Water Quality Recreation Aquatic Biological Resources Terrestrial Biological Resources

Project Name	Description	Citation	Activity Location	Sponsor	Timeframe	Affected Resources
Guadalupe River Watershed Fish Passage and Habitat Improvements	See below	See below	See below	See below	See below	See below
Almaden Lake Improvement Project	The project will separate Alamitos Creek from Almaden Lake and restore Alamitos Creek's stream function within the footprint of Almaden Lake. The goals are to improve water quality and physical habitat for steelhead and other anadromous fish by separating the creek from the lake while incorporating the principle of geomorphic design to create a self-sustaining channel that requires little maintenance to keep it viable for fisheries and wildlife benefits. Benefits of this project will be creation of channel complexity in the restored stream channel such as instream riffle-pool habitat, cover for rearing fish, gravel to support spawning and plantings that will provide numerous ancillary wildlife benefits; reduction of high water temperatures released from Almaden Lake into Alamitos Creek; and removal of entrainment, predatory and methylmercury impacts on anadromous fish from Almaden Lake. The objectives are as follows: separate Alamitos Creek from Almaden Lake; reduce thermal barrier to migration of anadromous fish; remove entrainment and impacts from predatory species to anadromous fish; reduce mercury concentration in target fish to meet applicable water quality objectives; and minimize impacts on recreational features. This project is the early implementation of the FAHCE Plan for Almaden Lake to isolate Almaden Lake from Alamitos Creek and prevent entrainment of steelhead trout and salmon.	Valley Water 2021a	Guadalupe River	Valley Water	Completion in 2024	Hydrology Groundwater Resources Water Supply Water Quality Recreation Aquatic Biological Resources Geology and Soils
Valley Water-wide Flood Protection	See below	See below	See below	See below	See below	See below
San Francisco Bay Shoreline	This project is a partnership with the California State Coastal Conservancy, USACE, and regional stakeholders to provide tidal flood protection, restore and enhance tidal marsh and related habitats, and provide recreational and public access opportunities. Initial construction for flood protection is planned for Economic Impact Area 11, which is the urban area of north San José and the community of Alviso.	Valley Water 2021m	Stevens Creek	Valley Water, California State Coastal Conservancy, USACE, and regional stakeholders	Completion in 2028	Aquatic Biological Resources
SMP	This program removes sediment, manages vegetation, clears trash and debris, and stabilizes banks within channel reaches that have been modified for flood protection. Work is performed annually between June and October following approval of the season's proposed work by the regulatory agencies. The program also includes the removal of nonnative/invasive vegetation and management of upland vegetation on Valley Water properties to comply with local fire codes and ensure access to the channels for maintenance and emergency work. An SMP mitigation measure, Stream and Watershed Land Preservation, includes acquisition and preservation of land in the upper watersheds in accordance with commitments made in Valley Water's SMP.	Valley Water 2021n	Stevens Creek, Guadalupe River	Valley Water	Ongoing/ long-term	Hydrology Groundwater Resources Water Supply Water Quality Recreation Aquatic Biological Resources Cultural Resources Tribal Cultural Resources Geology and Soils Air Quality GHG Emissions and Energy Noise

Project Name	Description	Citation	Activity Location	Sponsor	Timeframe	Affected Resources
Valley Water-wide Water Supply and Water Quality Improvements	See below	See below	See below	See below	See below	See below
Water Supply Master Plan 2040	The Water Supply Master Plan 2040 looks ahead at how water needs and water supply may change over the next 20 years. The population is likely to grow; aging water infrastructure must be maintained and renewed; additional regulations and land use changes may impact how Valley Water uses water; and climate changes are likely to alter the Sierra Nevada Mountains' snowpack resulting in longer and more severe droughts.	Valley Water 2019a	Stevens Creek, Guadalupe River	Valley Water	Ongoing/ long-term	Water Supply
2015 UWMP	The 2015 UWMP complements other Valley Water water resource planning efforts including planning for annual operations, sustainable groundwater management, recycled water, integrated water resource management, and integrated regional water management. Most importantly, it provides the demand and supply projections that form the basis of Valley Water's Water Supply and Infrastructure Master Plan (Water Master Plan), which presents Valley Water's strategy for providing a reliable future water supply for Santa Clara County and ensuring new water supply investments are effective and efficient. Water supply and demand assumptions and hydrology impacts are integrated into the future baseline. A 2020 UWMP was in preparation at the time this Draft EIR was being prepared.	Valley Water 2016a	Stevens Creek, Guadalupe River	Valley Water	Ongoing	Hydrology Groundwater Resources Water Supply Water Quality Recreation
Countywide Water Reuse Master Plan	The Countywide WRMP complements other plans, including the 2015 UWMP, to help meet Valley Water's Water Supply Master Plan 2040 goals. Valley Water initiated the Countywide Master Plan effort to identify feasible opportunities to expand water reuse as part of the strategy to improve water supply reliability and increase regional self-reliance for the Santa Clara County's nearly 2 million residents and growing economy. Critical to a successful outcome, development of the Countywide Master Plan must align with Valley Water's One Water Plan and Water Supply Master Plan 2040 and engage project partners to collaboratively identify and evaluate opportunities for expanding reuse. This vision evolved over recent years and expanded into a programmatic approach and collaborative effort to develop a Countywide reuse strategy that aims to: 1) Integrate existing recycled water systems and expand non-potable re-use; and 2) Develop purified water systems in partnership with recycled water producers/suppliers and other interested parties to enable potable reuse. Valley Water released a Draft Countywide WRMP in July 2020, with the final plan scheduled for 2021.	Valley Water 2020g	Stevens Creek, Guadalupe River	Valley Water	Ongoing/ long-term	Water Supply
Impaired Water Bodies Program	Valley Water employs oxygenation systems at Calero Reservoir, Guadalupe Reservoir, Almaden Reservoir, and Stevens Creek Reservoir to reduce the formation of methylmercury to meet TMDL standards set in place by the RWQCB.	Valley Water 2021o	Stevens Creek, Guadalupe River	Valley Water	Ongoing/ long-term	Hydrology Groundwater Resources Water Supply Water Quality Aquatic Biological Resources Terrestrial Biological Resources

Project Name	Description	Citation	Activity Location	Sponsor	Timeframe	Affected Resources
Encampment Clean Up Program	Valley Water, working with the City of San José, removes illegal encampments on Valley Water-owned property to reduce damage to riparian habitat, reduce trash entering the waterway, and improve water quality.	Valley Water 2021p	Stevens Creek, Guadalupe River	Valley Water	Ongoing/ long-term	Hydrology Groundwater Resources Water Supply Water Quality Aquatic Biological Resources Terrestrial Biological Resources Utilities
Small Capital Improvements, Water Treatment	This project provides resources for small capital improvements that replace or extend the life of an asset. This project implements a systematic approach of equipment replacement and renewal at the three water treatment plants and laboratory by designing and constructing improvements identified as part of Valley Water's 10-year asset management program. Typical activities included in this project include pump, motor, instrumentation, and valve replacement; chemical tank repairs; and large-scale renewal and replacement activities like clarifier mechanism overhaul and replacement. Planned projects to complete for Santa Teresa Water Treatment Plant, Penitencia Water Treatment Plant, Rinconada Water Treatment Plant, West Pipeline, and Silicon Valley Advanced Water Purification Center include: provide engineering, supplies, and services support for the Sulfuric Acid Water Quality project; purchase the Laboratory Information Management System and the Gas Chromatograph/Mass Spectrometer; and complete Small Capital Projects at Santa Teresa Water Treatment Plant, Rinconada Water Treatment Plant, Penitencia Water Treatment Plant, and Campbell Well Field.	Valley Water 2021j	Guadalupe River	Valley Water	Ongoing/ long-term	Hydrology Groundwater Resources Water Supply Water Quality
Pacheco Reservoir Expansion Project	The Valley Water Board has approved an MOU between Valley Water, Pacheco Pass Water District and San Benito County Water District and approved an option to buy land for a large dam and reservoir project, which has been in the planning stages for a decade. The project would establish a new dam and expanded reservoir on the North Fork of Pacheco Creek that could hold 141,000 AF of water, a substantial increase from the 6,000-AF capacity of the existing reservoir. Constructed in 1939 and used for groundwater recharge, the existing reservoir is located about 13 miles southwest of San Luis Reservoir, off Highway 152. A Draft EIR for the project was under preparation at the time this Draft EIR was being prepared.	Valley Water 2021q		Valley Water	Completion in 2030	Hydrology Groundwater Resources Water Supply Water Quality Terrestrial Biological Resources Cultural Resources Tribal Cultural Resources Air Quality GHG Emissions and Energy Noise Utilities

Project Name	Description	Citation	Activity Location	Sponsor	Timeframe	Affected Resources
Valley Water-wide Facility Dam Seismic Retrofitting and Safety	See below	See below	See below	See below	See below	
Dam Safety Program	This program is comprised of four key elements – periodic engineering studies, surveillance and monitoring, inspection and maintenance, and emergency response and preparedness. Maintenance on the dams consists of vegetation management on the dam face, along access roads, and around infrastructure such as spillways, outlets, and control systems.	Valley Water 2021r	Stevens Creek, Guadalupe River	Valley Water	Ongoing/ long-term	Hydrology Groundwater Resources Water Supply Water Quality Aquatic Biological Resources Terrestrial Biological Resources Cultural Resources Tribal Cultural Resources Geology and Soils Air Quality GHG Emissions and Energy Noise
Valley Water-wide Fish Passage and Habitat Improvements	See below	See below	See below	See below	See below	See below
Large Woody Debris and Gravel Augmentation	Valley Water has completed the Phase 1 report for this project, which includes project priority criteria and recommends potential project sites on eight major steelhead trout streams. Valley Water will begin the phase 2 study, which will examine the remaining streams. Valley Water completed construction of one instream complexity feature for steelhead in Stevens Creek at Clearcreek Court and has completed the 65 percent design for a gravel augmentation and LWD placement project in Los Gatos Creek (Guadalupe Watershed). The design has been submitted for regulatory review.	Valley Water 2021s	Stevens Creek, Guadalupe River	Valley Water	Completion in 2019	Water Quality Aquatic Biological Resources Terrestrial Biological Resources Utilities
South Bay Salt Ponds Restoration	This project reuses local sediment from streams flowing into San Francisco Bay to create and rehabilitate habitat in the South Bay Salt Ponds Restoration. Valley Water reuses sediment that has to be removed from streams to maintain their capacity to carry floodwaters. In partnership with USFWS, the clean sediment is applied to appropriate locations to improve the success of the South Bay Salt Ponds Restoration effort.	Valley Water 2021t	Stevens Creek	Valley Water	Completion in 2028	Aquatic Biological Resources Terrestrial Biological Resources Cultural Resources Tribal Cultural Resources Geology and Soils Air Quality GHG Emissions and Energy Noise
FAHCE-plus Flow Pilot Project	This 2-year pilot project began on October 15, 2020. The project implements the FAHCE-plus rule curves on the Guadalupe and Stevens Creeks on an experimental basis to test the efficacy of these rule curves; it was developed in consultation with the FAHCE Technical Workgroup. The pilot project also includes monitoring flows and water temperature within the CWMZs on Guadalupe Creek and Stevens Creek.	Ryan Heacock, personal communication, April 22, 2021. Valley Water 2021u	Stevens Creek, Guadalupe River	Valley Water	Completion in 2022	Aquatic Biological Resources

Project Name	Description	Citation	Activity Location	Sponsor	Timeframe	Affected Resources
Coyote Creek Watershed Facility/Dam Seismic Retrofitting and Safety	See below	See below	See below	See below	See below	See below
FERC Order Compliance Project (FOCP)	The FOCP is a set of proposed interim risk reduction measures as set forth in the FERC Order during the interim time period prior to construction and operation of the ADSRP. For public health and safety reasons, on February 20, 2020, FERC ordered Valley Water to implement the following interim risk reduction measures for Anderson Dam and Reservoir: (a) immediately lower and maintain the reservoir operating level no higher than elevation 565 feet; (b) lower the reservoir to elevation 488 feet (deadpool) beginning no later than October 1, 2020, as safely and quickly as possible and maintain deadpool to the extent feasible; (c) immediately design and construct the low-level outlet tunnel (Anderson Dam Tunnel) to more reliably and quickly draw down the reservoir after an earthquake and/or to better maintain deadpool during significant precipitation; and (d) implement the dam safety directives, including design and construction of the proposed low-level outlet, while securing alternative water supplies and working with FERC staff, and federal, state and local natural resource agencies to minimize environmental effects. To respond to the FERC Order, Valley Water modified Anderson Reservoir operations and will construct the Anderson Dam Tunnel Project, Anderson Reservoir bank and rim stability improvements, Anderson Reservoir intake structure reinforcement, extension of the Cross Valley Pipeline to the downstream side of the County of Santa Clara Ogier Ponds complex, water chiller units on the Coyote Discharge Line at the Coyote Pumping Plant, replacement of the Coyote Creek Percolation Pond Dam, and flood management measures along Coyote Creek near downtown San José. Further, FERC mandated environmental management and monitoring measures addressing biological, historical, and hydrologic resources in the vicinity of Anderson Reservoir, Coyote Creek downstream of Anderson Dam, and Upper Penitencia Creek. Collectively, these construction elements and environmental measures are referred to as the FOCP.	Valley Water 2020f	Coyote Creek	Valley Water	Under construction, completion in 2023	Hydrology Groundwater Resources Water Supply Recreation Terrestrial Biological Resources
Anderson Dam Seismic Retrofit Project	The ADSRP would correct dam seismic deficiencies and otherwise meet all current FERC and DSOD dam safety design standards. Upon completion of the proposed construction, reservoir storage restrictions would be lifted, allowing full reservoir storage capacity. Valley Water would also decommission a hydroelectric facility associated with dam operations, conditioned upon seismic retrofit of the dam. The project incorporates Avoidance and Minimization Measures that include proposed rule curves within Coyote Creek as outlined in the FHRP, fish passage barrier remediation, instream channel enhancements such as gravel augmentation and placement of LWD, and geomorphic restoration of 2,000 linear feet of stream channel.	Valley Water 2021v	Coyote Creek	Valley Water	Completion by 2030	Hydrology Groundwater Resources Water Supply Recreation Terrestrial Biological Resources

Project Name	Description	Citation	Activity Location	Sponsor	Timeframe	Affected Resources
Non-Valley Water Projects	See below	See below	See below	See below	See below	See below
Residential, Commercial, Industrial, and Recreation Area Development	Santa Clara County, San José, and other cities may implement a number of larger residential, industrial, commercial, and recreation area development projects throughout the county and within the cities through which the Three Creeks pass. The build out of these projects would add impacts that are discussed in various General Plan EIRs for relevant cities in Santa Clara County. Example projects include: ▪ The America Center (San José) ▪ Affordable housing developments (countywide) ▪ Residential developments (countywide) ▪ Serpa Quarry Minor Reclamation Plan Amendment (Milpitas) ▪ Mountain Winery (Los Gatos) ▪ Alma College Landmark Alteration Permit (Los Gatos)	Santa Clara County 2020 City of San José 2021b	Urban areas in Santa Clara County	Santa Clara County	Current	Water Quality Recreation Terrestrial Biological Resources Geology and Soils Air Quality GHG Emissions and Energy Noise Utilities
Habitat Restoration Program	Santa Clara Valley Habitat Agency Reserve System involves land acquisition, restoration, and protection of an estimated 46,900 acres of land that accomplishes the following: ▪ Acquires and permanently protects an estimated 33,600 acres of land for the benefit of covered species, natural communities, biological diversity, and ecosystem function. ▪ Incorporates about 13,300 acres of existing open space areas and enhances the long-term management and monitoring on those lands within the Reserve System. ▪ Protects 100 miles of streams ▪ Restores up to 500 acres of riparian woodland and scrub, wetlands, and ponds and up to 10.4 miles of streams to offset losses and contribute to species recovery ▪ Provides management and monitoring of habitats on protected lands to enhance populations of covered species and maintain ecosystem processes. ▪ Preserves major local and regional connections between key habitat areas and between existing protected areas.	Santa Clara Valley Habitat Agency 2018	County-wide	Santa Clara County Santa Clara Valley Habitat Agency	Ongoing/ long-term	Aquatic Biological Resources Terrestrial Biological Resources Air Quality GHG Emissions and Energy Noise

Project Name	Description	Citation	Activity Location	Sponsor	Timeframe	Affected Resources
Santa Clara County Parks Planning Projects and Natural Resource Management	Santa Clara County Parks has a number of current planning and development projects in the Santa Clara County park system. Current projects within the vicinity of the Three Creeks Project Area include the following: ▪ Alviso Dock Feasibility Study ▪ Coyote Highlands – Coyote Canyon Interim Management Plan ▪ Sanborn County Park Master Plan ▪ Environmental Review Documents for the Creekside and Meadowbrook Shelters Improvements Project ▪ Environmental Review Documents for the Motorcycle County Park Site Improvements Project ▪ Environmental Review Documents for the Los Gatos Creek Trail and Irrigation System Improvements Projects In addition, SCC Parks Natural Resource Management Program protects, enhances, and restores regional parks. Preservation of natural systems, biodiversity and special status species, and restoration of degraded habitats are all goals of the Santa Clara County Park's Natural Resource Program. Programs within the Natural Resource Management Program include vegetation management, rare plants, inventory and monitoring, fisheries and wildlife and the trails program.	Santa Clara County Parks 2019	Recreational areas of Santa Clara County	Santa Clara County Parks	Ongoing	Water Quality Recreation Aquatic Biological Resources Terrestrial Biological Resources

5.6 Cumulative Impact Analysis

This section summarizes the cumulative impact analysis by resource topics. Table ES-6 compares the Proposed Project's incremental contribution to the two Project alternatives.

5.6.1 Hydrology

The geographic study area for the cumulative impact analysis for hydrology encompasses portions of the Stevens Creek and Guadalupe River watersheds and the areas surrounding other relevant Valley Water and non-Valley Water projects and plans in northern Santa Clara County. Specifically, the study area in the Stevens Creek Watershed includes Stevens Creek, generally downstream of the Stevens Creek Dam and upstream of the tidally influenced section of the creek (approximately midway between Highway 101 and the Crittenden Lane pedestrian bridge). The study area in the Guadalupe River Watershed incudes the four specific waterways in the Guadalupe River watershed: Alamitos Creek, Guadalupe Creek, Los Gatos Creek, and the Guadalupe River. The study areas generally begin below each waterways' associated dam and upstream of the tidally influenced section of Guadalupe River (approximately located at the pedestrian bridge downstream of the Montague Expressway).

The cumulative activities are summarized in Table 5.5-1, and those relevant to the hydrology cumulative analysis are noted below.

Cumulative impact thresholds for hydrology are the same as the impact thresholds presented in Section 3.2, *Hydrology*. Cumulative impacts are considered significant if they would:

- **Cumulative Impact HYD-1:** Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site
- **Cumulative Impact HYD-2:** Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream runoff in a manner that would result in flooding on or off site
- **Cumulative Impact HYD-3:** Create or contribute runoff water that would exceed the capacity of existing or planned stormwater or provide substantial additional sources of polluted runoff

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cumulative impact analysis related to hydrology. Projects, plans, and programs considered in this analysis include those that could result in impacts to hydrology, as noted in the thresholds listed above. Based on these factors, the following projects, plans, and programs in Table 5.5-1 were determined to be relevant to the hydrology cumulative impact analysis:

- Valley Water Projects, Plans, and Programs[2]
  - SMP
  - Encampment Clean Up Program
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Almaden Lake Improvements
  - Almaden Dam Improvements Project

[2] The modeling scenario for the future baseline conditions included the impacts of the seismic retrofit projects planned at Calero, Anderson, and Guadalupe Reservoirs as well as the Almaden Dam Improvements Project and Valley Water's 2015 UWMP.

- Impaired Water Bodies Program
- Dam Safety Program
- Calero Dam Seismic Retrofit
- Federal Energy Regulatory Commission (FERC) Order Compliance Project (FOCP)
- ADSRP
- Guadalupe Dam Seismic Retrofit
- Pacheco Reservoir Expansion Project
- Small Capital Improvements, Water Treatment
- Vasona Pumping Plant Upgrade
- 2015 UWMP

5.6.1.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to hydrology. Table 5.6-1 summarizes the Proposed Project's contribution to cumulative impacts to hydrology.

Table 5.6-1. Summary of Proposed Project Impact Contribution to Cumulative Hydrology Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site	SI	NCC	N/A	NCC
Cumulative Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream runoff in a manner that would result in flooding on or off site	SI	NCC	N/A	NCC
Cumulative Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater or provide substantial additional sources of polluted runoff	SI	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site (not cumulatively considerable)[3]

Cumulative projects, plans, and programs, such as the 10-year Pipeline Rehabilitation (FY 2018 to FY 2027), Almaden Dam Improvements, and the Small Capital Improvements, Water Treatment, could

[3] Cumulative impact conclusions appearing after each threshold are post-mitigation, as applicable.

result in incrementally significant adverse impacts if their construction or operational timeframes overlap. Some of these cumulative activities would improve the hydrological functions of the creeks within the study area, such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. The incremental contribution of the Proposed Project flow or non-flow measures, however, would not include or result in substantially altering the existing drainage pattern of the site or area within Stevens Creek, Los Gatos Creek, Guadalupe Creek, and Alamitos Creek, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site under the current baseline or future baseline conditions. While the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water, releases from Pacheco Reservoir would not be during times that would increase high-flow releases from the Two-Creeks Project reservoirs, so there would be no cumulatively significant impacts. Likewise, there would be no cumulatively significant impacts to drainage patterns as a result of maintenance, monitoring, or adaptive management. Given the remaining geographic dispersal and the minor magnitude of the Proposed Project's impacts, the resulting impact would be **not cumulatively considerable**.

Cumulative Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream runoff, in a manner that would result in flooding on or off site (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Small Capital Improvements, Water Treatment, could result in incrementally significant adverse impacts if their construction or operational timeframes overlap. Some of these cumulative activities would improve the hydrological functions of the creeks in the cumulative study area, such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. The incremental contribution of the Proposed Project flow or non-flow measures, however, would not include or result in substantially altering the existing drainage pattern of the site or area within Stevens Creek, Los Gatos Creek, Guadalupe Creek, and Alamitos Creek, including through the alteration of the course of a stream runoff, in a manner that would result in flooding on or off site under the current baseline or future baseline conditions. As discussed for Cumulative Impact HYD-1, while the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water, imports from Pacheco Reservoir would not be during times that would increase high-flow releases from the Two-Creeks Project reservoirs, so there would be no cumulatively significant impacts. Likewise, there would be no cumulatively significant impacts to drainage patterns as a result of maintenance, monitoring, or adaptive management. Given the remaining geographic dispersal and the minor magnitude of the Proposed Project's impacts, the impact would be **not cumulatively considerable**.

Cumulative Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater or provide substantial additional sources of polluted runoff (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Small Capital Improvements, Water Treatment, could result in incrementally adverse impacts if their construction or operation timeframes overlap. Some of these cumulative activities would improve the hydrological function of the creeks in the cumulative study area, such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. As discussed for Cumulative Impact HYD-1, while the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water, releases from Pacheco Reservoir would not be during times that would increase high-flow releases from the Two-Creeks Project reservoirs, so there would be no cumulatively significant impacts. The incremental contribution of the Proposed Project flow or non-flow measures, including related maintenance, monitoring, or adaptive management, however, would not include or result in the creation or contribution of runoff water that would exceed the capacity of existing or planned stormwater or provide substantial additional sources of polluted runoff under the current baseline or future baseline conditions. Given the remaining geographic dispersal and the minor magnitude of the Proposed Project's impacts, the impact would be **not cumulatively considerable**.

5.6.1.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

This section describes the Non-flow Measures Only Alternative's contribution to cumulative impacts to hydrology. Table 5.6-2 summarizes the Non-flow Measures Only Alternative's contribution to cumulative impacts to hydrology.

Table 5.6-2. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Hydrology Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site	LTS	NCC	N/A	NCC
Cumulative Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream runoff in a manner that would result in flooding on or off site	LTS	NCC	N/A	NCC
Cumulative Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater or provide substantial additional sources of polluted runoff	LTS	NCC	N/A	NCC

Notes: CC = cumulatively considerable, LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the 10-year Pipeline Rehabilitation (FY 2018 to FY 2027), Almaden Dam Improvements, and Small Capital Improvements, Water Treatment, could result in incrementally adverse impacts if their construction or operational timeframes overlap. Some of these cumulative activities would improve the hydrological functions of the creeks in the cumulative study area, such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. While the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water, releases from Pacheco Reservoir would not be during times that would increase high-flow releases from the Two-Creeks Project reservoirs, so there would be no cumulatively significant impacts. The incremental contribution of the Non-flow Measures Only Alternative, including related maintenance or monitoring, would not include or result in substantially altering the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site under the current baseline or future baseline conditions because the projects, plans, and programs listed above would not substantially result in erosion or siltation on or off site. Therefore, there would be an incremental contribution, though it would not be considerable, by the Non-flow Measures Only Alternative to hydrology for this threshold. Additionally, given their geographic dispersal and the minor magnitude of the alternative's impacts, and because there would be no considerable incremental contribution by the Non-flow Measures Only Alternative, the impact would be **not cumulatively considerable**.

Cumulative Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream runoff in a manner that would result in flooding on or off site (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Small Capital Improvements, Water Treatment, could result in incrementally adverse impacts if their construction or operational timeframes overlap. Some of these cumulative activities would improve the hydrological functions of the creeks in the cumulative study area, such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. As discussed for Cumulative Impact HYD-1, while the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water, releases from Pacheco Reservoir would not be during times that would increase high-flow releases from the Two-Creeks Project reservoirs, so there would be no cumulatively significant impacts. The incremental contribution of the Non-flow Measures Only Alternative, however, including related maintenance, monitoring, or adaptive management, would not include or result in substantially altering the existing drainage pattern in a manner that would result in flooding on or off site under the current baseline or future baseline conditions because the projects, plans, and programs listed above would not substantially result in flooding on or off site. Therefore, there would be an incremental contribution, though it would not be considerable, by the Non-flow Measures Only Alternative to hydrology for this threshold. Additionally, given their geographic dispersal and the minor magnitude of the alternative's impacts, and because there would be no considerable incremental contribution by the Non-flow Measures Only Alternative, the impact would be **not cumulatively considerable.**

Cumulative Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater or provide substantial additional sources of polluted runoff (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Small Capital Improvements, Water Treatment, could result in incrementally adverse impacts if their construction or operation timeframes overlap. Some of these cumulative activities would improve the hydrological function of the creeks in the cumulative study area, such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. As discussed for Cumulative Impact HYD-2, while the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water, releases from Pacheco Reservoir would not be during times that would increase high-flow releases from the Two-Creeks Project reservoirs, so there would be no cumulatively significant impacts. The incremental contribution of the Non-flow Measures Only Alternative, however, including related maintenance, monitoring, and adaptive management, would not include or result in the creation or contribution of runoff water that would exceed the capacity of existing or planned stormwater or provide substantial additional sources of polluted runoff under the current baseline or future baseline conditions because the projects, plans, and programs listed above would not substantially add to sources of polluted runoff. Therefore, there would be an incremental contribution, though it would not be considerable, by the Non-flow Measures Only Alternative to hydrology for this threshold. Additionally, given their geographic dispersal and the minor magnitude of the alternative’s impacts, and because there would be no considerable incremental contribution by the Non-flow Measures Only Alternative, the impact would be **not cumulatively considerable**.

5.6.1.3 FAHCE-plus Alternative Cumulative Impact Analysis

This section describes the FAHCE-plus Alternative’s contribution to cumulative impacts to hydrology. Table 5.6-3 summarizes the FAHCE-plus Alternative’s contribution to cumulative impacts to hydrology.

Table 5.6-3. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Hydrology Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site	SI	NCC	N/A	NCC
Cumulative Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream runoff in a manner that would result in flooding on or off site	SI	NCC	N/A	NCC
Cumulative Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater or provide substantial additional sources of polluted runoff	SI	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact HYD-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the 10-year Pipeline Rehabilitation (FY 2018 to FY 2027), Almaden Dam Improvements, and Small Capital Improvements, Water Treatment, could result in incrementally significant adverse impacts if their construction or operational timeframes overlap and if some of these cumulative activities would improve the hydrological functions of the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. While the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water, releases from Pacheco Reservoir would not be during times that would increase high-flow releases from the Two-Creeks Project reservoirs, so there would be no cumulatively significant impacts. The incremental contribution of the FAHCE-plus Alternative flow or non-flow measures, however, including related maintenance, monitoring, or adaptive management, would not include or result in substantially altering the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site under the current baseline or future baseline conditions because the projects, plans, and programs listed above would not substantially result in erosion or siltation on or off site; therefore, there would be an incremental contribution, though it would not be considerable, by the FAHCE-plus Alternative to hydrology for this threshold. Given the remaining geographic dispersal and the minor magnitude of the FAHCE-plus Alternative's impacts, the resulting impact would be **not cumulatively considerable.**

Cumulative Impact HYD-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream runoff, in a manner that would result in flooding on or off site (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Small Capital Improvements, Water Treatment, could result in incrementally significant adverse impacts if their construction or operational timeframes overlap and if some of these cumulative activities would improve the hydrological functions of the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. As discussed for Cumulative Impact HYD-1, while the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water, releases from Pacheco Reservoir would not be during times that would increase high-flow releases from the Two-Creeks Project reservoirs, so there would be no cumulatively significant impacts. The incremental contribution of the FAHCE-plus Alternative flow or non-flow measures, however, including related maintenance, monitoring, or adaptive management, would not include or result in substantially altering the existing drainage pattern of the site or area, including through the alteration of the course of a stream runoff, in a manner that would result in flooding on or off site under the current baseline or future baseline conditions because the projects, plans, and programs listed above would not substantially result in flooding on or off site; therefore, there would be an incremental contribution, though it would not be considerable, by the FAHCE-plus Alternative to hydrology for this threshold. Specific to the future baseline implementation of the FAHCE-plus Alternative, within Calero Creek this alternative could contribute significantly to the cumulative impact to drainage patterns primarily because peak flows exceed current baseline capacity. Given the remaining geographic dispersal and the minor magnitude of the FAHCE-plus Alternative's impacts, the resulting impact would be **not cumulatively considerable**.

Cumulative Impact HYD-3: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater or provide substantial additional sources of polluted runoff (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Small Capital Improvements, Water Treatment, could result in incrementally significant adverse impacts if their construction or operation timeframes overlap and if some of these cumulative activities would improve the hydrological function of the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. As discussed for Cumulative Impact HYD-2, while the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water, releases from Pacheco Reservoir would not be during times that would increase high-flow releases from the Two-Creeks Project reservoirs, so there would be no cumulatively significant impacts. The incremental contribution of the FAHCE-plus Alternative flow or non-flow measures, however, including related maintenance, monitoring, or adaptive management, would not include or result in the creation or contribution of runoff water that would exceed the capacity of existing or planned stormwater or provide substantial additional sources of polluted runoff under the current baseline or future baseline conditions because the projects, plans, and programs listed above would not substantially add to sources of polluted runoff; therefore, there would be an incremental contribution, though it would not be considerable, by the FAHCE-plus Alternative to hydrology for this threshold. Given the remaining geographic dispersal and the minor magnitude of the FAHCE-plus Alternative's impacts, the resulting impact would be **not cumulatively considerable**.

5.6.2 Groundwater Resources

The geographic study area for the cumulative impact analysis for groundwater encompasses the Stevens Creek and Guadalupe River watersheds, the Santa Clara Plain Subbasin, and the areas surrounding other relevant Valley Water and non-Valley Water projects and plans in northern Santa Clara County. Since the Coyote Valley and Llagas subbasins are only affected by Coyote Creek operations, they could be affected by projects along that creek, such as the FOCP and the ADSRP, but those effects would not be cumulative with effects from projects implemented in these two watersheds. Cumulative activities are summarized in Table 5.5-1, and those relevant to the groundwater cumulative analysis are noted below.

Cumulative impact thresholds for groundwater are the same as the impact thresholds presented in Section 3.3, *Groundwater Resources*. Cumulative impacts are considered significant if they would:

- **Cumulative Impact GW-1:** Substantially decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin
- **Cumulative Impact GW-2:** Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cumulative impact analysis related to groundwater. Projects, plans, and programs considered in this analysis include those that could result in impacts to groundwater, as noted in the thresholds listed above. Based on these factors, the following projects, plans, and programs in Table 5.5-1 were determined to be relevant to the groundwater cumulative impact analysis:

- Valley Water Projects, Plans, and Programs[4]
  - SMP
  - Encampment Clean Up Program
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Almaden Lake Improvements
  - Almaden Dam Improvement Project
  - Impaired Water Bodies Program
  - Dam Safety Program
  - Calero Dam Seismic Retrofit
  - FOCP
  - ADSRP
  - Guadalupe Dam Seismic Retrofit
  - Pacheco Reservoir Expansion Project
  - Small Capital Improvements, Water Treatment
  - Vasona Pumping Plant Upgrade

[4] The modeling scenario for the future baseline conditions included the impacts of the seismic retrofit projects planned at Calero, Anderson, and Guadalupe Reservoirs as well as the Almaden Dam Improvements Project and Valley Water's 2015 UWMP.

- 2015 UWMP

5.6.2.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to groundwater. Table 5.6-4 summarizes the Proposed Project's contribution to cumulative impacts to groundwater.

Table 5.6-4. Summary of Proposed Project Impact Contribution to Cumulative Groundwater Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin	SI	NCC	N/A	NCC
Cumulative Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality	SI	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Calero Dam Seismic Retrofit, FOCP, ADSRP, and Vasona Pumping Plant Upgrade, could result in incrementally adverse impacts if their construction or operational timeframes overlap because temporary reductions in service could reduce the ability to deliver water downstream for groundwater recharge. This effect would be magnified if the upgrades occur simultaneously. Implementation of the proposed rule curves on Coyote Creek through the ADSRP could substantially decrease groundwater supplies and impede groundwater recharge such that sustainable groundwater management would be at risk because Coyote Basin storage could be greatly reduced. Substantial reduction levels could be cumulatively considerable. However, this potential impact would occur with or without the implementation of the Proposed Project and would not be affected positively or negatively by the Proposed Project. The Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water and could reduce stress on groundwater basins by either providing additional water for recharge, or reducing the need for extraction. Flow measure monitoring activities could include groundwater sampling; however, there would be no measurable impact to groundwater supplies or recharge from monitoring under the Proposed Project. The incremental contribution of the Proposed Project non-flow measures, including related maintenance, monitoring, or adaptive management, however, would not include or result in substantially decreasing groundwater supplies or interfere with groundwater charge such that it may impede sustainable groundwater management of the basin under the current baseline or future baseline condition.

The projects, plans, and programs listed above could result in further decreases in groundwater supplies, a potentially significant impact, but the Proposed Project's contribution to this impact would be **not cumulatively considerable.** Mitigation would need to be developed to offset the potential over-pumping in the Coyote Basin regardless of the implementation of the Proposed Project.

Cumulative Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Calero Dam Seismic Retrofit, FOCP, ADSRP, and Vasona Pumping Plant Upgrade, could result in incrementally adverse impacts if their construction or operational timeframes overlap because temporary reductions in service could reduce the ability to deliver water downstream for groundwater recharge, resulting in reduced groundwater levels, and higher concentrations of nitrates. This effect would be magnified if the upgrades occur simultaneously. Implementation of the proposed rule curves on Coyote Creek as part of the ADSRP could substantially decrease groundwater levels and correspondingly degrade water quality because of an increased concentration of nitrate because the rule curves could result in substantially reduced Coyote Valley subbasin water levels. However, this potential impact would occur with or without the implementation of the Proposed Project and would not be affected positively or negatively by the Proposed Project. As discussed under Cumulative Impact GW-1, the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water and could reduce stress on groundwater basins by either providing additional water for recharge, or reducing the need for extraction. Flow measure monitoring activities could include groundwater sampling; however, there would be no measurable impact to groundwater quality from monitoring under the Proposed Project in the two watersheds. The incremental contribution of the Proposed Project non-flow measures including related maintenance, monitoring, and adaptive management would not include or result in any violations of groundwater quality standards, or otherwise substantially degrade groundwater quality under the current baseline or future baseline conditions.

The projects, plans, and programs listed above could result in further degradation to groundwater quality, even with Valley Water and non-Valley Water cumulative activities such as the Encampment Clean Up Program that improve groundwater quality because water quality that is being recharged into the system would be better quality; nevertheless, decreases in groundwater levels could result in a substantial degradation of water quality, a potentially significant impact, but the Proposed Project's contribution to this impact would be **not cumulatively considerable.** Mitigation would need to be developed to offset the potential groundwater quality impacts in the Coyote Basin regardless of the implementation of the Proposed Project.

5.6.2.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

This section describes the Non-flow Measures Only Alternative's contribution to cumulative impacts to groundwater. Table 5.6-5 summarizes the Non-flow Measures Only Alternative's contribution to cumulative impacts to groundwater.

Table 5.6-5. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Groundwater Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin	SI	NCC	N/A	NCC
Cumulative Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality	SI	NCC	N/A	NCC

Notes: N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Calero Dam Seismic Retrofit, FOCP, ADSRP, and Vasona Pumping Plant Upgrade, could result in incrementally adverse impacts if their construction or operational timeframes overlap because temporary reductions in service could reduce the ability to deliver water downstream for groundwater recharge. This effect would be magnified if the upgrades occur simultaneously. The Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water and could reduce stress on groundwater basins by either providing additional water for recharge, or reducing the need for extraction. The incremental contribution of the Non-flow Measures Only Alternative, including related maintenance, monitoring, or adaptive management, however, would not include or result in substantially decreasing groundwater supplies or interfere with groundwater charge such that it may impede sustainable groundwater management of the basin under the current baseline or future baseline condition.

The projects, plans, and programs listed above could result in further decreases in groundwater supplies, a potentially significant impact, but because of the Non-flow Measures Only Alternative's small incremental contribution, the cumulative impact would not be significant, and the Non-flow Measures Only Alternative's contribution to this impact would be **not cumulatively considerable.**

Cumulative Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Calero Dam Seismic Retrofit, FOCP, ADSRP, and Vasona Pumping Plant Upgrade, could result in incrementally adverse impacts if their construction or operational timeframes overlap because temporary reductions in service could reduce the ability to deliver water downstream for groundwater recharge, resulting in reduced groundwater levels and associated higher concentrations of nitrates. This effect would be magnified if the upgrades occur simultaneously; some of these cumulative activities would improve the sustainability of groundwater functions of the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and the Impaired Water Bodies Program. As discussed under Cumulative Impact GW-1, the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water and could reduce stress on groundwater basins by either providing additional water for recharge or reducing the need for extraction. There would be no incremental contribution of the Non-flow Measures Only Alternative, including related maintenance, monitoring, or adaptive management, that would include or result in any violations of groundwater quality standards, or otherwise substantially degrade groundwater quality under the current baseline or future baseline conditions.

The projects, plans, and programs listed above could result in some decreases in groundwater quality, a potentially significant impact, but because of the Non-flow Measures Only Alternative's lack of incremental contribution, the cumulative impact would not be significant, and the Non-flow Measures Only Alternative's contribution to this impact would be **not cumulatively considerable.**

5.6.2.3 FAHCE-plus Alternative Cumulative Impact Analysis

This section describes the FAHCE-plus Alternative's contribution to cumulative impacts to groundwater. Table 5.6-6 summarizes the FAHCE-plus Alternative's contribution to cumulative impacts to groundwater.

Table 5.6-6. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Groundwater Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin	SI	NCC	N/A	NCC
Cumulative Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality	SI	NCC	N/A	NCC

Notes: N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact GW-1: Substantially decrease groundwater supplies or interfere with groundwater recharge such that the Project may impede sustainable groundwater management of the basin (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Calero Dam Seismic Retrofit, FOCP, ADSRP, and Vasona Pumping Plant Upgrade, could result in incrementally adverse impacts if their construction or operational timeframes overlap because temporary reductions in service could reduce the ability to deliver water downstream for groundwater recharge. Implementation of the proposed rule curves on Coyote Creek through the ADSRP could substantially decrease groundwater supplies and impede groundwater recharge such that sustainable groundwater management would be at risk because Coyote Basin storage could be greatly reduced. Substantial reduction levels could be cumulative considerable. However, this potential impact would occur with or without the implementation of the FAHCE-plus Alternative and would not be affected positively or negatively by the FAHCE-plus Alternative. The Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water and could reduce stress on groundwater basins by either providing additional water for recharge, or reducing the need for extraction. Flow measure monitoring activities could include groundwater sampling; however, there would be no measurable impact to groundwater supplies or recharge from monitoring under the FAHCE-plus Alternative. The incremental contribution of the FAHCE-plus Alternative non-flow measures, including related maintenance, monitoring, and adaptive management, however, would not include or result in substantially decreasing groundwater supplies or interfere with groundwater charge such that it may impede sustainable groundwater management of the basin under the current baseline or future baseline condition.

The projects, plans, and programs listed above could result in further decreases in groundwater supplies, a potentially significant impact, but the FAHCE-plus Alternative’s contribution to this impact would be **not cumulatively considerable.** Mitigation would need to be developed to offset the potential over-pumping in the Coyote Basin regardless of the implementation of the FAHCE-plus Alternative.

Cumulative Impact GW-2: Violate any groundwater quality standards, or otherwise substantially degrade groundwater quality (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Calero Dam Seismic Retrofit, FOCP, ADSRP, and Vasona Pumping Plant Upgrade, could result in incrementally adverse impacts if their construction or operational timeframes overlap because temporary reductions in service could reduce the ability to deliver water downstream for groundwater recharge, resulting in reduced groundwater levels, and higher concentrations of nitrates. This effect would be magnified if the upgrades occur simultaneously. Implementation of the proposed rule curves on Coyote Creek as part of the ADSRP could substantially decrease groundwater levels and correspondingly degrade water quality because of an increased concentration of nitrate because the rule curves could result in substantially reduced Coyote Valley subbasin water levels. However, this potential impact would occur with or without the implementation of the FAHCE-plus Alternative and would not be affected positively or negatively by the FAHCE-plus Alternative. As discussed under Cumulative Impact GW-1, the Pacheco Reservoir Expansion Project would provide additional water supply to Valley Water and could reduce stress on groundwater basins by either providing additional water for recharge or reducing the need for extraction. Flow measure monitoring activities could include groundwater sampling; however, there would be no measurable impact to groundwater supplies or recharge from monitoring under the FAHCE-plus Alternative. The incremental contribution of the FAHCE-plus Alternative non-flow measures, including related maintenance, monitoring and adaptive management, would not include or result in any violations of groundwater quality standards, or otherwise substantially degrade groundwater quality under the current baseline or future baseline conditions.

The projects, plans, and programs listed above could result in further degradation to groundwater quality, even with Valley Water and non-Valley Water cumulative activities such as the Encampment Clean Up Program that improve groundwater quality because water quality that is being recharged into the system would be better quality; nevertheless, decreases in groundwater levels could result in a substantial degradation of water quality, a potentially significant impact, but the FAHCE-plus Alternative’s contribution to this impact would be **not cumulatively considerable.** Mitigation would need to be developed to offset the potential groundwater quality impacts in the Coyote Basin regardless of the implementation of the FAHCE-plus Alternative.

5.6.3 Water Supply

The geographic study area for the cumulative impact analysis for water supply encompasses the Stevens Creek and Guadalupe River watersheds and the areas surrounding other relevant Valley Water and non-Valley Water projects and plans in northern Santa Clara County. These cumulative activities are summarized in Table 5.5-1, and those relevant to the water supply cumulative analysis are noted below.

Cumulative impact thresholds for water supply are the same as the impact thresholds presented in Section 3.4, *Water Supply*. Cumulative impacts are considered significant if they would:

- **Cumulative Impact WS-1:** Substantially reduce Valley Water's ability to have sufficient water supplies available from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years
- **Cumulative Impact WS-2:** Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cumulative impact analysis related to water supply. Projects, plans, and programs considered in this analysis include those that could result in impacts to water supply, as noted in the thresholds listed above. Based on these factors, the following projects, plans, and programs in Table 5.5-1 were determined to be relevant to the water supply cumulative impact analysis:

- Valley Water Projects, Plans, and Programs[5]
  - SMP
  - Encampment Clean Up Program
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Almaden Lake Improvement Project
  - Almaden Dam Improvements
  - Impaired Water Bodies Program
  - Dam Safety Program
  - Calero Dam Seismic Retrofit
  - FOCP
  - ADSRP
  - Guadalupe Dam Seismic Retrofit
  - Pacheco Reservoir Expansion Project
  - Small Capital Improvements, Water Treatment
  - Vasona Pumping Plant Upgrade
  - 2015 UWMP
  - Water Supply Master Plan 2040
  - Countywide Water Reuse Master Plan

5.6.3.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to water supply. Table 5.6-7 summarizes the Proposed Project's contribution to cumulative impacts to water supply.

[5] The modeling scenario for the future baseline conditions included the impacts of the seismic retrofit projects planned at Calero, Anderson, and Guadalupe Reservoirs as well as the Almaden Dam Improvements Project and Valley Water's 2015 UWMP.

Table 5.6-7. Summary of Proposed Project Impact Contribution to Cumulative Water Supply Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact WS-1: Substantially reduce Valley Water's ability to have sufficient water supplies from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years	LTS	NCC	N/A	NCC
Cumulative Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects	NI	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact WS-1: Substantially reduce Valley Water's ability to have sufficient water supplies available from existing entitlement and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Water Supply Master Plan 2040, 2015 UWMP, Countywide Water Reuse Master Plan, the Pacheco Reservoir Expansion Project, 10-year Pipeline Rehabilitation (FY 2018 to FY 2027), Almaden Dam Improvements, and Small Capital Improvements, Water Treatment, could result in incrementally adverse impacts if their construction timeframes overlap, or beneficial impacts from long-term operations. Likewise, reservoir dewatering and restrictions during construction of seismic retrofit projects at Anderson, Calero, and Guadalupe Dams could adversely affect water supply. Some of these cumulative activities would otherwise improve the water quality to improve water supply in the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. The Pacheco Reservoir Expansion Project would positively affect water supplies for Valley Water. The incremental contribution of the Proposed Project flow measures including related monitoring would not result in substantially altering Valley Water's ability to have sufficient water supplies available to serve the program from existing entitlement and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years under the current baseline or future baseline conditions. The incremental contribution of the Proposed Project non-flow measures, including related maintenance, monitoring, and adaptive management, would not result in substantially altering Valley Water's ability to have sufficient water supplies available to serve the program from existing entitlement and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years under the current baseline or future baseline conditions. The 2015 UWMP and Water Supply Master Plan demonstrate that there are adequate water supplies for forecasted demands in light of all of these planned activities, such that the cumulative water supply impact is less than significant.

There would be an incremental contribution by the Proposed Project flow measures to water supply impacts, though it would not be considerable. Additionally, given their geographic dispersal and the minor magnitude of the Proposed Project's impacts as quantified in Section 3.4, *Water Supply*, and because there would be no considerable incremental contribution by the Proposed Project, the impact would be **not cumulatively considerable**.

Cumulative Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Water Supply Master Plan 2040, 2015 UWMP, Countywide Water Reuse Master Plan, 10-year Pipeline Rehabilitation (FY 2018 to FY 2027), Almaden Dam Improvements, and Small Capital Improvements, Water Treatment, could result in incrementally adverse impacts to water supply and demand on existing facilities if construction or operational timeframes overlap. Likewise, reservoir dewatering and restrictions during construction of seismic retrofit projects at Anderson, Calero, and Guadalupe Dams could adversely affect water supply. As noted for Cumulative Impact WS-1, some of these cumulative activities would otherwise improve the water quality to improve water supply in the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program, thereby relieving the burden on these facilities. Similarly, the Pacheco Reservoir Expansion Project would positively affect water supplies for Valley Water, potentially reducing the need for other new or expanded facilities. The incremental contribution of the Proposed Project flow measures including related monitoring would not result in the relocation or construction of new or expanded water facilities. The incremental contribution of the Proposed Project non-flow measures, including related maintenance, monitoring, and adaptive management, would not result in the relocation or construction of new or expanded water facilities. The projects, plans, and programs listed above could result in the need for new or expanded water supply facilities, but because of the Proposed Project's lack of incremental contribution, the cumulative impact would not be significant, and the Proposed Project's contribution to this impact would be **not cumulatively considerable**.

5.6.3.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

This section describes the Non-flow Measures Only Alternative's contribution to cumulative impacts to water supply. Table 5.6-8 summarizes the Non-flow Measures Only Alternative's contribution to cumulative impacts to water supply.

Table 5.6-8. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Water Supply Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact WS-1: Substantially reduce Valley Water's ability to have sufficient water supplies from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years	LTS	NCC	N/A	NCC
Cumulative Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact WS-1: Substantially reduce Valley Water's ability to have sufficient water supplies from existing entitlement and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Water Supply Master Plan 2040, 2015 UWMP, Countywide Water Reuse Master Plan, 10-year Pipeline Rehabilitation (FY 2018 to FY 2027), Almaden Dam Improvements, and Small Capital Improvements, Water Treatment, could result in incrementally adverse impacts if their construction timeframes overlap, or beneficial impacts from long-term operations. Reservoir dewatering and restrictions during construction of seismic retrofit projects at Anderson, Calero, and Guadalupe Dams could adversely affect water supply. The Pacheco Reservoir Expansion Project would positively affect water supplies for Valley Water. Some of these cumulative activities would otherwise improve the water quality to improve water supply in the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. The incremental contribution of the Non-flow Measures Only Alternative, including related maintenance, monitoring, and adaptive management, would not result in substantially altering Valley Water's ability to have sufficient water supplies available to serve the program from existing entitlement and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years under the current baseline or future baseline conditions. The 2015 UWMP and Water Supply Master Plan 2040 demonstrate that there are adequate water supplies for forecasted demands in light of all of these planned activities such that the cumulative water supply impact is less than significant

The projects, plans, and programs listed above could result in some effect on water supply, but because of the Non-flow Measures Only Alternative's lack of incremental contribution, the cumulative impact would not be significant, and the Non-flow Measures Only Alternative's contribution to this impact would be **not cumulatively considerable**.

Cumulative Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Water Supply Master Plan 2040, 2015 UWMP, Countywide Water Reuse Master Plan, 10-year Pipeline Rehabilitation (FY 2018 to FY 2027), Almaden Dam Improvements, and Small Capital Improvements, Water Treatment, could result in incrementally adverse impacts to water supply and demand on existing facilities if construction timeframes overlap, or beneficial impacts from long-term operations. Reservoir dewatering and restrictions during construction of seismic retrofit projects at Anderson, Calero, and Guadalupe Dams could adversely affect water supply. Similarly, the Pacheco Reservoir Expansion Project would positively affect water supplies for Valley Water, potentially reducing the need for other new or expanded facilities. As noted for Cumulative Impact WS-1, some of these cumulative activities would otherwise improve the water quality to improve water supply in the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program, thereby relieving the burden on these facilities. The incremental contribution of the Non-flow Measures Only Alternative, including related maintenance, monitoring, and adaptive management, would not result in the relocation or construction of new or expanded water facilities. The projects, plans, and programs listed above could result in the need for new or expanded water supply facilities, but because of the Non-flow Measures Only Alternative's lack of incremental contribution, the cumulative impact would not be significant, and the Proposed Project's contribution to this impact would be **not cumulatively considerable**.

5.6.3.3 FAHCE-plus Alternative Cumulative Impact Analysis

This section describes the FAHCE-plus Alternative's contribution to cumulative impacts to water supply. Table 5.6-9 summarizes the FAHCE-plus Alternative's contribution to cumulative impacts to water supply.

Table 5.6-9. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Water Supply Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact WS-1: Substantially reduce Valley Water's ability to have sufficient water supplies from existing entitlements and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years	LTS	NCC	N/A	NCC
Cumulative Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact WS-1: Substantially reduce Valley Water's ability to have sufficient water supplies available from existing entitlement and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Water Supply Master Plan 2040, 2015 UWMP, Countywide Water Reuse Master Plan, 10-year Pipeline Rehabilitation (FY 2018 to FY 2027), Almaden Dam Improvements, and Small Capital Improvements, Water Treatment, could result in incrementally adverse impacts if their construction timeframes overlap, or beneficial impacts from long-term operations. Reservoir dewatering and restrictions during construction of seismic retrofit projects at Anderson, Calero, and Guadalupe Dams could adversely affect water supply. The Pacheco Reservoir Expansion Project would positively affect water supplies for Valley Water, potentially reducing the need for other new or expanded facilities. Some of these cumulative activities would otherwise improve the water quality to improve water supply in the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program. The incremental contribution of the FAHCE-plus Alternative flow measures including related monitoring would not result in substantially altering Valley Water's ability to have sufficient water supplies available to serve the program from existing entitlement and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years under the current baseline or future baseline conditions. The incremental contribution of the FAHCE-plus Alternative non-flow measures, including related maintenance, monitoring, and adaptive management, would not result in substantially altering Valley Water's ability to have sufficient water supplies available to serve the program from existing entitlement and resources based on reasonably foreseeable future development during normal, dry, and multiple dry years under the current baseline or future baseline conditions. The 2015 UWMP and Water Supply Master Plan 2040 demonstrate that there are adequate water supplies for forecasted demands in light of all of these planned activities such that the cumulative water supply impact is less than significant.

There would be an incremental contribution by the FAHCE-plus Alternative flow measures to water supply for this threshold, though it would not be considerable. Additionally, given their geographic dispersal and the minor magnitude of the FAHCE-plus Alternative's impacts as quantified in Section 4.5.3.3, and because there would be no considerable incremental contribution by the FAHCE-plus Alternative, the impact would be **not cumulatively considerable**.

Cumulative Impact WS-2: Require or result in the relocation or construction of new or expanded water facilities, the construction of which could cause significant environmental effects (not cumulatively considerable)

Cumulative projects, plans, and programs, such as the Water Supply Master Plan 2040, 2015 UWMP, Countywide Water Reuse Master Plan, 10-year Pipeline Rehabilitation (FY 2018 to FY 2027), Almaden Dam Improvements, and Small Capital Improvements, Water Treatment, could result in incrementally adverse impacts to water supply and demand on existing facilities if construction timeframes overlap, or beneficial impacts from long-term operations. Reservoir dewatering and restrictions during construction of seismic retrofit projects at Anderson, Calero, and Guadalupe Dams could adversely affect water supply. As noted for Cumulative Impact WS-1, some of these cumulative activities would otherwise improve the water quality to improve water supply in the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program, thereby relieving the burden on these facilities. Similarly, the Pacheco Reservoir Expansion Project would positively affect water supplies for Valley Water, potentially reducing the need for other new or expanded facilities. The incremental contribution of the FAHCE-plus Alternative flow measures including related monitoring would not result in the relocation or construction of new or expanded water facilities. The incremental contribution of the FAHCE-plus Alternative non-flow measures, including related maintenance, monitoring, and adaptive management, would not result in the relocation or construction of new or expanded water facilities. The projects, plans, and programs listed above could result in the need for new or expanded water supply facilities, but because of the Proposed Project's lack of incremental contribution, the cumulative impact would not be significant, and the Proposed Project's contribution to this impact would be **not cumulatively considerable**.

5.6.4 Water Quality

The geographic study area for the cumulative impact analysis for hydrology encompasses portions of the Stevens Creek and Guadalupe River watersheds and the areas surrounding other relevant Valley Water and non-Valley Water projects and plans in northern Santa Clara County. Specifically, the study area in the Stevens Creek Watershed includes Stevens Creek, generally downstream of the Stevens Creek Dam and upstream of the tidally influenced section of the creek (approximately midway between Highway 101 and the Crittenden Lane pedestrian bridge). For the analysis of water temperature, the Stevens Creek study area is the CWMZ below Stevens Creek Dam. For the analysis of the warm water habitat beneficial use, the study area is the Steven Creek reservoir.

The study area in the Guadalupe River Watershed includes the four specific waterways in the Guadalupe River watershed: Alamitos Creek, Guadalupe Creek, Los Gatos Creek, and the Guadalupe River. It includes areas that begin below each waterways' associated dam and upstream of the tidally influenced section of Guadalupe River (approximately located at the pedestrian bridge downstream of the Montague Expressway). For the analysis of water temperature, the Guadalupe River study area is the CWMZ below Guadalupe Dam on Guadalupe Creek. For the analysis of warm water habitat beneficial use, the study area is the reservoirs associated with the watershed.

The cumulative activities are summarized in Table 5.5-1, and those relevant to the water quality cumulative analysis are noted below.

Cumulative impact thresholds for water quality are the same as the impact thresholds presented in Section 3.5, *Water Quality*. Cumulative impacts are considered significant if they would:

- **Cumulative Impact WQ-1:** Impair beneficial uses of surface waters
- **Cumulative Impact WQ-2:** Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cumulative impact analysis related to water quality. Projects, plans, and programs considered in this analysis include those that could result in impacts to water quality, as noted in the thresholds listed above. Based on these factors, the following projects, plans, and programs in Table 5.5-1 were determined to be relevant to the water quality cumulative impact analysis:

- Valley Water Projects, Plans, and Programs[6]
  - SMP
  - Encampment Clean Up Program
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Almaden Lake Improvements
  - Almaden Dam Improvements
  - Impaired Water Bodies Program
  - Dam Safety Program
  - Calero Dam Seismic Retrofit
  - Guadalupe Dam Seismic Retrofit
  - Pacheco Reservoir Expansion Project
  - Small Capital Improvements, Water Treatment
  - Vasona Pumping Plant Upgrade
  - 2015 UWMP
  - Permanente Creek, San Francisco Bay to Foothill Expressway
  - Palo Alto Flood Basin Tide Gate Structure Improvements
  - San Francisquito Creek, San Francisco Bay through Searsville Dam
  - Downtown Guadalupe River Flood Protection Project/Lower Guadalupe Project
  - Guadalupe River-Upper, SPRR-Blossom Hill
  - Large Woody Debris and Gravel Augmentation
- Non-Valley Water Projects, Plans, and Programs
  - Residential, Commercial, Industrial, And Recreation Area Development
  - Santa Clara County Parks Planning Projects and Natural Resource Management

5.6.4.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to water quality. Table 5.6-10 summarizes the Proposed Project's contribution to cumulative impacts to water quality.

[6] The modeling scenario for the future baseline conditions included the impacts of the seismic retrofit projects planned at Calero, Anderson, and Guadalupe Dams, as well as the Almaden Dam Improvements Project and Valley Water's 2015 UWMP.

Table 5.6-10. Summary of Proposed Project Impact Contribution to Cumulative Water Quality Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact WQ-1: Impair beneficial uses of surface waters	LTS	NCC	N/A	NCC
Cumulative Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality	LTS	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact WQ-1: Impair beneficial uses of surface waters (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, dam safety, and seismic retrofit projects as well as the non-Valley Water Pacheco Reservoir Expansion Project, among others listed above, when combined with the Proposed Project's flow measures, including related monitoring could result in cumulatively significant adverse impacts to designated beneficial uses during construction, if their timeframes overlap. Many of these cumulative activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program would otherwise improve the water quality in the creeks in the cumulative study area through benefits to most of the beneficial uses such as COLD, MIGR, WILD, RARE, FRSH, and MUN. However, other activities such as new water rights allocations, use, and changes; and residential, commercial, and industrial development could result in adverse impacts to designated beneficial uses. The requirement for CWA permits includes certification of adhering to state water quality standards. The actions more likely to contribute to the impairment of designated beneficial uses are those that would result in non-point source releases, which are difficult to predict and assess. The Proposed Project's effect on beneficial uses listed in the Basin Plan would be less than significant for every creek, as it would seek to improve the status of beneficial uses.

The incremental contribution of the Proposed Project non-flow measures, including related maintenance, monitoring, and adaptive management, would not result in impairing beneficial uses of surface waters over the long term under either the current baseline or future baseline conditions. However, there could be temporary impacts during construction Although many of the listed projects, plans, and programs above would result in long-term benefits to designated beneficial uses, the construction of these projects and others (residential, industrial, urban) could have short-term impacts to beneficial uses of surface waters.

Some of the noted beneficial improvements to water quality could offset those adverse impacts from the other cumulative activities within the study area in general and because the geographic dispersal of these activities would limit the cumulative effect on water quality in any one area of the cumulative study area. Cumulative impacts to beneficial uses would not be significant, and the Proposed Project's contribution to this impact would be **not cumulatively considerable** as impacts to designated beneficial uses would be at most less than significant and would instead seek to improve conditions through flow and non-flow measures and enhance designated beneficial uses, especially COLD, SPWN, MIGR, WILD, and RARE.

Cumulative Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, dam safety, and seismic retrofit projects as well as the non-Valley Water Pacheco Reservoir Expansion Project when combined with the Proposed Project's flow could result in cumulatively short-term adverse impacts to water quality through violating surface water quality standards or waste discharge requirements, or substantially degrading water quality if their construction or operational timeframes overlap. As noted for Cumulative Impact WQ-1, some of these cumulative activities would improve the water quality in the creeks in the cumulative study area in both the short and long term, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program.

The incremental contribution of the Proposed Project including related monitoring would seek to improve water quality in terms of temperature and DO, with at most less than significant impacts to water quality standard. Proposed flow measures would maintain and improve water temperatures in the CWMZs the majority of the time, with only limited periods where the temperature would not meet the Settlement Agreement standards. However, water flows would not violate water temperatures standards. Similarly, non-flow measures could result in short-term less than significant impacts to water quality standards; however, long-term benefits would be expected. The Proposed Project's flow and non-flow measures would help to reduce overall potential significant adverse cumulative impacts under the current baseline or future baseline conditions.

The incremental contribution of the Proposed Project non-flow measures, including related maintenance, monitoring, and adaptive management, would affect surface water quality standards or waste discharge requirements in the short term, though the implementation of BMPs would limit the impact to less than significant. While the Proposed Project non-flow measures would incrementally contribute to water quality impacts, this impact is projected to help ameliorate non-project significant cumulative adverse impacts in the long term.

Cumulative impacts to water quality standards would not be significant, and the Proposed Project's contribution to this impact would be **not cumulatively considerable** as impacts to water quality standards would be at most less than significant and would instead seek to improve conditions through flow and non-flow measures.

5.6.4.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

This section describes the Non-flow Measures Only Alternative's contribution to cumulative impacts to water quality. Table 5.6-11 summarizes the Non-flow Measures Only Alternative's contribution to cumulative impacts to water quality.

Table 5.6-11. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Water Quality Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact WQ-1: Impair beneficial uses of surface waters	LTS	NCC	N/A	NCC
Cumulative Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality	LTS	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact, TBD = to be determined

Cumulative Impact WQ-1: Impair beneficial uses of surface waters (not cumulatively considerable)

The Non-flow Measures Only Alternative would involve ground disturbance, soil compaction, disturbances to channel beds and banks, weir installation, channel modification, construction staging and access, gravel augmentation, sediment removal, bank stabilization, minor maintenance, and the removal of culverts, riprap, or other structures. Any of these activities when combined with cumulative projects, plans, and programs in the area (such as Valley Water's watershed improvements, dam safety, and seismic retrofit projects as well as the non-Valley Water Pacheco Reservoir Expansion Project, among others) could affect designated beneficial uses in the short term, as described in Section 3.5, *Water Quality*.

Cumulative projects, plans, and programs could result in incrementally adverse impacts to water quality if their construction or operational timeframes overlap. Some of these cumulative activities would otherwise improve the water quality in the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program; however, others would continue to result in significant impacts. The incremental contribution of the Non-flow Measures Only Alternative, including related maintenance, monitoring, and adaptive management, would not result in impairing beneficial uses of surface waters under the current baseline or future baseline conditions. In fact, once constructed, the non-flow measures are expected to improve conditions especially for COLD, SPWN, MIGR, WILD, and RARE. Therefore, there would be an incremental contribution by the Non-flow Measures Only Alternative to water quality impacts for this threshold in the short term. Some of the noted beneficial improvements to water quality could offset those adverse impacts from the other cumulative activities within the study area in general and the geographic dispersal of these activities would limit the cumulative effect on water quality in any one area of the cumulative study area. Cumulative impacts to beneficial uses would not be significant, and the Non-flow Measures Only Alternative's contribution to this impact would be **not cumulatively considerable**.

Cumulative Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality (not cumulatively considerable)

The Non-flow Measures Only Alternative would involve ground disturbance, soil compaction, disturbances to channel beds and banks, weir installation, channel modification, construction staging and access, gravel augmentation, sediment removal, bank stabilization, minor maintenance, and the removal of culverts, riprap, or other structures. Any of these activities when combined with cumulative projects, plans, and programs in the area (such as Valley Water's watershed improvements, dam safety, and seismic retrofit projects as well as the non-Valley Water Pacheco Reservoir Expansion Project, among others) could affect water quality standards in the short term, as described in Section 3.5, *Water Quality*.

The incremental contribution of the Proposed Project non-flow measures, including related maintenance, monitoring, and adaptive management, would affect surface water quality standards or waste discharge requirements, and could otherwise degrade surface water quality under the current baseline or future baseline conditions in the short term, though the implementation of BMPs would limit the impact to less than significant. While the Proposed Project non-flow measures would incrementally contribute to water quality impacts in the short term, long-term benefits would improve conditions and reduce the potential for violating applicable water quality standards. The cumulative impact to water quality standards would not be significant, and the Non-flow Measures Only Alternative's incremental contribution would be **not cumulatively considerable** as impacts from non-flow measures would be at most less than significant and would instead seek to improve water quality standard conditions by improving habitat conditions in the streams and creeks.

5.6.4.3 FAHCE-plus Alternative Cumulative Impact Analysis

The cumulative impacts related to water quality for the FAHCE-plus Alternative were found to be identical to that of the Proposed Project. Table 5.6-12 summarizes those impacts.

Table 5.6-12. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Water Quality Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact WQ-1: Impair beneficial uses of surface waters	LTS	NCC	N/A	NCC
Cumulative Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality	LTS	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact, TBD = to be determined

Cumulative Impact WQ-1: Impair beneficial uses of surface waters (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, dam safety, and seismic retrofit projects as well as the non-Valley Water Pacheco Reservoir Expansion Project, among others that when combined with the FAHCE-plus Alternative's flow measures, including related monitoring could result in cumulatively significant adverse impacts to designated beneficial uses during construction, if their timeframes overlap. Many of these cumulative activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program would otherwise improve the water quality in the creeks in the cumulative study area through benefits to most of the beneficial uses such as COLD, MIGR, WILD, RARE, FRSH, and MUN. However, other activities such as new water rights allocations, use, and changes; and residential, commercial, and industrial development could result in adverse impacts to designated beneficial uses. The requirement for CWA permits includes certification of adhering to state water quality standards. Those actions more likely to contribute to the impairment of designated beneficial uses are those that would result in non-point source releases, which are difficult to predict and assess. The FAHCE-plus Alternative's on beneficial uses listed in the Basin Plan would be less than significant for every creek, as it would seek to improve the status of beneficial uses.

The incremental contribution of the FAHCE-plus Alternative non-flow measures, including related maintenance, monitoring, and adaptive management, would not result in impairing beneficial uses of surface waters over the long term under either the current baseline or future baseline conditions. However, there could be temporary impacts during construction. Although many of the listed projects, plans, and programs above would result in long-term benefits to designated beneficial uses, the construction of these projects and others (residential, industrial, urban) could have short-term impacts to beneficial uses of surface waters.

Some of the noted beneficial improvements to water quality could offset those adverse impacts from the other cumulative activities within the study area in general and because the geographic dispersal of these activities would limit the cumulative effect on water quality in any one area of the cumulative study area. Cumulative impacts to beneficial uses would not be significant, the FAHCE-plus Alternative contribution to this impact would be **not cumulatively considerable** as impacts to designated beneficial uses would be at most less than significant and would instead seek to improve conditions through flow and non-flow measures and enhance designated beneficial uses, especially COLD, SPWN, MIGR, WILD, and RARE.

Cumulative Impact WQ-2: Violate any applicable surface water quality standards or waste discharge requirements, or otherwise substantially degrade surface water quality (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, dam safety, and seismic retrofit projects as well as the non-Valley Water Pacheco Reservoir Expansion Project when combined with the FAHCE-plus Alternative's flow could result in cumulatively adverse impacts to water quality through violating surface water quality standards or waste discharge requirements, or substantially degrading water quality if their construction or operational timeframes overlap. As noted for Cumulative Impact WQ-1, some of these cumulative activities would improve the water quality in the creeks in the cumulative study area, activities such as the SMP, Encampment Clean Up Program, and Impaired Water Bodies Program.

The incremental contribution of the FAHCE-plus Alternative including related monitoring would seek to improve water quality in terms of temperature and DO, with at most less than significant impacts to water quality standard. Proposed flow measures would maintain and improve water temperatures in the CWMZs the majority of the time, with only limited periods where the temperature would not meet the Settlement Agreement standards. However, water flows would not violate water temperatures standards. Similarly, non-flow measures could result in short-term less than significant impacts to water quality standards; however, long-term benefits would be expected. The FAHCE-plus Alternative flow and non-flow measures would help to reduce overall potential significant adverse cumulative impacts under the current baseline or future baseline conditions.

The incremental contribution of the FAHCE-plus Alternative non-flow measures, including related maintenance, monitoring, and adaptive management, would affect surface water quality standards or waste discharge requirements in the short term, though the implementation of BMPs would limit the impact to less than significant. While the FAHCE-plus Alternative non-flow measures would incrementally contribute to water quality impacts, this impact is projected to help ameliorate significant cumulative adverse impacts in the long term by improving habitat conditions in the streams and creeks.

Cumulative impacts to water quality standards would not be significant, and the Proposed Project's contribution to this impact would be **not cumulatively considerable** as impacts to water quality standards would be at most less than significant and would instead seek to improve conditions through flow and non-flow measures.

5.6.5 Recreation

The geographic study area for the cumulative impact analysis for recreation is the Stevens Creek and Guadalupe River watersheds in northern Santa Clara County where Valley Water holds water rights licenses.

The cumulative impact threshold for recreation resources is the same as the impact threshold presented in Section 3.6, *Recreation*. Cumulative impacts are considered significant if they would:

- **Cumulative Impact REC-1:** Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cumulative impact analysis related to recreation resources. Projects, plans, and programs considered in this analysis include those that could result in impacts to recreation resources, as noted in the thresholds listed above. Based on these factors, the following projects, plans, and programs were determined to be relevant to the recreation resources cumulative impact analysis:

- Valley Water Projects, Plans, and Programs[7]
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Valley Water watershed improvements (Almaden Lake, Permanente Creek, and Guadalupe River)
  - 2015 UWMP
  - Valley Water-wide Flood Protection Projects
  - SMP
  - FOCP
  - ADSRP
  - Calero Dam Seismic Retrofit
  - Guadalupe Dam Seismic Retrofit
- Non-Valley Water Projects, Plans, and Programs
  - Residential, Commercial, Industrial, and Recreation Area Development
  - Santa Clara County Parks Planning Projects and Natural Resource Management

5.6.5.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to recreation resources. Table 5.6-13 summarizes the Proposed Project's contribution to cumulative impacts to recreation resources.

[7] The modeling scenario for the future baseline conditions included the impacts of the seismic retrofit projects planned at Calero, Anderson, and Guadalupe Reservoirs as well as the Almaden Dam Improvements Project and Valley Water's 2015 UWMP.

Table 5.6-13. Summary of Proposed Project Impact Contribution to Cumulative Recreation Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact REC-1: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact REC-1: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (not cumulatively considerable)

Cumulative projects, plans, and programs could increase use of recreational facilities throughout the cumulative study area. For example, Valley Water watershed improvement projects could disrupt recreation use at Almaden Lake Regional Park for projects at Almaden Lake and along Guadalupe River and Guadalupe Creek Trails for projects along the Guadalupe River. The Almaden Lake Improvement Project would include the construction of a new facilities and the relocation of some existing facilities, which would result in temporary closures to several existing recreational facilities during the 30-month construction period. Given the availability of other nearby park facilities it would be expected that no one park alternative would replace all the displaced Almaden Lake Park users. The access to and use of the affected recreational facilities would be restored following the completion of these temporary measures and would not result in a permanent disruption or displaced users that might result in an increase in use of other existing recreation facilities in the study area. Therefore, impacts to other parks or recreational facilities during the Almaden Lake Improvement Project construction would be less than significant (Valley Water 2021a).

The 2015 UWMP could affect reservoir capacities and use throughout Valley Water's jurisdiction. The recreation-area development projects as part of the non-Valley Water residential, commercial, industrial, and recreation area development projects have a similar potential to disrupt recreation use along the Calero Creek Trail. Santa Clara County Parks Planning Projects and Natural Resource Management Projects, particularly the Los Gatos Creek Trail and Irrigation Systems projects, may disrupt use along Los Gatos Creek Trail. Similar to the non-flow measures as part of the Proposed Project, these cumulative projects may result in the disruption and possible closure of some existing recreation facilities, particularly trails, but this impact would be short term and localized with an abundance of alternative trail and park options available for displaced users.

The proposed reservoir reoperation curves as part of the Proposed Project would not increase use at reservoirs in the study area, and therefore, would not result in substantial physical deterioration or accelerate the deterioration of existing recreation facilities in the study area. In addition, the non-flow measures as part of the Proposed Project would result in the disruption and possible closure of some existing recreation facilities, particularly trails, but this impact would be short term and localized with an abundance of alternative trail options available for displaced users. Although monitoring would not affect recreational facilities, proposed maintenance and adaptive measures could have similar effects as both the flow and non-flow measures, resulting in temporarily displaced recreational use or disruption and possible closures of existing recreational facilities.

The Proposed Project's incremental impact to recreation would not be significant. When added to other cumulative projects, plans, and programs, given their geographic dispersal and the minor magnitude of the Proposed Project's impacts, the cumulative impact would not be significant, and the Proposed Project's incremental contribution would be **not cumulatively considerable.**

5.6.5.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

This section describes the Non-flow Measures Only Alternative's contribution to cumulative impacts to recreation resources. Table 5.6-14 summarizes the Non-flow Measures Only Alternative's contribution to cumulative impacts to recreation resources.

Table 5.6-14. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Recreation Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact REC-1: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact REC-1: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (not cumulatively considerable)

Cumulative Valley Water and non-Valley Water activities, projects, plans, and programs could increase use of recreational facilities throughout the cumulative study area; however, they would not cause substantial physical deterioration of existing neighborhood and regional parks or other recreational facilities. The Non-flow Measures Only Alternative would result in the disruption and possible closure of some existing recreation facilities, particularly trails, but this impact would be short term and localized with an abundance of alternative trail options available for displaced users. Although monitoring would not affect recreational facilities, proposed maintenance and adaptive measures could have similar effects as the non-flow measures, resulting in temporary disruption and possible closures of existing recreational facilities. As a result, cumulative impacts would not be significant, and the Non-flow Measures Only Alternative's incremental contribution to these impacts would be **not cumulatively considerable**.

5.6.5.3 FAHCE-plus Alternative Cumulative Impact Analysis

This section describes the FAHCE-plus Alternative's contribution to cumulative impacts to recreation resources. Table 5.6-15 summarizes the FAHCE-plus Alternative's contribution to cumulative impacts to recreation resources.

Table 5.6-15. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Recreation Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact REC-1: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact REC-1: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (not cumulatively considerable)

FAHCE-plus Alternative impacts to recreation are similar to those of the Proposed Project. Cumulative projects, plans, and programs could increase use of recreational facilities throughout the cumulative study area. The non-flow measures as part of the FAHCE-plus Alternative would result in the disruption and possible closure of some existing recreation facilities, particularly trails, but this impact would be short term and localized with an abundance of alternative trail options available for displaced users. Although monitoring would not affect recreational facilities, proposed maintenance and adaptive measures could have similar effects as both the flow and non-flow measures, resulting in temporarily displaced recreational use or disruption and possible closures of existing recreational facilities. The proposed reservoir reoperation curves as part of the FAHCE-plus Alternative would not increase use at any reservoirs in the study area resulting in substantial physical deterioration or accelerate the deterioration of existing recreation facilities.

The FAHCE-plus Alternative's incremental impact to recreation would not be significant. When added to other cumulative projects, plans, and programs, given their geographic dispersal and the minor magnitude of the FAHCE-plus Alternative's impacts, cumulative impacts would not be significant, and the alternative's incremental contribution would be **not cumulatively considerable**.

5.6.6 Aquatic Biological Resources

The geographic study area considered for the cumulative impact analysis for aquatic biological resources includes the Stevens Creek and Guadalupe River watersheds as well as the locations of multiple ongoing and planned Valley Water and non-Valley Water projects and plans in northern Santa Clara County. The cumulative activities are summarized in Table 5.5-1, and those relevant to the aquatic biological resources cumulative analysis are noted below.

Cumulative impact thresholds for aquatic biological resources are analogous to the impact thresholds presented in Section 3.7, *Aquatic Biological Resources*. Cumulative impacts are considered significant if they would:

- **Cumulative Impact AQUA-1:** Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS.

Valley Water and non-Valley Water projects, plans, and programs were considered in the aquatic biological cumulative impact analysis. Projects, plans, and programs considered in this analysis include those that could result in impacts to special-status fish species or their habitats. Projects, plans, programs that would directly impact species or would interact hydrologically in the aquatic biological resources study area in Stevens Creek and Guadalupe River watersheds were included in the analysis. The following projects, plans, and programs were determined to be relevant to the aquatic biological cumulative impact analysis:

- Valley Water Projects, Plans, and Programs[8]
  - Stevens Creek
    - Stevens Creek Watershed Flood Protections
      - Permanente Creek, San Francisco Bay to Foothill Expressway (2021)
      - Palo Alto Flood Basin Tide Gate Structure Improvements (2025)
      - San Francisquito Creek, San Francisco Bay through Searsville Dam (2020)
  - Guadalupe River Watershed
    - Flood Protection Projects
      - Downtown Guadalupe River Flood Protection Project/Lower Guadalupe Project (2004)
      - Guadalupe River-Upper, SPRR-Blossom Hill (2025)
      - Guadalupe River Flood Protection Project Adaptive Management (long-term)
    - Water Supply and Water Quality Improvements
    - Facility/Dam Seismic Retrofitting and Safety
      - Almaden Dam Improvements Project (to be determined)
      - Calero Dam Seismic Retrofit (2023)
      - Guadalupe Dam Seismic Retrofit (2024)
      - ADSRP (2030)
    - Fish Passage and Habitat Improvements
      - Almaden Lake Improvements (2024)
  - Valley Water-wide Flood Protection
    - San Francisco Bay Shoreline (Stevens Creek 2028)
    - SMP (Stevens/Guadalupe long term)
  - Valley Water-wide Water Quality
    - Impaired Water Bodies Program (Stevens/Guadalupe ongoing)
    - Encampment Clean Up Program (Stevens/Guadalupe ongoing)
  - Dam Seismic Retrofitting and Safety
    - Dam Safety Program (Stevens/Guadalupe ongoing)
  - Fish Passage and Habitat Improvements
    - Large Woody Debris and Gravel Augmentation (Stevens/Guadalupe 2019)
    - South Bay Salt Ponds Restoration (Stevens 2028)
    - FAHCE-plus Flow Pilot Project (Stevens 2022)
- Non-Valley Water Projects, Plans, and Programs
  - Habitat Restoration Program (County-wide ongoing)

[8] The modeling scenario for the future baseline conditions included the impacts of the seismic retrofit projects planned at Calero, Anderson, and Guadalupe Reservoirs as well as the Almaden Dam Improvements Project and Valley Water's 2015 UWMP.

- Santa Clara County Parks Planning Projects and Natural Resource Management (Recreational areas of Santa Clara County ongoing)

Cumulative impacts of the listed projects with the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative are analyzed below.

5.6.6.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to aquatic biological resources (summarized in Table 5.6-16).

Table 5.6-16. Summary of Cumulative and Proposed Project Contribution to Fish Aquatic Biological Resources Impacts

Impact	Level of Cumulative Significance before Mitigation	Incremental Project Contribution	Applicable Project Mitigation	Level of Impact after Mitigation
Impact AQUA-1: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, NMFS, or USFWS	LTS	NCC	N/A	NCC

Notes: SI = significant impact; LTS= less than significant impact; CC=cumulatively considerable; NCC = not cumulatively considerable; N/A = not applicable

Cumulative Impact AQUA-1: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement, on any Stevens Creek watershed or Guadalupe River watershed study area species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or USFWS (not cumulatively considerable)

Projects, programs, and plans considered in the cumulative impact analysis for aquatic biological resources include projects, programs, and plans that may affect the hydrology as well as stream or river channels in the study area (Stevens Creek and Guadalupe River watersheds below impassable barriers for anadromous fish). Given the potential cumulative adverse impacts to the hydrology and channels within the study area, these projects, programs, and plans may result in cumulative adverse impacts to special-status fish populations within these watersheds. Based on the scope of this analysis, the FOCP and ADSRP in Coyote Creek were not considered as cumulative projects that would affect special-status fish populations in the Stevens Creek and Guadalupe River watersheds.

The cumulative projects, programs, and plans include flood protection projects in Stevens Creek and Guadalupe watersheds; fish passage and habitat improvement projects in the Stevens Creek and Guadalupe River watersheds; water quality improvement in Stevens Creek and Guadalupe River watersheds; facility/dam seismic retrofitting and safety projects in the Guadalupe River watershed; and the Santa Clara County ongoing habitat restoration program and natural resource planning.

Flood protection projects can directly impact fish species during construction phases through vehicle strikes or crushing by heavy equipment. These projects can impact fish through habitat modification if they involve channelization of the river and a decrease in channel complexity or through dewatering during construction. They can also interfere with migration during the construction phase by dewatering areas of the river the fish need to swim through during migration or through channelizing the river in a way that creates velocity or temperature barriers to migration.

Flood protection projects covered through the VHP will implement conditions required by the plan, and Valley Water projects will apply its BMPs to avoid and minimize impacts to fish species during construction. Flood protection projects will require permits pursuant to the federal CWA and ESA and the California Porter-Cologne Act and Fish and Game Code (discussed here as other permitting requirements), and those permits include protective measures for sensitive and native aquatic biological species as well as mitigation for impacts to aquatic habitat and wetlands (discussed here as protective measures). Valley Water flood protection projects also involve a multiple-objective approach that includes environmental restoration and enhancement as part of flood protection projects, including habitat for aquatic biological species, riparian corridors, and tidal marsh. Also, the effort to stabilize sediment to prevent erosion and minimize sedimentation can be beneficial for aquatic biological resources because it prevents a toxic buildup of suspended sediment that can harm aquatic biological species when concentrations reach high levels. The SMP also manages vegetation (including nonnative invasive species) as well as clearing trash and debris.

Fish passage and habitat improvement projects can directly impact fish species during construction phases through vehicle strikes or crushing by heavy equipment, gravel, or woody debris. Fish passage and habitat improvement projects can impact fish through habitat modification through dewatering during construction. These projects can interfere with migration during the construction phase by dewatering areas of the river the fish need to swim through during migration.

Fish passage and habitat improvement projects covered through the VHP will implement conditions required by the plan and Valley Water projects will apply their BMPs to avoid and minimize impacts to fish species during construction. Fish passage and habitat improvement projects will need to fulfill other permitting requirements with protective measures. These projects would provide long-term benefits to aquatic biological resources because the goals and objectives are to improve conditions for fish, particularly anadromous fish.

No adverse impacts were identified for water quality improvement projects (Impaired Water Bodies Program and the Encampment Clean Up Program). All projects would either have no impact or would benefit aquatic biological resources as they improve water quality, which benefits fish. The projects also clean up and remove itinerant encampments that can impact fish through habitat modification, water quality degradation, and poaching. Therefore, water supply and water quality improvement projects are not considered further in this analysis.

Dam seismic retrofitting and safety projects can directly impact fish species during construction phases through vehicle strikes or crushing by heavy equipment. These projects can impact fish through habitat modification through dewatering during construction. Dam seismic retrofitting and safety projects can interfere with migration during the construction phase by dewatering areas of the river the fish need to swim through or to during migration.

Currently, seismic restrictions limit the amount of water that can be stored and released throughout the year, affecting instream flows for aquatic biological resources. In both the impact analyses of the Proposed Project and the FAHCE-plus Alternative, fish habitat and conditions for migration for anadromous fish improved, compared with the future baseline that incorporates the water storage improvements from the seismic retrofit projects. Therefore, these projects would have a long-term benefit to fish species in the Guadalupe River portion of the cumulative study area and Valley Water would be subject to other permitting with protective measures in addition to BMPs and VHP conditions.

The Dam Safety Program would have no impacts from studies, surveillance, and monitoring. Some potential for impacts would occur during maintenance if the area downstream needs to be dewatered. Vegetation maintenance would have no impact because it can be conducted in a manner that avoids impacts to fish.

Lastly, the County has an ongoing habitat restoration program and natural resource planning. Like fish passage improvements, the habitat restoration program would have potential for short-term impacts that would be minimized through other required permitting with protective measures in addition to Santa Clara County BMPs and VHP conditions and long-term benefits for fish species through protection of 100 miles of streams and restoration of up to 500 acres of riparian woodland and scrub, wetlands, and ponds and up to 10.4 miles of streams. The natural resource planning would not have any direct effects on fish but would involve planning for their long-term management and includes the goals to protect, enhance, and restore regional parks. Preservation of natural systems, biodiversity, and special-status species, and restoration of degraded habitats, are all goals of the Santa Clara County Park's Natural Resource Program. The Natural Resource Management Program includes a fisheries and wildlife program. Therefore, in terms of adverse impacts, the Natural Resource Management Program would have no impact.

When considered cumulatively, projects with a construction component or other actions that dewater the stream channel temporarily have some potential for short-term adverse impacts to special-status fish species. Short-term impacts may result from construction-related activities such as the direct physical harm or mortality attributable to use and staging of heavy equipment within the channel; channel excavation or grading; habitat impairments, including removal of riparian vegetation, which reduces shade and habitat complexity; water quality impacts, including increased suspended sediment from erosion; and modification of channel beds and banks resulting in changes to substrate required for spawning and habitat required for rearing and migration. Long-term impacts are also possible for projects that will result in channelization or decrease habitat complexity. However, the cumulative projects and programs would include other permitting requirements with protective measures, BMPs, and VHP conditions that would avoid and minimize construction impacts. Also, most the projects and programs have a mitigation or habitat restoration component that is proposed as part of the project or program or will be required by the other permitting, commensurate with the level of impacts required for that regulation. Therefore, most of the projects and programs would have long-term benefits for fish species and cumulative impacts would be less than significant.

Central California Coast Steelhead

The Proposed Project flow measures and the non-flow measures would have no long-term adverse impact to, and would benefit, steelhead in the Stevens Creek and Guadalupe River portions of the study area compared with the current and the future baseline. Therefore, there would be no significant cumulative impacts to steelhead from flow measures in Stevens Creek or once seismic restrictions are lifted in the Guadalupe River portion of the study area.

The short-term construction of the non-flow measures in both watersheds would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to steelhead. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to steelhead from the Proposed Project would be if the flow measures in the Guadalupe River under the existing conditions and/or the short-term construction of the non-flow measures in either watershed temporally overlap projects that require substantial construction in the same watershed. These impacts could potentially prevent more than a year of steelhead migration or the ability of steelhead to fulfill their lifecycle and maintain a population in the Stevens Creek watershed or the Guadalupe River watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Proposed Project to steelhead would be **not cumulatively considerable**.

Central Valley Fall-Run Chinook Salmon

In the Guadalupe River watershed portion of the study area, the non-flow measures would have no long-term adverse impact to, and would benefit, Chinook salmon and, therefore, would not contribute to cumulative impacts to Chinook salmon.

The flow measures and the short-term construction of the non-flow measures in the Guadalupe River watershed study area would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to Chinook salmon. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to Chinook salmon from the Proposed Project would be if the flow measures in the Guadalupe River and/or the short-term construction of the non-flow measures temporally overlap projects that require substantial construction. These impacts could potentially prevent more than a year of Chinook salmon migration or the ability of Chinook salmon to fulfill their lifecycle in the Guadalupe River watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Chinook salmon tend to spawn in the mainstem Guadalupe River over the tributaries. Construction for many of the cumulative projects and programs would occur in the tributaries, limiting impacts to Chinook salmon and their habitat. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Proposed Project to Chinook salmon would be **not cumulatively considerable**.

Pacific Lamprey

In both watersheds, the flow measures and the non-flow measures would have no long-term adverse impact to and would benefit Pacific lamprey and would therefore have no significant cumulative impacts to Pacific lamprey.

The short-term construction of the non-flow measures in both watersheds would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to Pacific lamprey. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat

Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to Pacific lamprey from the Proposed Project would be if the flow measures and/or the short-term construction of the non-flow measures in either watershed temporally overlap projects that require substantial construction in the same watershed. These impacts could potentially prevent more than a year of Pacific lamprey migration or the ability of Pacific lamprey to fulfill their lifecycle. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Proposed Project to Pacific lamprey would be **not cumulatively considerable**.

Sacramento Hitch

In both the Guadalupe River and Los Gatos Creek, the flow measures and the non-flow measures would benefit and, in terms of adverse impacts, have no impact to Sacramento hitch and would therefore have no adverse cumulative impacts.

The short-term construction of the non-flow measures in Guadalupe River and Los Gatos Creek would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to Sacramento hitch. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to Sacramento hitch from the Proposed Project would be if the flow measures and/or the short-term construction of the non-flow measures in the Guadalupe River or Los Gatos Creek temporally overlap projects that require substantial construction in the same watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Proposed Project to Sacramento hitch would be **not cumulatively considerable**.

Riffle Sculpin

In the Guadalupe River and Guadalupe Creek, the flow measures and non-flow measures would benefit, and have no long-term adverse impact to and would benefit riffle sculpin and would therefore have no significant cumulative impacts to riffle sculpin.

The short-term construction of the non-flow measures in the Guadalupe River and Guadalupe Creek would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to riffle sculpin. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to riffle sculpin from the Proposed Project would be if the flow measures and/or the short-term construction of the non-flow measures in the Guadalupe River or Los Gatos Creek temporally overlap projects that require substantial construction in the same watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Proposed Project to riffle sculpin would be **not cumulatively considerable**.

For each special-status aquatic biological species, the Proposed Project impacts would be **not cumulatively considerable** when added to the impacts of the cumulative plans and programs.

5.6.6.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

This section describes the Non-flow Measures Only Alternative's contribution to cumulative impacts to aquatic biological resources (summarized in Table 5.6-17).

Table 5.6-17. Summary of Cumulative and Non-flow Measures Only Alternative Contribution to Aquatic Biological Resources Impacts

Impact	Level of Cumulative Significance before Mitigation	Incremental Project Contribution	Applicable Project Mitigation	Level of Impact after Mitigation
Cumulative Impact AQUA-1: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement, on any Stevens Creek watershed or Guadalupe River watershed species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or USFWS	LTS	NCC	N/A	NCC

Notes: SI = significant impact; LTS= less than significant impact; NCC = not cumulatively considerable; N/A = not applicable

Cumulative Impact AQUA-1: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement, on any Stevens Creek watershed or Guadalupe River watershed species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or USFWS (not cumulatively considerable)

When considered cumulatively, projects with a construction component or other actions that dewater the stream channel temporarily have some potential for short-term adverse impacts to special-status fish species. Short-term impacts may result from construction-related activities such as the direct physical harm or mortality attributable to use and staging of heavy equipment within the channel; channel excavation or grading; habitat impairments, including removal of riparian vegetation, which reduces shade and habitat complexity; water quality impacts, including increased suspended sediment from erosion; and modification of channel beds and banks resulting in changes to substrate required for spawning and habitat required for rearing and migration. Long-term impacts are also possible for projects that will result in channelization or decrease habitat complexity. However, the cumulative projects and programs would include other permitting requirements with protective measures, BMPs, and VHP conditions that would avoid and minimize construction impacts. Also, most the projects and programs have a mitigation or habitat restoration component that is proposed as part of the project or program or will be required by the other permitting, commensurate with the level of impacts required for that regulation. Therefore, most of the projects and programs would have long-term benefits for fish species and cumulative impacts would be less than significant.

Central California Coast Steelhead

The non-flow measures would have no long-term impacts to and would benefit steelhead in either watershed under the Non-flow Measures Only Alternative. Therefore, there would be no significant cumulative impacts to steelhead from long-term non-flow measures.

The short-term construction of the non-flow measures in both watersheds would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to steelhead. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to steelhead from the Non-flow Measures Only Alternative would be if the short-term construction of the non-flow measures in either watershed temporally overlaps projects that require substantial construction in the same watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Non-flow Measures Only Alternative to steelhead would be **not cumulatively considerable**.

Central Valley Fall-Run Chinook Salmon

In the Guadalupe River watershed portion of the study area, the non-flow measures would have no long-term impact to and would benefit Chinook salmon and would therefore have no significant cumulative impacts to Chinook salmon.

The short-term construction of the non-flow measures in the Guadalupe River watershed study area would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to Chinook salmon. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to Chinook salmon from the Non-flow Measures Only Alternative would be if the short-term construction of the non-flow measures temporally overlaps projects that require substantial construction. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Construction for many of the cumulative projects and programs would occur in the tributaries, limiting impacts to Chinook salmon and their habitat. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Non-flow Measures Only Alternative to Chinook salmon would be **not cumulatively considerable**.

Pacific Lamprey

In both watersheds, the non-flow measures would have no long-term impacts to and would benefit Pacific lamprey, and would therefore have no significant cumulative impacts to Pacific lamprey.

The short-term construction of the non-flow measures in both watersheds would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to Pacific lamprey. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to Pacific lamprey from the Non-flow Measures Only Alternative would be if the flow measures and/or the short-term construction of the non-flow measures in either watershed temporally overlap projects that require substantial construction in the same watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Non-flow Measures Only Alternative to Pacific lamprey would be **not cumulatively considerable**.

Sacramento Hitch

In both the Guadalupe River and Los Gatos Creek, the non-flow measures would have no long-term impacts to and would benefit Sacramento hitch, and would therefore have no significant cumulative impacts to Sacramento hitch.

The short-term construction of the non-flow measures in Guadalupe River and Los Gatos Creek would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to Sacramento hitch. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to Sacramento hitch from the Non-flow Measures Only Alternative would be if the flow measures and/or the short-term construction of the non-flow measures in the Guadalupe River or Los Gatos Creek temporally overlap projects that require substantial construction in the same watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Non-flow Measures Only Alternative on Sacramento hitch would be **not cumulatively considerable**.

Riffle Sculpin

In the Guadalupe River and Guadalupe Creek, the long-term non-flow measures would have no long-term impact to and would benefit riffle sculpin, and would therefore have no significant cumulative impacts to riffle sculpin.

The short-term construction of the non-flow measures in Guadalupe River and Guadalupe Creek would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to riffle sculpin. Therefore, the Non-flow Measures Only Alternative impacts were added to the cumulative project and program impacts for riffle sculpin. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The only identified avenue for a significant cumulative impact to riffle sculpin from the Non-flow Measures Only Alternative would be if the flow measures and/or the short-term construction of the non-flow measures in the Guadalupe River or Los Gatos Creek temporally overlap projects that require substantial construction in the same watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Non-flow Measures Only Alternative on riffle sculpin would be **not cumulatively considerable**.

For each special-status aquatic biological species, the Non-flow Measures Only Alternative impacts would be **not cumulatively considerable** when added to the impacts of the cumulative plans and programs.

5.6.6.3 FAHCE-plus Alternative Cumulative Impact Analysis

This section describes the FAHCE-plus Alternative's contribution to cumulative impacts to aquatic biological resources (summarized in Table 5.6-18).

Table 5.6-18. Summary of Cumulative and FAHCE-plus Alternative Contribution to Aquatic Biological Resources Impacts

Impact	Level of Cumulative Significance before Mitigation	Incremental Project Contribution	Applicable Project Mitigation	Level of Impact after Mitigation
Cumulative Impact AQUA-1: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement, on any Stevens Creek watershed or Guadalupe River watershed species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or USFWS	LTS	NCC	N/A	NCC

Notes: SI = significant impact; LTS= less than significant impact; NCC = not cumulatively considerable; N/A = not applicable

Cumulative Impact AQUA-1: Have a substantial adverse effect, either directly, through habitat modifications, or through substantial interference with movement, on any Stevens Creek watershed or Guadalupe River watershed species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or USFWS (not cumulatively considerable)

Central California Coast Steelhead

The FAHCE-plus Alternative flow measures and the non-flow measures would have no long-term adverse impact to, and would benefit, steelhead in both watersheds compared with the current and the future baseline. Therefore, there would be no significant cumulative impacts to steelhead from flow measures.

The short-term construction of the non-flow measures in both watersheds would have less than significant impacts that would add impacts to the cumulative projects, plans, and programs impacts to steelhead. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to steelhead from the Proposed Project would be if the flow measures in the Guadalupe River under the existing conditions and/or the short-term construction of the non-flow measures in either watershed temporally overlap projects that require substantial construction in the same watershed. These impacts could potentially prevent more than a year of steelhead migration or the ability of steelhead to fulfill their lifecycle and maintain a population in the Stevens Creek watershed or the Guadalupe River watershed. However, most of the cumulative projects and programs are Valley Water’s projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the Proposed Project to steelhead would be **not cumulatively considerable**.

Central Valley Fall-Run Chinook Salmon

In the Guadalupe River watershed portion of the study area, the non-flow measures would have no long-term adverse impact to, and would benefit, Chinook salmon and would therefore have no significant cumulative impacts to Chinook salmon.

Under the FAHCE-plus Alternative, the flow measures and the short-term construction of the non-flow measures in the Guadalupe River portion of the study area would have less than significant impacts that would add impacts to the cumulative project and program impacts to Chinook salmon. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to Chinook salmon from the FAHCE-plus Alternative would be if the flow measures in the Guadalupe River and/or the short-term construction of the non-flow measures temporally overlap projects that require substantial construction. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Chinook salmon tend to spawn in the mainstem Guadalupe River over the tributaries. Construction for many of the cumulative projects and programs would occur in the tributaries, limiting impacts to Chinook salmon and their habitat. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the FAHCE-plus Alternative to Chinook salmon would be **not cumulatively considerable**.

Pacific Lamprey

In both watersheds, the flow measures and the non-flow measures would benefit and, in terms of adverse impacts, have no long-term impact to Pacific lamprey and would therefore have no significant cumulative impacts to Pacific lamprey.

The short-term construction of the non-flow measures in both watersheds would have less than significant impacts that would be added to the cumulative project and program impacts to Pacific lamprey. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to Pacific lamprey from the FAHCE-plus Alternative would be if the flow measures and/or the short-term construction of the non-flow measures in either watershed temporally overlap projects that require substantial construction in the same watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the FAHCE-plus Alternative to Pacific lamprey would be **not cumulatively considerable**.

Sacramento Hitch

In both the Guadalupe River and Los Gatos Creek, the flow measures and the non-flow measures would have no long-term impacts to and would benefit Sacramento hitch, and would therefore have no significant cumulative impacts to Sacramento hitch.

The short-term construction of the non-flow measures in both watersheds would have less than significant impacts that would be added to the cumulative project and program impacts to Sacramento hitch. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to Sacramento hitch from the FAHCE-plus Alternative would be if the flow measures and/or the short-term construction of the non-flow measures in the Guadalupe River or Los Gatos Creek temporally overlap projects that require substantial construction in the same watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the FAHCE-plus Alternative to Sacramento hitch would be **not cumulatively considerable**.

Riffle Sculpin

In the Guadalupe River and Guadalupe Creek, the flow measures and the non-flow measures would have no long-term impacts to and would benefit riffle sculpin and would therefore have no significant cumulative impacts to riffle sculpin.

The short-term construction of the non-flow measures in both watersheds would have less than significant impacts that would be added to the cumulative project and program impacts to riffle sculpin. These include the flood protection projects, fish passage and habitat improvement projects, dam seismic retrofitting projects and safety program, and the county-wide Habitat Restoration Program. Adverse impacts could include direct impacts or habitat modifications during construction or habitat modifications from channelization as described above.

The main identified avenue for a significant cumulative impact to riffle sculpin from the FAHCE-plus Alternative would be if the flow measures and/or the short-term construction of the non-flow measures in the Guadalupe River or Los Gatos Creek temporally overlap projects that require substantial construction in the same watershed. However, most of the cumulative projects and programs are Valley Water's projects and programs and will undergo environmental review and have other required permitting with protective measures in addition to BMPs and VHP conditions. When feasible, Valley Water would have the ability to phase projects in a way that prevents significant cumulative impacts from occurring. Therefore, cumulative impacts would be less than significant, and the incremental impacts of the FAHCE-plus Alternative to riffle sculpin would be **not cumulatively considerable**.

For each special-status aquatic biological species, the FAHCE-plus Alternative impacts would not be cumulatively considerable when added to the impacts of the cumulative plans and programs.

5.6.7 Terrestrial Biological Resources

The geographic study area considered for the cumulative impact analysis for terrestrial biological resources includes the Stevens Creek and Guadalupe River watersheds as well as the locations of multiple ongoing and planned Valley Water and non-Valley Water projects and plans in northern Santa Clara County. Specifically, the study area includes the same area as considered for the direct and indirect impact analysis. To assess impacts from implementation of the flow measures, a 500-foot area of potential impact on either side of centerline of the study area streams was applied. This area captures potential impacts to terrestrial species using the streams within the bank and adjacent riparian areas. The study area in the Stevens Creek Watershed includes areas within and on terrestrial lands adjacent to Stevens Creek, downstream of the Stevens Creek Dam and upstream of the tidally influenced section of the creek (approximately midway between Highway 101 and the Crittenden Lane pedestrian bridge). The study area for the Guadalupe Watershed includes Alamitos Creek, Guadalupe Creek, Los Gatos Creek, and the Guadalupe River and adjacent terrestrial areas. The study area includes areas below the associated dams and extends upstream of the tidally influenced section of Guadalupe River (approximately located at the pedestrian bridge downstream of the Montague Expressway). The cumulative activities are summarized in Table 5.5-1, and those relevant to the terrestrial biological resources cumulative analysis are noted below.

Cumulative impact thresholds for terrestrial biological resources are the same as the impact thresholds presented in Section 3.8, *Terrestrial Biological Resources*. Cumulative impacts are considered significant if they would:

- **Cumulative Impact TERR-1:** Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS
- **Cumulative Impact TERR-2:** Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS
- **Cumulative Impact TERR-3:** Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means
- **Cumulative Impact TERR-4:** Interfere substantially with the movement of any native resident or migratory terrestrial species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites
- **Cumulative Impact TERR-5:** Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance
- **Cumulative Impact TERR-6:** Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan

Valley Water and non-Valley Water projects, plans, and programs were considered in the terrestrial biological cumulative impact analysis. Projects, plans, and programs considered in this analysis include those that could result in impacts to terrestrial species or habitats or otherwise conflict with local policies, ordinances, or habitat plans, as noted in the thresholds listed above. Based on these factors, the following projects, plans, and programs were determined to be relevant to the terrestrial biological cumulative impact analysis:

- Valley Water Projects, Plans, and Programs
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Valley Water Watershed Improvements (Almaden Lake, Permanente Creek, Coyote Creek, and Guadalupe River)
  - FOCP

  - ADSRP
  - Calero Dam Seismic Retrofit
  - Guadalupe Dam Seismic Retrofit
  - Fish passage Improvements
  - Impaired Water Bodies Program
  - Dam Safety Program
  - South Bay Salt Ponds Restoration
  - Valley Water-wide Water Supply and Water Quality Improvements
  - Encampment Clean Up Program
  - Large Woody Debris and Gravel Augmentation
- Non-Valley Water Projects, Plans, and Programs
  - Residential, Commercial, Industrial, and Recreation Area Development
  - Habitat Restoration Program
  - Santa Clara County Parks Planning Projects and Natural Resource Management

Cumulative Impacts for the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative are analyzed below.

5.6.7.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to terrestrial biological resources. Table 5.6-19 summarizes the Proposed Project's contribution to cumulative impacts to terrestrial biological resources.

Table 5.6-19. Summary of Proposed Project Impact Contribution to Cumulative Terrestrial Biological Resources Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	SI	CC	MM TERR-1a, MM TERR-1b, MM TERR-1c, MM TERR-1d, MM TERR-1e	NCC
Cumulative Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS	SI	CC	MM TERR-1a, MM TERR-1b, MM TERR-1d, MM TERR-1e	NCC
Cumulative Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means	SI	CC	MM TERR-1d, MM TERR-2	NCC

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact TERR-4: Interfere substantially with the movement of any native resident or migratory terrestrial species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites	LTS	NCC	N/A	NCC
Cumulative Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance	SI	CC	MM TERR-3	NCC
Cumulative Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan	LTS	NCC	N/A	NCC

Notes: CC = cumulatively considerable, LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (not cumulatively considerable)

Cumulative projects, plans, and programs (such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects as well as the non-Valley Water Pacheco Reservoir Expansion Project, among others), when combined with impacts of the Proposed Project's flow and non-flow measures, could affect terrestrial biological resources, including identified candidate, sensitive, listed, or special-status species, as described in Section 3.8.4.

The cumulative impact to terrestrial biological resources resulting from the Proposed Project impacts (described in Section 3.8.4) in combination with other reasonably foreseeable probable future projects, plans, and programs in the cumulative impact area would result in significant cumulative impacts to identified candidate, sensitive, listed, or special-status species. The magnitude of these impacts would depend on the relative magnitude of adverse effects of these projects, plans, and programs on biological resources compared to the relative benefit to these resources of impact avoidance and minimization efforts prescribed by planning documents; CEQA mitigation measures; permit requirements for each project, plan, or program; compensatory mitigation and proactive conservation measures associated with each project, plan, or program; and the benefits to biological resources accruing from the VHP and FHRP.

Valley Water would implement Valley Water's BMPs and adhere to the VHP conditions in VHP-covered areas. The Proposed Project's pre-mitigation contribution to cumulative impacts would be **cumulatively considerable**. However, Valley Water would also implement MM TERR-1a through MM TERR-1e which would reduce the Proposed Project's contribution to cumulative impacts to special-status terrestrial species by avoiding or minimizing the impact in areas where these species occur and compensating for direct or indirect impacts to species or their habitat. These mitigation measures would reduce the Proposed Project's impacts to less than significant; therefore, post-mitigation, the

Proposed Project's incremental contribution to this cumulative impact would be **not cumulatively considerable**.

Cumulative Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area could result in significant cumulative impacts to sensitive natural communities when combined with impacts of the flow and non-flow measures of the Proposed Project, including associated maintenance, monitoring, and adaptive management. The magnitude of these impacts would depend on the relative magnitude of adverse effects of these projects, plans, and programs on riparian habitat or other sensitive natural communities compared to the relative benefit to these resources from impact avoidance and minimization efforts prescribed by planning documents, and the benefits to biological resources accruing from the VHP and FHRP. Valley Water would implement Valley Water's BMPs and adhere to the VHP conditions in VHP-covered areas. The Proposed Project's pre-mitigation contribution to cumulative impacts would be **cumulatively considerable**.

Valley Water would also implement MM TERR-1a, 1b, 1d, and -1e which would reduce the Proposed Project's contribution to cumulative impacts which would reduce the Proposed Project's cumulative contribution to riparian habitat or other sensitive natural communities impacts by avoiding or minimizing the impact in areas where these communities occur and by compensating for direct or indirect impacts to these communities through restoration and/or enhancement. These mitigation measures would reduce the Proposed Project's impacts to less than significant; therefore, the Proposed Project's post-mitigation incremental contribution to this cumulative impact would be **not cumulatively considerable**.

Cumulative Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area, could result in significant cumulative impacts to jurisdictional waters and wetlands when combined with impacts of the flow and non-flow measures of the Proposed Project, including associated maintenance, monitoring, and adaptive management. The magnitude of these impacts would depend on the relative magnitude of the adverse effects of these projects, plans, and programs on wetlands and waters of the U.S. as defined by Section 404 of the CWA compared to the relative benefit to these resources from impact avoidance and minimization efforts prescribed by planning documents; and the benefits to biological resources accruing from the VHP and FHRP. The pre-mitigation incremental contribution of the Proposed Project would result in **cumulatively considerable** contribution to significant cumulative impacts to these resources.

Valley Water would implement MM TERR-1d and MM TERR-2 to reduce impacts to wetlands and other waters of the U.S. and State. These mitigation measures would reduce the Proposed Project's impacts to less than significant; therefore, the Proposed Project's post-mitigation incremental contribution to this cumulative impact would be **not cumulatively considerable**.

Cumulative Impact TERR-4: Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area, could result in incrementally adverse impacts to wildlife movement or nurseries when combined with impacts of the flow and non-flow measures of the Proposed Project, including associated maintenance, monitoring, and adaptive management. Proposed Project activities would impact terrestrial wildlife movement during construction; however, these impacts would be temporary since animals would continue to move through the project site(s) following project completion and the cumulative impacts would be less than significant. The ability of animals to move through the project site(s) following project completion would be similar to current conditions and would be improved by the channel-enhancement activities including riparian restoration (see Section 3.8.4). The cumulative impact would be less than significant, and the incremental contribution by the Proposed Project would be **not cumulatively considerable**.

Cumulative Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area could result in adverse impacts to locally protected trees when combined with the flow and non-flow measures of the Proposed Project, including associated maintenance, monitoring, and adaptive management. Cumulative impacts to locally protected trees could be significant. As discussed in Section 3.8.4, the majority of the proposed non-flow measures and the resulting biological benefits would inherently be consistent with applicable local policies designed to protect biological resources. However, complete avoidance of trees protected by applicable local ordinances may not be practicable, and there would be an incremental contribution by the Proposed Project. When considered together with the impacts of other cumulative projects, plans, and programs, cumulative impacts to locally protected trees would be significant, and the Proposed Project's pre-mitigation incremental contribution to this impact would be **cumulatively considerable**.

Valley Water would implement MM TERR-3, which would mitigate impacts to ordinance trees that cannot be avoided by replacing such trees if required by applicable ordinances so that the Proposed Project does not conflict with the applicable provisions of local tree ordinances. Therefore, post-mitigation, the Proposed Project's incremental contribution to this cumulative impact would **be not cumulatively considerable**.

Cumulative Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others, could result in adverse impacts to terrestrial biological resources when combined with the flow and non-flow measures of the Proposed Project, including associated maintenance, monitoring, and adaptive management. As discussed in Section 3.8.4, a number of plant and animal species are covered by the VHP, which is an adopted HCP and NCCP. Valley Water would apply for VHP coverage for covered activities and would adhere to all applicable VHP conditions during project implementation, and cumulative impacts associated with the Proposed Project would be less than significant.

There is no known conflict with the VHP as a result of the listed cumulative projects, plans, and programs. The incremental contribution of the Proposed Project would likewise not conflict with or obstruct implementation of an adopted HCP/NCCP or other approved local, regional, or state HCP. For this reason, the cumulative impact would be less than significant, and the Proposed Project's contribution would be **not cumulatively considerable**.

5.6.7.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

This section describes the Non-flow Measures Only Alternative's contribution to cumulative impacts to terrestrial biological resources. Table 5.6-20 summarizes the Non-flow Measures Only Alternative's contribution to cumulative impacts to terrestrial biological resources.

Table 5.6-20. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Terrestrial Biological Resources Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	SI	CC	MM TERR-1a, MM TERR-1b, MM TERR-1c, MM TERR-1d, MM TERR-1e	NCC
Cumulative Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS	SI	CC	MM TERR-1a, MM TERR-1b, MM TERR-1d, MM TERR-1e	NCC
Cumulative Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means	SI	CC	MM TERR-1, MM TERR-2	NCC
Cumulative Impact TERR-4: Interfere substantially with the movement of any native resident or migratory terrestrial species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites	LTS	NCC	N/A	NCC
Cumulative Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance	SI	CC	MM TERR-3	NCC

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan	LTS	NCC	N/A	NCC

Notes: CC = cumulatively considerable, LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (not cumulatively considerable)

The Non-flow Measures Only Alternative would involve ground disturbance, soil compaction, disturbances to channel beds and banks, weir installation, channel modification, construction staging and access, gravel augmentation, sediment removal, bank stabilization, minor maintenance, and the removal of culverts, riprap, or other structures. Any of these activities when combined with impacts of cumulative projects, plans, and programs in the area (such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects as well as the non-Valley Water Pacheco Reservoir Expansion Project, among others) could affect terrestrial biological resources, including identified candidate, sensitive, listed, or special-status species, as described in Section 3.8.4.

The cumulative impact to terrestrial biological resources resulting from the Non-flow Measures Only Alternative's impacts (described in Section 3.8.4) in combination with other reasonably foreseeable probable future projects, plans, and programs in the cumulative impact area would result in significant cumulative impacts to identified candidate, sensitive, listed, or special-status species. The magnitude of these impacts would depend on the relative magnitude of adverse effects of these projects, plans, and programs on biological resources compared to the relative benefit to these resources of impact avoidance and minimization efforts prescribed by planning documents; CEQA mitigation measures; permit requirements for each project, plan, or program; compensatory mitigation and proactive conservation measures associated with each project, plan, or program; and the benefits to biological resources accruing from the VHP and FHRP.

Valley Water will implement Valley Water's BMPs and adhere to the VHP conditions in VHP-covered areas. The Non-flow Measures Only Alternative's pre-mitigation contribution to cumulative impacts would be **cumulatively considerable**. Valley Water will implement MM TERR-1 through MM TERR-1e, which would reduce the Proposed Project's cumulative contribution to special-status terrestrial species impacts by avoiding or minimizing the impact in areas where these species occur and compensating for direct or indirect impacts to species or their habitat. These mitigation measures would reduce the Proposed Project's impacts to less than significant; therefore post-mitigation, the Proposed Project's incremental contribution to this cumulative impact would be **not cumulatively considerable** to identified candidate, sensitive, listed, or special-status species.

Cumulative Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area could result in significant cumulative impacts to sensitive natural communities when combined with impacts of the Non-flow Measures Only Alternative. The magnitude of these impacts would depend on the relative magnitude of the adverse effects of these projects, plans, and programs on riparian habitat or other sensitive natural communities compared to the relative benefit to these resources from impact avoidance and minimization efforts prescribed by planning documents; CEQA mitigation measures; permit requirements for each project, plan, or program; compensatory mitigation and proactive conservation measures associated with each project, plan, or program; and the benefits to biological resources accruing from the VHP and FHRP. The pre-mitigation incremental contribution of the Non-flow Measures Only Alternative would be **cumulatively considerable.**

Valley Water would implement MM TERR-1a, 1b, 1d, and 1e which would reduce the Non-flow Measures Only Alternative's cumulative contribution to riparian habitat or other sensitive natural communities impacts by avoiding or minimizing the impact in areas where these communities occur and by compensating for direct or indirect impacts to these communities through restoration and/or enhancement. These mitigation measures would reduce the Non-flow Measures Only Alternative's impacts to less than significant; therefore, post-mitigation the Proposed Project's incremental contribution to this cumulative impact would be **not cumulatively considerable**.

Cumulative Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area, could result in significant cumulative impacts to jurisdictional waters and wetlands when combined with impacts of the Non-flow Measures Only Alternative. The magnitude of these impacts would depend on the relative magnitude of the adverse effects of these projects, plans, and programs on wetlands and waters of the U.S. as defined by Section 404 of the CWA compared to the relative benefit to these resources from impact avoidance and minimization efforts prescribed by planning documents; CEQA mitigation measures; permit requirements for each project, plan, or program; compensatory mitigation and proactive conservation measures associated with each project, plan, or program; and the benefits to biological resources accruing from the VHP and FHRP. The pre-mitigation incremental contribution of the Non-flow Measures Only Alternative would be **cumulatively considerable**. Valley Water would implement MM TERR-1d and MM TERR-2 to reduce impacts to wetlands and other waters of the U.S. and state. These mitigation measures would reduce the Non-flow Measures Only Alternative's impacts to less than significant; therefore, post-mitigation the Non-flow Measures Only Alternative's incremental contribution to this cumulative impact would be **not cumulatively considerable**.

Cumulative Impact TERR-4: Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area, could result in adverse impacts to wildlife movement and nurseries when combined with impacts of the Non-flow Measures Only Alternative. The alternative's activities would impact terrestrial wildlife movement during construction; however, these impacts would be temporary since animals would continue to move through the project site(s) following project completion. The ability of animals to move through the project site(s) following project completion would be similar to current conditions and would be improved by the channel-enhancement activities including riparian restoration (see Section 3.8.4). The cumulative impact would be less than significant, and the incremental contribution by the Non-flow Measures Only Alternative to this impact would be **not cumulatively considerable**.

Cumulative Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area, could result in adverse impacts to locally protected trees when combined with impacts of the Non-flow Measures Only Alternative. As discussed in Section 3.8.4, the majority of the proposed measures and the resulting biological benefits would inherently be consistent with applicable local policies designed to protect biological resources. However, complete avoidance of trees protected by local ordinances may not be practicable, and there would be a contribution to a significant cumulative impact by the Non-flow Measures Only Alternative to this impact, which would be **cumulatively considerable** pre-mitigation. Valley Water would implement MM TERR-3, which would mitigate impacts to ordinance trees that cannot be avoided by replacing such trees if required by applicable ordinances so that the Non-flow Measures Only Alternative does not conflict with the applicable provisions of local tree ordinances. Therefore, post-mitigation, the Proposed Project's incremental contribution to this cumulative impact would be **not cumulatively considerable**.

Cumulative Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan (not cumulatively considerable)

Cumulative projects, plans, and programs in the cumulative impact area could result in incrementally adverse impacts to terrestrial biological resources when combined with the Non-flow Measures Only Alternative. As discussed in Section 3.8.4, a number of plant and animal species are covered by the VHP, which is an adopted HCP and NCCP. Valley Water would apply for VHP coverage for covered activities and would adhere to all applicable VHP conditions during project implementation, and cumulative impacts associated with the Proposed Project would be less than significant. There is no known conflict with the VHP as a result of the listed cumulative projects, plans, and programs. The incremental contribution of the Non-flow Measures Only Alternative would likewise not conflict with or obstruct implementation of an adopted HCP/NCCP or other approved local, regional, or state HCP. For this reason, the cumulative impact would be less than significant, and the alternative's contribution would be **not cumulatively considerable**.

5.6.7.3 FAHCE-plus Alternative Cumulative Impact Analysis

The cumulative impacts related to terrestrial biological resources for the FAHCE-plus Alternative were found to be identical to that of the Proposed Project. Table 5.6-21 summarizes those impacts. See Section 5.6.7.1 for analysis.

Table 5.6-21. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Terrestrial Biological Resources Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	SI	CC	MM TERR-1a, MM TERR-1b, MM TERR-1c, MM TERR-1d, MM TERR-1e	NCC
Cumulative Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS	SI	CC	MM TERR-1a, MM TERR-1b, MM TERR-1d, MM TERR-1e	NCC
Cumulative Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means	SI	CC	MM TERR-1, MM TERR-2	NCC
Cumulative Impact TERR-4: Interfere substantially with the movement of any native resident or migratory terrestrial species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites	LTS	NCC	N/A	NCC
Cumulative Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance	SI	CC	MM TERR-3	NCC
Cumulative Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan	LTS	NCC	N/A	NCC

Notes: CC = cumulatively considerable, LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact TERR-1: Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (cumulatively considerable)

Cumulative projects, plans, and programs (such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects as well as the non-Valley Water Pacheco Reservoir Expansion Project, among others), when combined with impacts of the FAHCE-plus Alternative's flow and non-flow measures, could affect terrestrial biological resources, including identified candidate, sensitive, listed, or special-status species, as described in Section 3.8.4.

The cumulative impact to terrestrial biological resources resulting from the FAHCE-plus Alternative impacts (described in Section 3.8.4) in combination with other reasonably foreseeable probable future projects, plans, and programs in the cumulative impact area would result in significant cumulative impacts to identified candidate, sensitive, listed, or special-status species. The magnitude of these impacts would depend on the relative magnitude of adverse effects of these projects, plans, and programs on biological resources compared to the relative benefit to these resources of impact avoidance and minimization efforts prescribed by planning documents; CEQA mitigation measures; permit requirements for each project, plan, or program; compensatory mitigation and proactive conservation measures associated with each project, plan, or program; and the benefits to biological resources accruing from the VHP and FHRP.

Valley Water would implement Valley Water's BMPs and adhere to the VHP conditions in VHP-covered areas. The alternative's pre-mitigation contribution to cumulative impacts would be **cumulatively considerable**. However, Valley Water would also implement MM TERR-1a through MM TERR-1e which would further reduce the alternative's contribution to cumulative impacts to special-status terrestrial species by avoiding or minimizing the impact in areas where these species occur and compensating for direct or indirect impacts to species or their habitat. These mitigation measures would reduce the alternative's impacts to less than significant; therefore, post-mitigation, the FAHCE-plus Alternative's incremental contribution to this cumulative impact would be **not cumulatively considerable**.

Cumulative Impact TERR-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS (cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area could result in significant cumulative impacts to sensitive natural communities when combined with impacts of the flow and non-flow measures of the FAHCE-plus Alternative, including associated maintenance, monitoring, and adaptive management. The magnitude of these impacts would depend on the relative magnitude of adverse effects of these projects, plans, and programs on riparian habitat or other sensitive natural communities compared to the relative benefit to these resources from impact avoidance and minimization efforts prescribed by planning documents, and the benefits to biological resources accruing from the VHP and FHRP. Valley Water would implement Valley Water's BMPs and adhere to the VHP conditions in VHP-covered areas. The alternative's pre-mitigation contribution to cumulative impacts would be **cumulatively considerable**. Valley Water would also implement MM TERR-1a, 1b, 1d, and 1e, which would reduce the FAHCE-plus Alternative's cumulative contribution to riparian habitat or other sensitive natural communities impacts by avoiding or minimizing the impact in areas where these communities occur and by compensating for direct or indirect impacts to these communities through restoration and/or enhancement. These mitigation measures would reduce the Proposed Project's impacts to less than significant; therefore, the FAHCE-plus Alternative's post-mitigation incremental contribution to this cumulative impact would be **not cumulatively considerable**.

Cumulative Impact TERR-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means (cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area, could result in significant cumulative impacts to jurisdictional waters and wetlands when combined with the flow and non-flow measures of the FAHCE-plus Alternative, including associated maintenance. monitoring, and adaptive management. The magnitude of these impacts would depend on the relative magnitude of the adverse effects of these projects, plans, and programs on wetlands and waters of the U.S. as defined by Section 404 of the CWA compared to the relative benefit to these resources from impact avoidance and minimization efforts prescribed by planning documents; and the benefits to biological resources accruing from the VHP and FHRP. The pre-mitigation incremental contribution of the FAHCE-plus Alternative would result in a **cumulatively considerable** contribution to significant cumulative impacts to these resources.

Valley Water would implement MM TERR-1d and MM TERR-2 to reduce impacts to wetlands and other waters of the U.S. and state. These mitigation measures would reduce the Proposed Project's impacts to less than significant; therefore, the FAHCE-plus Alternative's post-mitigation incremental contribution to this cumulative impact would be **not cumulatively considerable**.

Cumulative Impact TERR-4: Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory terrestrial wildlife corridors, or impede the use of native wildlife nursery sites (cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area, could result in incrementally adverse impacts to wildlife movement or nurseries when combined with impacts of the flow and non-flow measures of the FAHCE-plus Alternative, including associated maintenance, monitoring, and adaptive management. FAHCE-plus Alternative activities would impact terrestrial wildlife movement during construction; however, these impacts would be temporary since animals would continue to move through the project site(s) following project completion and the cumulative impacts would be less than significant. The ability of animals to move through the project site(s) following project completion would be similar to current conditions and would be improved by the channel-enhancement activities including riparian restoration (see Section 3.8.4). The cumulative impact would be less than significant, and the incremental contribution by the FAHCE-plus would be **not cumulatively considerable**.

Cumulative Impact TERR-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others in the cumulative impact area, could result in adverse impacts to locally protected trees when combined with the flow and non-flow measures of the FAHCE-plus Alternative, including associated maintenance, monitoring, and adaptive management. Cumulative impacts to locally protected trees could be significant. As discussed in Section 3.8.4, the majority of the proposed non-flow measures and the resulting biological benefits would inherently be consistent with applicable local policies designed to protect biological resources. However, complete avoidance of trees protected by applicable local ordinances may not be practicable, and there would be an incremental contribution by the FAHCE-plus Alternative. When considered together with the impacts of other cumulative projects, plans, and programs, cumulative impacts to locally protected trees would be significant, and the Proposed Project's pre-mitigation incremental contribution to this impact would be **cumulatively considerable**.

Valley Water would implement MM TERR-3, which would mitigate impacts to ordinance trees that cannot be avoided by replacing such trees if required by applicable ordinances so that the FAHCE-plus Alternative does not conflict with the applicable provisions of local tree ordinances. Therefore, post-mitigation, the Proposed Project's post-mitigation incremental contribution to this cumulative impact would be **not cumulatively considerable**.

Cumulative Impact TERR-6: Conflict with the provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan (not cumulatively considerable)

Cumulative projects, plans, and programs such as Valley Water's watershed improvements, Almaden Lake Improvement Project, dam safety, and seismic retrofit projects, among others, could result in adverse impacts to terrestrial biological resources when combined with the flow and non-flow measures of the FAHCE-plus Alternative, including associated maintenance, monitoring, and adaptive management. As discussed in Section 3.8.4, a number of plant and animal species are covered by the VHP, which is an adopted HCP and NCCP. Valley Water would apply for VHP coverage for covered activities and would adhere to all applicable VHP conditions during project implementation, and cumulative impacts associated with the FAHCE-plus Alternative would be less than significant.

There is no known conflict with the VHP as a result of the listed cumulative projects, plans, and programs. The incremental contribution of the FAHCE-plus Alternative would likewise not conflict with or obstruct implementation of an adopted HCP/NCCP or other approved local, regional, or state HCP. For this reason, the cumulative impact would be less than significant, and the FAHCE-plus Alternative's contribution would be **not cumulatively considerable**.

5.6.8 Cultural Resources

The geographic study area for the cumulative impact analysis for cultural resources includes the Stevens Creek and Guadalupe River watersheds as well as the locations of multiple ongoing and planned Valley Water and non-Valley Water projects and plans in northern Santa Clara County.

Cumulative impact thresholds for cultural resources are the same as the thresholds presented in Section 3.9, *Cultural Resources*. Cumulative impacts to cultural resources are considered significant if they would:

- **Cumulative Impact CUL-1:** Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built-Environment Resources
- **Cumulative Impact CUL-2:** Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources
- **Cumulative Impact CUL-3:** Disturb any human remains, including those interred outside of dedicated cemeteries

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cultural cumulative impact analysis. Projects, plans, and programs considered in this analysis include those that could result in impacts to historic resources or structures, archaeological resources, or human remains, as noted in the thresholds listed above. Based on these factors, the following projects, plans, and programs were determined to be relevant to the cultural cumulative impact analysis:

- Valley Water Projects, Plans and Programs
  - SMP
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Valley Water Watershed Improvements (Almaden Lake, Permanente Creek, Coyote Creek, and Guadalupe River)
  - Valley Water-wide Flood Protection Projects
  - Valley Water Dam Safety and Seismic Retrofit Projects
  - Pacheco Reservoir Expansion
  - South Bay Salt Ponds Restoration
  - Valley Water-wide Water Supply and Water Quality Improvements
  - Valley Water Fish Passage and Habitat Improvements
- Non-Valley Water Projects, Plans and Programs
  - Residential, Commercial, Industrial, and Recreation Area Development

Cumulative impacts for the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative are analyzed below.

5.6.8.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to cultural resources. Table 5.6-22 summarizes the Proposed Project's contribution to cumulative impacts to cultural resources.

Table 5.6-22. Summary of Proposed Project Impact Contribution to Cumulative Cultural Resources Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources	SI	CC	MM CUL-1a, through 1c	CC
Cumulative Impact CUL-2: Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources	SI	CC	MM CUL-2a, MM CUL-2b	CC
Cumulative Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries	SI	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources (cumulatively considerable)

In regard to historical built environment resources, cumulative projects, plans, and programs (such as the Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects, as well as the non-Valley Water projects) affecting historic-era infrastructure could demolish or alter a historic structure in such a way that it would no longer convey its historic significance. The incremental contribution of the Proposed Project non-flow measures could likewise be significant and **cumulatively considerable**. Although proposed maintenance, monitoring, and adaptive management would not likely substantially affect historic resources, implementation of additional measures would have the same potential to impact historic resources as these measures and would closely align with the proposed non-flow measures. For this reason, there would be a cumulatively significant impact as a result of likely substantial adverse changes to the significance of historic resources.

Implementation of MM CUL-1a, MM CUL-1b, and MM CUL-1c would require a historic structure report and evaluation of resources prior to Valley Water ground-disturbing activities and would require all report recommendations be implemented to offset the effects of the disturbance to historic structures. However, even with the implementation of these mitigation measures as part of the Proposed Project, demolition of a significant historical building is irreversible, and, with the consideration of similar impacts from other cumulative projects, plans, and programs, after mitigation the impact would be **cumulatively considerable**.

Cumulative Impact CUL-2: Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources (cumulatively considerable)

Any of the Valley Water or non-Valley Water cumulative projects, plans, and programs noted above which involve disturbance of intact soils or sediments could potentially result in adverse effects on previously recorded or newly discovered archeological resources. Likewise, the Proposed Project non-flow measures, including associated maintenance, monitoring, and adaptive management, could impact archaeological resources. With implementation of Valley Water BMPs CU-1, GEN-40, and GEN-41, impacts from those activities implemented by Valley Water could be avoided or offset. These measures would likewise be included as a condition of funding for non-Valley Water-owned projects. However, these measures would not likely be implemented uniformly for each site across projects, plans, and programs. Additionally, archaeological sites are a non-renewable resource and, if damaged or destroyed, can never be recreated. For this reason, there would be a cumulatively significant impact as a result of likely substantial adverse changes in the significance of archaeological resources. Given the magnitude of the Proposed Project's impacts, and because there would be a significant impact of the Proposed Project, the impact would be **cumulatively considerable**. Accordingly, Valley Water will also implement MMs CUL-2a and CUL-2b, which would reduce the Proposed Project's contribution to cumulative impacts to previously recorded or newly discovered archaeological sites by avoiding or minimizing the impact in areas where these sites are located and offsetting those impacts when appropriate and necessary. However, even with the implementation of these mitigation measures as part of the Proposed Project, the impact would remain **cumulatively considerable.**

Cumulative Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries (not cumulatively considerable)

Similar to the analysis of Cumulative Impact CUL-2, ground-disturbing activity from Valley Water and non-Valley Water cumulative projects, plans, and programs and the Proposed Project non-flow measures could disturb human remains. By implementing the resource identification efforts detailed in Valley Water BMPs CU-1, GEN-40, and GEN-41, and MM CUL-2a and MM CUL-2b, the location of human remains can be identified and avoided. As discussed in Section 3.9.4.3, it is not always possible to predict where human remains may be located. Therefore, it is possible that excavation and construction activity associated with both Valley Water and non-Valley Water projects, plans, and programs, regardless of depth, may yield human remains that are not interred in marked, formal burial plots. For this reason, there would be a cumulatively significant impact to human remains. Because Valley Water, as well as all other local and regional agencies, must enforce and abide by PRC Section 5907's rules and regulations of both the CHSC and the PRC, the Proposed Project, when evaluated with and without BMPs CU-1, GEN-40, and GEN-41, is considered to have a less than significant impact in the case of the discovery of human remains. Given the Proposed Project's less than significant impacts, the Proposed Project's incremental contribution would be **not cumulatively considerable**.

5.6.8.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

Because cumulative impacts related to cultural resources are based on the implementation of the proposed non-flow measures and there would be no impacts associated with the proposed flow measures, the cumulative impact analysis for the Non-flow Measures Only Alternative is identical to that of the Proposed Project. Table 5.6-23 summarizes those impacts.

Table 5.6-23. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Cultural Resources Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources	SI	CC	MM CUL-1a, through 1c	CC
Cumulative Impact CUL-2: Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources	SI	CC	MM CUL-2a, MM CUL-2b	CC
Cumulative Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries	SI	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources (cumulatively considerable)

In regard to historical built environment resources, cumulative projects, plans, and programs (such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects) affecting historic-era infrastructure could demolish or alter a historic structure in such a way that it would no longer convey its historic significance. The incremental contribution of the Non-flow Measures Only Alternative could likewise be significant and **cumulatively considerable**. Although proposed maintenance, monitoring, and adaptive management would not likely substantially affect historic resources, implementation of additional measures would have the same potential to impact historic resources as these measures and would closely align with the proposed non-flow measures. For this reason, there would be a cumulatively significant impact as a result of likely substantial adverse changes to the significance of historic resources.

Implementation of MM CUL-1a, MM CUL-1b, and MM CUL-1c would require a historic structure report and evaluation of resources prior to Valley Water ground-disturbing activities and would require all report recommendations be implemented to offset the effects of the disturbance to historic structures. However, even with the implementation of these mitigation measures as part of the Non-flow Measures Only Alternative, demolition of a significant historical building is irreversible, and, with the consideration of similar impacts from other cumulative projects, plans, and programs, after mitigation the impact would be **cumulatively considerable**.

Cumulative Impact CUL-2: Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources (cumulatively considerable)

Any of Valley Water or non-Valley Water cumulative projects, plans, and programs noted above which involve disturbance of intact soils or sediments could potentially result in adverse effects on previously recorded or newly discovered archeological resources. Likewise, the Non-flow Measures Only Alternative including associated maintenance, monitoring, and adaptive management, could impact archaeological resources. With implementation of Valley Water BMPs CU-1, GEN-40, and GEN-41, impacts from those activities implemented by Valley Water could be avoided or offset. These measures would likewise be included as a condition of funding for non-Valley Water-owned projects. However, these measures would not likely be implemented uniformly for each site across projects, plans, and programs. Additionally, archaeological sites are a non-renewable resource and, if damaged or destroyed, can never be recreated. For this reason, there would be a cumulatively significant impact as a result of likely substantial adverse changes in the significance of archaeological resources. Given the magnitude of the Non-flow Measures Only Alternative's impacts, and because there would be a significant impact of the Non-flow Measures Only Alternative, the impact would be **cumulatively considerable**. Accordingly, Valley Water will also implement MMs CUL-2a and CUL-2b, which would reduce the Proposed Project's contribution to cumulative impacts to previously recorded or newly discovered archaeological sites by avoiding or minimizing the impact in areas where these sites are located and offsetting those impacts when appropriate and necessary. However, even with the implementation of these mitigation measures as part of the Non-flow Measures Only Alternative, the impact would remain **cumulatively considerable.**

Cumulative Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries (not cumulatively considerable)

Similar to the analysis of Cumulative Impact CUL-2, ground-disturbing activity from Valley Water and non-Valley Water cumulative projects, plans, and programs and the Non-flow Measures Only Alternative could disturb human remains. By implementing the resource identification efforts detailed in Valley Water BMPs CU-1, GEN-40, and GEN-41, and MM CUL-2a and MM CUL-2b, the location of human remains can be identified and avoided. As discussed in Section 3.9.4.3, it is not always possible to predict where human remains may be located. Therefore, it is possible that excavation and construction activity associated with both Valley Water and non-Valley Water projects, plans, and programs, regardless of depth, may yield human remains that are not interred in marked, formal burial plots. For this reason, there would be a cumulatively significant impact to human remains. Because Valley Water, as well as all other local and regional agencies, must enforce and abide by PRC Section 5907's rules and regulations of both the CHSC and the PRC, the Non-flow Measures Only Alternative, when evaluated with and without BMPs CU-1, GEN-40, and GEN-41, is considered to have a less than significant impact in the case of the discovery of human remains**.** Given the Proposed Project's less than significant impacts, the Proposed Project's incremental contribution would be **not cumulatively considerable.**

5.6.8.3 FAHCE-plus Alternative Cumulative Impact Analysis

The cumulative impacts related to cultural resources for the FAHCE-plus Alternative are identical to that of the Proposed Project. Table 5.6-24 summarizes those impacts.

Table 5.6-24. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Cultural Resources Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources	SI	CC	MM CUL-1a through 1c	CC
Cumulative Impact CUL-2: Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources	SI	CC	MM CUL-2a, MM CUL-2b	CC
Cumulative Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries	SI	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact CUL-1: Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines: Historical Built Environment Resources (cumulatively considerable)

In regard to historical built environment resources, cumulative projects, plans, and programs (such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir

Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects) affecting historic-era infrastructure could demolish or alter a historic structure in such a way that it would no longer convey its historic significance. The incremental contribution of the FAHCE-plus Alternative could likewise be significant and **cumulatively considerable**. Although proposed maintenance, monitoring, and adaptive management would not likely substantially affect historic resources, implementation of additional measures would have the same potential to impact historic resources as these measures and would closely align with the proposed non-flow measures. For this reason, there would be a cumulatively significant impact as a result of likely substantial adverse changes to the significance of historic resources.

Implementation of MM CUL-1a, MM CUL-1b, and MM CUL-1c would require a historic structure report and evaluation of resources prior to Valley Water ground-disturbing activities and would require all report recommendations be implemented to offset the effects of the disturbance to historic structures. However, even with the implementation of these mitigation measures as part of the FAHCE-plus Alternative, demolition of a significant historical building is irreversible, and, with the consideration of similar impacts from other cumulative projects, plans, and programs, after mitigation the impact would be **cumulatively considerable**.

Cumulative Impact CUL-2: Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines: Archaeological Resources (cumulatively considerable)

Any of the Valley Water or non-Valley Water cumulative projects, plans, and programs noted above which involve disturbance of intact soils or sediments could potentially result in adverse effects on previously recorded or newly discovered archeological resources. Likewise, the FAHCE-plus Alternative including associated maintenance, monitoring, and adaptive management, could impact archaeological resources. With implementation of Valley Water BMPs CU-1, GEN-40, and GEN-41, impacts from those activities implemented by Valley Water could be avoided or offset. These measures would likewise be included as a condition of funding for non-Valley Water-owned projects. However, these measures would not likely be implemented uniformly for each site across projects, plans, and programs. Additionally, archaeological sites are a non-renewable resource and, if damaged or destroyed, can never be recreated. For this reason, there would be a cumulatively significant impact as a result of likely substantial adverse changes in the significance of archaeological resources. Given the magnitude of the FAHCE-plus Alternative's impacts, and because there would be a significant impact of the FAHCE-plus Alternative, the impact would be **cumulatively considerable**. Accordingly, Valley Water will also implement MMs CUL-2a and CUL-2b, which would reduce the Proposed Project's contribution to cumulative impacts to previously recorded or newly discovered archaeological sites by avoiding or minimizing the impact in areas where these sites are located and offsetting those impacts when appropriate and necessary. However, even with the implementation of these mitigation measures as part of the FAHCE-plus Alternative, the impact would remain **cumulatively considerable.**

Cumulative Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries (cumulatively considerable)

Similar to the analysis of Cumulative Impact CUL-2, ground-disturbing activity from Valley Water and non-Valley Water cumulative projects, plans, and programs and the FAHCE-plus Alternative could disturb human remains. By implementing the resource identification efforts detailed in Valley Water BMPs CU-1, GEN-40, and GEN-41, and MM CUL-2a and MM CUL-2b, the location of human remains can be identified and avoided. As discussed in Section 3.9.4.3, it is not always possible to predict where human remains may be located. Therefore, it is possible that excavation and construction activity associated with both Valley Water and non-Valley Water projects, plans, and programs, regardless of depth, may yield human remains that are not interred in marked, formal burial plots. For this reason, there would be a cumulatively significant impact to human remains. Because Valley Water, as well as all other local and regional agencies, must enforce and abide by PRC Section 5907's rules and regulations of both the CHSC and the PRC, the FAHCE-plus Alternative, when evaluated with and without BMP CU-1, GEN-40, and GEN-41, is considered to have a less than significant impact in the case of the discovery of human remains. Given the Proposed Project's less than significant impacts, the Proposed Project's incremental contribution would be **not cumulatively considerable.**

5.6.9 Tribal Cultural Resources

The geographic study area for the cumulative impact analysis for tribal cultural resources includes the Stevens Creek and Guadalupe River watersheds as well as the locations of multiple ongoing and planned Valley Water and non-Valley Water projects, plans, and programs in northern Santa Clara County. These cumulative activities considered in this analysis are summarized in Table 5.5-1, with those relevant to the tribal cultural resources cumulative analysis specified below.

The cumulative impacts threshold for tribal cultural resources is the same as the threshold presented in Section 3.10, *Tribal Cultural Resources*. Cumulative impacts to tribal cultural resources are considered significant if they would:

- **Cumulative Impact TRI-1:** Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant

Both cumulative Valley Water and non-Valley Water projects, plans, and programs were considered in the tribal cultural resources cumulative impact analysis, as noted in the threshold listed above. Based on these factors, the following projects, plans, and programs were determined to be relevant to the tribal cultural resources cumulative impact analysis:

- Valley Water Projects, Plans, and Programs
  - SMP
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Valley Water Watershed Improvements (Almaden Lake, Permanente Creek, Coyote Creek, and Guadalupe River)
  - Valley Water-wide Flood Protection Projects
  - Valley Water Dam Safety and Seismic Retrofit Projects
  - Pacheco Reservoir Expansion Project
  - South Bay Salt Ponds Restoration
  - Valley Water-wide Water Supply and Water Quality Improvements
  - Valley Water Fish Passage and Habitat Improvement Projects
- Non-Valley Water Projects, Plans, and Programs
  - Residential, Commercial, Industrial, and Recreation Area Development

Cumulative Impacts for the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative are analyzed below.

5.6.9.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to tribal cultural resources. Table 5.6-25 summarizes the Proposed Project's contribution to cumulative impacts to tribal cultural resources.

Table 5.6-25. Summary of Proposed Project Impact Contribution to Cumulative Tribal Cultural Resources Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant	SI	CC	MM TRI-1a, MM TRI-1b	CC

Notes: CC = cumulatively considerable, SI = significant impact

Cumulative Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant (cumulatively considerable)

The analysis of cumulative impacts to tribal cultural resources is consistent with the cumulative impact analysis of cultural resources in Section 5.6.8. Valley Water and non-Valley Water cumulative projects, plans, and programs (such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects) could destroy or alter a tribal cultural resource in such a way that the resource is no longer able to convey its historic significance to the tribal community. Although the specific impact would be contingent on the nature of the tribal cultural resource, the incremental impact of the Proposed Project non-flow measures under the Proposed Project would be significant and **cumulatively considerable**. Proposed maintenance, monitoring, and adaptive management would not likely substantially affect tribal cultural resources. By implementing the resource identification efforts in Valley Water BMPs CU-1, GEN-40, and GEN-41, and MM CUL-2a and MM CUL-2b, the location of tribal cultural resources can be identified and avoided. Similar to the discussion of cumulative impacts to human remains discussed in Section 5.6.8, it is not always possible to predict where tribal cultural resources may be located prior to project implementation. Given the magnitude of the Proposed Project's potential impacts, there would be a considerable incremental contribution to a significant cumulative impact to tribal cultural resources by the Proposed Project. MM TRI-1a and TRI-1b would reduce this impact, but after mitigation it would remain **cumulatively considerable** as tribal cultural resources are rare, finite, and non-renewable.

5.6.9.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

Because cumulative impacts related to tribal cultural resources are based on the implementation of the proposed non-flow measures and there would be no impacts associated with the proposed flow measures, the cumulative impact analysis for the Non-flow Measures Only Alternative is identical to that of the Proposed Project. Table 5.6-26 summarizes those impacts.

Table 5.6-26. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Tribal Cultural Resources Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant	SI	CC	MM TRI-1a, MM TRI-1b	CC

Notes: CC = cumulatively considerable, SI = significant impact

Cumulative Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant (cumulatively considerable)

The analysis of cumulative impacts to tribal cultural resources is consistent with the cumulative impact analysis of cultural resources in Section 5.6.8. Valley Water and non-Valley Water cumulative projects, plans, and programs (such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects) could destroy or alter a tribal cultural resource in such a way that the resource is no longer able to convey its historic significance to the tribal community. Although the specific impact would be contingent on the nature of the tribal cultural resource, the incremental impact of the Non-flow Measures Only Alternative would be significant and **cumulatively considerable**. Although proposed maintenance, monitoring, and adaptive management would not likely substantially affect tribal cultural resources, implementation of additional measures would have the same potential to impact tribal cultural resources as these measures and would closely align with the Non-flow Measures Only Alternative. By implementing the resource identification efforts in Valley Water BMPs CU-1, GEN-40, and GEN-41, and MM CUL-2a and MM CUL-2b, the location of tribal cultural resources can be identified and avoided. Similar to the discussion of cumulative impacts to human remains discussed in Section 5.6.8, it is not always possible to predict where tribal cultural resources may be located prior to project implementation. Given the magnitude of the Non-flow Measures Only Alternative's potential impacts, there would be a considerable incremental contribution to a significant cumulative impact to tribal cultural resources by the Non-flow Measures Only Alternative. MM TRI-1a and TRI-1b would reduce this impact, but after mitigation it would remain **cumulatively considerable** as tribal cultural resources are rare, finite, and non-renewable.

5.6.9.3 FAHCE-plus Alternative Cumulative Impact Analysis

The cumulative impacts related to tribal cultural resources for the FAHCE-plus Alternative are identical to that of the Proposed Project. Table 5.6-27 summarizes those impacts.

Table 5.6-27. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Tribal Cultural Resources Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant	SI	CC	MM TRI-1a, MM TRI-1b	CC

Notes: CC = cumulatively considerable, SI = significant impact

Cumulative Impact TRI-1: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined by the PRC) that is (1) listed or eligible for listing in the CRHR, or in a local register of historical resources; or (2) a resource determined by the lead agency to be significant (cumulatively considerable)

The analysis of cumulative impacts to tribal cultural resources is consistent with the cumulative impact analysis of cultural resources in Section 5.6.8. Valley Water and non-Valley Water cumulative projects, plans, and programs (such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects) could destroy or alter a tribal cultural resource in such a way that the resource is no longer able to convey its historic significance to the tribal community. Although the specific impact would be contingent on the nature of the tribal cultural resource, the incremental contribution of the FAHCE-plus Alternative would be significant and **cumulatively considerable**. Although proposed maintenance, monitoring, and adaptive management would not likely substantially affect tribal cultural resources, implementation of additional measures would have the same potential to impact tribal cultural resources as these measures and would closely align with the proposed FAHCE-plus Alternative. By implementing the resource identification efforts in Valley Water BMPs CU-1, GEN-40, and GEN-41, and MM CUL-2a and MM CUL-2b, the location of tribal cultural resources can be identified and avoided. Similar to the discussion of cumulative impacts to human remains discussed in Section 5.6.8, it is not always possible to predict where tribal cultural resources may be located prior to project implementation. Given the magnitude of the FAHCE-plus Alternative's potential impacts, there would be a considerable incremental contribution to a significant cumulative impact to tribal cultural resources by the FAHCE-plus Alternative. MM TRI-1a and TRI-1b would reduce this impact, but after mitigation it would remain **cumulatively considerable** as tribal cultural resources are rare, finite, and non-renewable.

5.6.10 Geology and Soils

The geographic study area for the cumulative impact analysis for geology and soils encompasses Stevens Creek and Guadalupe River watersheds and the areas immediately surrounding other relevant Valley Water and non-Valley Water projects, plans, and programs in northern Santa Clara County.

Cumulative impacts thresholds for geology and soils are the same as the thresholds presented in Section 3.11, *Geology and Soils*. Cumulative impacts to geology and soils are considered significant if they would:

- **Cumulative Impact GEO-1:** Result in substantial soil erosion or the loss of topsoil
- **Cumulative Impact GEO-2:** Directly or indirectly destroy a unique paleontological resource or site

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cumulative impact analysis for geology and soils. Projects, plans, and programs considered in this analysis include those that would require ground disturbance that could result in erosion, loss of topsoil, or sedimentation or could unearth or disturb a unique paleontological resource or site. Based on these factors, the following projects, plans, and programs were determined to be relevant to the geology and soils cumulative impact analysis:

- Valley Water Projects, Plans, and Programs
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Valley Water Watershed Improvements (Almaden Lake, Permanente Creek, Coyote Creek, and Guadalupe River)
  - Valley Water dam safety and seismic retrofit projects
  - Valley Water-wide Water Supply and Water Quality Improvements Valley Water-wide Flood Protection Projects (Downtown Guadalupe River Flood Protection Project/Lower Guadalupe Project)
  - Valley Water Fish Passage and Habitat Improvements
  - South Bay Salt Ponds Restoration
  - SMP
  - Guadalupe River Flood Protection Project
- Non-Valley Water Projects, Plans, and Programs
  - Residential, Commercial, Industrial, and Recreation Area Development

Cumulative impacts for the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative are analyzed below.

5.6.10.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to geology and soils. Table 5.6-28 summarizes the Proposed Project's contribution to cumulative impacts to geology and soils.

Table 5.6-28. Summary of Proposed Project Impact Contribution to Cumulative Geology and Soils Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact GEO-1: Result in substantial soil erosion or the loss of topsoil	LTS	NCC	N/A	NCC
Cumulative Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site	SI	CC	MM GEO-1	NCC

Notes: CC = cumulatively considerable, LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact GEO-1: Result in substantial soil erosion or the loss of topsoil (not cumulatively considerable)

Ongoing and future Valley Water projects, such as the planned improvements within the Valley Water watersheds, dam safety and seismic retrofit projects, the Almaden Lake Project, and the 10-year Pipeline Rehabilitation Project, would require ground disturbance or changes in flow volumes or would otherwise alter flow patterns. Of note, the Almaden Lake Improvement Project would involve separating Alamitos Creek from Almaden Lake by constructing a new levee through the lake. If the Almaden Lake Improvement Project and the other aforementioned Valley Water projects were to alter flow patterns and flow volumes, this alteration could increase sedimentation, loss of topsoil, and soil erosion. BMPs to minimize erosion and loss of topsoil (BMPs GEN-20, SED-1, SED-2, SED-3, VEG-1, GEN-21, GEN-22, and GEN-23) would be implemented by Valley Water during work within Valley Water watersheds for projects in addition to the Proposed Project. Non-Valley Water projects such as residential, commercial, industrial, and recreation area development; and affordable housing developments would also result in erosion and loss of topsoil. Projects occurring in Santa Clara County are required to adhere to state and local regulations for construction, regulations such as the County Grading Ordinance and the County Geologic Ordinance, which would minimize impacts from loss of topsoil, sedimentation, and erosion. As discussed in Chapter 3, *Environmental Setting and Impact Analysis*, the city governments of the cities in which future projects would occur have similar ordinances. Additionally, impacts from erosion and loss of topsoil from a single project would likely not be additive given that many ongoing and reasonably foreseeable probable future projects, plans, and programs are dispersed and not concentrated in a single area of Santa Clara County. As a result, the cumulative impacts from loss of topsoil and erosion would be not significant.

Likewise, implementation of the proposed flow measures including related monitoring could increase sedimentation and erosion in Stevens Creek and Guadalupe River watersheds. However, these changes in stream flow would be based primarily on the seasonal timing of water releases and would not increase sedimentation and erosion beyond the yearly norm. Therefore, cumulative impacts and the Proposed Project's incremental cumulative contribution to erosion or the loss of topsoil would be not significant for flow measures.

As noted in Section 3.11, *Geology and Soils*, non-flow measures considered programmatically could result in short-term erosion and loss of topsoil. As it pertains to Cumulative Impact GEO-1, measures that could result in erosion and loss of topsoil include construction activities involving ground disturbance and demolition, work within the channel or stream bed, vehicle and equipment staging, vegetation removal, and alteration of flows associated with the implementation of non-flow measures. Likewise, proposed maintenance, monitoring, and adaptive management activities could cause minor erosion or siltation. The physical changes associated with the Proposed Project would mainly include upgrades to existing Valley Water-owned and -maintained facilities. Valley Water would implement BMPs GEN-20, SED-1, SED-2, SED-3, VEG-1, GEN-21, GEN-22, and GEN-23 to reduce impacts from erosion and loss of topsoil to a less than significant level. For those proposed barrier remediation projects for non-Valley Water-owned and -maintained facilities, Valley Water would include as a condition of funding the implementation of similar measures. Therefore, the cumulative impacts and Proposed Project's incremental impact to erosion and loss of topsoil would be not significant.

Given the seasonal timing of water releases, the fact that these proposed non-flow measures and other cumulative activities would be spaced over time, the geographic dispersal of cumulative activities, and because there would be a less than significant impact caused by the Proposed Project, the Proposed Project's incremental contribution would be **not cumulatively considerable**.

Cumulative Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site (cumulatively considerable)

Ongoing and future Valley Water and non-Valley Water projects requiring ground disturbance, such as the 10-year Pipeline Rehabilitation Project, planned improvements within Valley Water watersheds, and residential, commercial, industrial, and recreation-area developments, could unearth undiscovered unique paleontological resources. As it pertains to Cumulative Impact GEO-2, implementation of flow measures would increase erosion and sedimentation in Stevens Creek and Guadalupe River watersheds, increase stream flow and water depth, and change temperatures in the Stevens Creek and Guadalupe River watersheds. These impacts would not disturb paleontological resources. Further, given that ground-disturbing activities are not proposed, it is unlikely that implementation of flow measures would unearth or result in the inadvertent disturbance of a unique paleontological resource or site.

Likewise, monitoring has little to no potential to disturb a unique paleontological resource or site because minimal ground-disturbing activities would be involved (for example, pedestrian surveys). Therefore, because the Proposed Project would have no incremental impact, flow measure impacts to a unique paleontological resource or site would be not cumulatively considerable.

Construction activities associated with non-flow measures, including demolition and removal of structures, excavations, installations, and other ground-disturbing activities, could result in the inadvertent disturbance of paleontological resources. The Project area contains soils from the Quaternary age that are considered suitable for the preservation of paleontological resources; however, deposits have been obscured or removed by urban development. Other soils from the Holocene age present in the Project area are considered to possess a low potential for paleontological resources. A variety of soil types are present in Santa Clara County and some soils are more supportive of paleontological resources than others. As a result, cumulative impacts to a unique paleontological resource could be significant, and the Proposed Project's contribution would be **cumulatively considerable**. However, MM GEO-1, as described in Section 3.11, *Geology and Soils*, would reduce the Proposed Project's contribution to **not cumulatively considerable** levels.

5.6.10.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

This section describes the Non-flow Measures Only Alternative's contribution to cumulative impacts to geology and soils. Table 5.6-29 summarizes the Non-flow Measures Only Alternative's contribution to cumulative impacts to geology and soils.

Table 5.6-29. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Geology and Soils Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact GEO-1: Result in substantial soil erosion or the loss of topsoil	LTS	NCC	N/A	NCC
Cumulative Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site	SI	CC	MM GEO-1	NCC

Notes: CC = cumulatively considerable, LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact GEO-1: Result in substantial soil erosion or the loss of topsoil (not cumulatively considerable)

As it pertains to Cumulative Impact GEO-1, impacts related to geology and soils under the Non-flow Measures Only Alternative would closely mirror those under the Proposed Action. The only difference is that the Non-flow Measures Only Alternative does not include flow measures. The non-flow measures included in the Non-flow Measures Only Alternative, including proposed maintenance, monitoring, and adaptive management, could result in short-term erosion and loss of topsoil. Given the fact that these proposed non-flow measures and other cumulative activities would be spaced over time, the geographic dispersal of cumulative activities, and because there would be a less than significant impact caused by the Proposed Project, the Proposed Project's incremental contribution would be **not cumulatively considerable**.

Cumulative Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site (cumulatively considerable)

Because paleontological impacts would result only from non-flow measures, this analysis is identical to that for the Proposed Project. Construction activities associated with non-flow measures, including demolition and removal of structures, excavations, installations, and other ground-disturbing activities, could result in the inadvertent disturbance of paleontological resources. A variety of soil types are present in Santa Clara County and some soils are more supportive of paleontological resources than others. As a result, cumulative impacts to a unique paleontological resource could be significant and the contribution from non-flow measures would be **cumulatively considerable**. However, MM GEO-1, as described in Section 3.11, *Geology and Soils*, would reduce impacts to **not cumulatively considerable** levels.

5.6.10.3 FAHCE-plus Alternative Cumulative Impact Analysis

The cumulative impacts related to geology and soils for the FAHCE-plus Alternative are identical to that of the Proposed Project. Table 5.6-30 summarizes those impacts.

Table 5.6-30. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Geology and Soils Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact GEO-1: Result in substantial soil erosion or the loss of topsoil	LTS	NCC	N/A	NCC
Cumulative Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site	SI	CC	MM GEO-1	NCC

Notes: CC = cumulatively considerable, LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact GEO-1: Result in substantial soil erosion or the loss of topsoil (not cumulatively considerable)

Valley Water and non-Valley Water projects have the potential to result in erosion and loss of topsoil. Impacts from erosion and loss of topsoil from a single project would likely not be additive given that many ongoing and reasonably foreseeable probable future projects, plans, and programs are dispersed and not concentrated in a single area of Santa Clara County. As a result, the cumulative impacts from loss of topsoil and erosion would be not significant.

Likewise, cumulative impacts and the FAHCE-plus Alternative's incremental cumulative contribution to erosion or the loss of topsoil would be not significant for flow measures because ground-disturbing activities associated with monitoring would be minimal (for example, pedestrian surveys), and because changes in stream flow would be based primarily on the seasonal timing of water releases and would not increase sedimentation and erosion beyond the yearly norm.

Non-flow measures considered programmatically could result in short-term erosion and loss of topsoil. As it pertains to Cumulative Impact GEO-1, measures that could result in erosion and loss of topsoil include construction activities involving ground disturbance and demolition, work within the channel or stream bed, vehicle and equipment staging, vegetation removal, and alteration of flows associated with the implementation of non-flow measures. Additionally, proposed maintenance, monitoring, and adaptive management activities could cause minor erosion or siltation. Given the seasonal timing of water releases, the fact that these proposed non-flow measures and other cumulative activities would be spaced over time, the geographic dispersal of cumulative activities, and because there would be a less than significant impact caused by the Proposed Project, the Proposed Project's incremental contribution would **be not cumulatively considerable**.

Cumulative Impact GEO-2: Directly or indirectly destroy a unique paleontological resource or site (cumulatively considerable)

Ongoing and future Valley Water and non-Valley Water projects requiring ground disturbance, such as the 10-year Pipeline Rehabilitation Project, planned improvements within Valley Water watersheds, and residential, commercial, industrial, and recreation-area developments, could unearth undiscovered unique paleontological resources. As it pertains to Cumulative Impact GEO-2, implementation of flow measures would increase erosion and sedimentation in Stevens Creek Guadalupe River watersheds, increase stream flow and water depth, and change temperatures in the Stevens Creek and Guadalupe River watersheds. These impacts would not disturb paleontological resources. Further, given that ground-disturbing activities are not proposed, it is unlikely that implementation of flow measures would unearth or result in the inadvertent disturbance of a unique paleontological resource or site.

Likewise, monitoring has little to no potential to disturb a unique paleontological resource or site because ground-disturbing activities would be minimal (for example, pedestrian surveys). Therefore, because the FAHCE-plus Alternative would have no incremental impact, flow measure impacts to a unique paleontological resource or site would be not cumulatively considerable.

Construction activities associated with non-flow measures, could result in the inadvertent disturbance of paleontological resources. A variety of soil types are present in Santa Clara County and some soils are more supportive of paleontological resources than others. As a result, cumulative impacts to a unique paleontological resource could be significant prior to mitigation, and the FAHCE-plus Alternative's contribution to this impact would be **cumulatively considerable**. However, MM GEO-1, as described in Section 3.11, *Geology and Soils*, would reduce the FAHCE-plus Alternative's contribution to **not cumulatively considerable** levels.

5.6.11 Air Quality

The geographic study area for the cumulative impact analysis for air quality encompasses the SFBAAB. With regard to regional criteria air pollutants, according to BAAQMD, no single project is sufficient in size, by itself, to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to cumulatively significant adverse air quality impacts. For assessment of cumulative regional pollutant impacts, BAAQMD has developed a methodology of assessing whether a project would have a cumulatively considerable contribution. According to the 2017 BAAQMD CEQA Guidelines, if a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions (BAAQMD 2017a).

Cumulative impact thresholds for air quality are the same as the thresholds presented in Section 3.12, *Air Quality*. Cumulative impacts are considered significant if they would:

- **Cumulative Impact AIR-1:** Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan
- **Cumulative Impact AIR-2:** Violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants
- **Cumulative Impact AIR-3:** Expose sensitive receptors to substantial pollutant concentrations
- **Cumulative Impact AIR-4:** Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cumulative impact analysis for air quality. Based on these thresholds, the following projects, plans, and programs were determined to be relevant to the air quality cumulative impact analysis:

- Valley Water Projects, Plans, and Programs
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Valley Water Watershed Improvements (Almaden Lake, Permanente Creek, Coyote Creek, and Guadalupe River)
  - Seismic retrofit of on-stream facilities
  - Fish passage improvements
  - SMP
  - Valley Water-wide Flood Protection Projects
  - Pacheco Reservoir Expansion Project
  - Valley Water dam safety and seismic retrofit projects
  - South Bay Salt Ponds Restoration
  - Valley Water-wide Water Supply and Water Quality Improvements
- Non-Valley Water Projects, Plans, and Programs
  - Residential, Commercial, Industrial, and Recreation Area Development
  - Habitat Restoration Program

Cumulative impacts for the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative are analyzed below.

5.6.11.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to air quality. Table 5.6-31 summarizes the Proposed Project's contribution to cumulative impacts to air quality.

Table 5.6-31. Summary of Proposed Project Impact Contribution to Cumulative Air Quality Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan	LTS	NCC	N/A	NCC
Cumulative Impact AIR-2: Violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants	SI	NCC	N/A	NCC
Cumulative Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations	LTS	NCC	N/A	NCC
Cumulative Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. The incremental contribution of the Proposed Project flow or non-flow measures, however, would not exceed the BAAQMD's significance criteria for criteria air pollutant emissions during construction or operation. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management.

Because Proposed Project emissions would not exceed BAAQMD significance thresholds, air quality plan conflict impacts would be **not cumulatively considerable**.

Cumulative Impact AIR-2: Violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. The incremental contribution of the Proposed Project flow or non-flow measures, however, would not exceed the BAAQMD's significance criteria for criteria air pollutant emissions during construction or operation. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management. Fugitive dust emissions from the Proposed Project and the cumulative projects would be minimized and controlled through the implementation of BMP AQ-1 and GEN-29. While cumulative SFBAAB criteria pollutant impacts may be significant, because Proposed Project emissions would not exceed BAAQMD significance thresholds, air quality standards impacts would be **not cumulatively considerable**.

Cumulative Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. Construction and operation of the Proposed Project's non-flow measures would not expose sensitive receptors to substantial pollutant concentrations. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management. Other reasonably foreseeable probable future projects, plans, and programs could add to these impacts if their construction or operational timeframes overlap, but, given their geographic dispersal and the minor magnitude of the Proposed Project's impacts, the cumulative impact would be less than significant, and the Proposed Project's contribution would be **not cumulatively considerable**.

Cumulative Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. Odors from the Proposed Project and the cumulative projects would be minimized and controlled through the implementation of BMP AQ-2, and fugitive dust emissions would be minimized and controlled through the implementation of BMP AQ-1. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management. Other reasonably foreseeable probable future projects, plans, and programs could add to these impacts if their construction or operational timeframes overlap, but, given their geographic dispersal and the minor magnitude of the Proposed Project's impacts, the cumulative impact would be less than significant, and the Proposed Project's contribution would be **not cumulatively considerable**.

5.6.11.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

Because impacts related to air quality are based on the implementation of the proposed non-flow measures and there would be no impacts associated with the proposed flow measures, the cumulative impact analysis for the Non-flow Measures Only Alternative is identical to that of the Proposed Project. Table 5.6-32 summarizes those impacts.

Table 5.6-32. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Air Quality Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan	LTS	NCC	N/A	NCC
Cumulative Impact AIR-2: Violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants	SI	NCC	N/A	NCC
Cumulative Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations	LTS	NCC	N/A	NCC
Cumulative Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. The incremental contribution of the Non-flow Measures Only Alternative, however, would not exceed the BAAQMD's significance criteria for criteria air pollutant emissions during construction or operation. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management.

Because Non-flow Measures Only Alternative emissions would not exceed BAAQMD significance thresholds, air quality plan conflict impacts would be **not cumulatively considerable**.

Cumulative Impact AIR-2: Violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. The incremental contribution of the Non-flow Measures Only Alternative, however, would not exceed the BAAQMD's significance criteria for criteria air pollutant emissions during construction or operation. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management. Fugitive dust emissions from the Non-flow Measures Only Alternative and the cumulative projects would be minimized and controlled through the implementation of BMP AQ-1 and GEN-29. While cumulative

SFBAAB criteria pollutant impacts may be significant, because Non-flow Measures Only Alternative emissions would not exceed BAAQMD significance thresholds, air quality standards impacts would be **not cumulatively considerable**.

Cumulative Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. Construction and operation of the Non-flow Measures Only Alternative would not expose sensitive receptors to substantial pollutant concentrations. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management. Other reasonably foreseeable probable future projects, plans, and programs could add to these impacts if their construction or operational timeframes overlap, but, given their geographic dispersal and the minor magnitude of the Non-flow Measures Only Alternative's impacts, the cumulative impact would be less than significant, and the Non-flow Measures Only Alternative's contribution would be **not cumulatively considerable**.

Cumulative Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. Odors from the Non-flow Measures Only Alternative and the cumulative projects would be minimized and controlled through the implementation of BMP AQ-2, and fugitive dust emissions would be minimized and controlled through the implementation of BMP AQ-1. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management. Other reasonably foreseeable probable future projects, plans, and programs could add to these impacts if their construction or operational timeframes overlap, but, given their geographic dispersal and the minor magnitude of the Non-flow Measures Only Alternative's impacts, the cumulative impact would be less than significant, and the Non-flow Measures Only Alternative's contribution would be **not cumulatively considerable**.

5.6.11.3 FAHCE-plus Alternative Cumulative Impact Analysis

The cumulative impacts related to air quality for the FAHCE-plus Alternative are identical to that of the Proposed Project. Table 5.6-33 summarizes those impacts.

Table 5.6-33. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Air Quality Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan	LTS	NCC	N/A	NCC
Cumulative Impact AIR-2: Violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants	SI	NCC	N/A	NCC
Cumulative Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations	LTS	NCC	N/A	NCC
Cumulative Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact AIR-1: Conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. The incremental contribution of the FAHCE-plus Alternative, however, would not exceed the BAAQMD's significance criteria for criteria air pollutant emissions during construction or operation. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management.

Because FAHCE-plus Alternative emissions would not exceed BAAQMD significance thresholds, air quality plan conflict impacts would be **not cumulatively considerable**.

Cumulative Impact AIR-2: violate any air quality standard or result in a cumulatively considerable net increase in an existing or projected air quality violation, based on exceedance of BAAQMD thresholds for criteria pollutants (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. The incremental contribution of the FAHCE-plus Alternative, however, would not exceed the BAAQMD's significance criteria for criteria air pollutant emissions during construction or operation. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management. Fugitive dust emissions from the FAHCE-plus Alternative and the cumulative projects would be minimized and controlled through the implementation of BMP AQ-1 and GEN-29. While cumulative SFBAAB criteria pollutant impacts may be significant, because FAHCE-plus Alternative emissions would not exceed BAAQMD significance thresholds, air quality standards impacts would be **not cumulatively considerable**.

Cumulative Impact AIR-3: Expose sensitive receptors to substantial pollutant concentrations (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. Construction and operation of the FAHCE-plus Alternative would not expose sensitive receptors to substantial pollutant concentrations. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management. Other reasonably foreseeable probable future projects, plans, and programs could add to these impacts if their construction or operational timeframes overlap, but, given their geographic dispersal and the minor magnitude of the FAHCE-plus Alternative's impacts, the cumulative impact would be less than significant, and the FAHCE-plus Alternative's contribution would be **not cumulatively considerable**.

Cumulative Impact AIR-4: Result in substantial emissions (such as odors or dust) adversely affecting a substantial number of people (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. Odors from the FAHCE-plus Alternative and the cumulative projects would be minimized and controlled through the implementation of BMP AQ-2, and fugitive dust emissions would be minimized and controlled through the implementation of BMP AQ-1. Likewise, there would be no significant impacts to air quality as a result of maintenance, monitoring, or adaptive management. Other reasonably foreseeable probable future projects, plans, and programs could add to these impacts if their construction or operational timeframes overlap, but, given their geographic dispersal and the minor magnitude of the FAHCE-plus Alternative's impacts, the cumulative impact would be less than significant, and the FAHCE-plus Alternative's contribution would be **not cumulatively considerable**.

5.6.12 Greenhouse Gas Emissions and Energy

The geographic study area for the cumulative impact analysis for GHG encompasses the state of California. According to BAAQMD, the environmental impacts of GHG emissions are inherently cumulative. The 2017 BAAQMD CEQA Guidelines state that, if "a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact, and would be considered significant." Conversely, if a project does not exceed the BAAQMD GHG thresholds, then its contribution to cumulative GHG impacts would not be cumulatively considerable, and therefore its impacts would be less than significant (BAAQMD 2017a).

The geographic study area of the cumulative impact analysis for energy encompasses the Stevens Creek and Guadalupe River watersheds and the areas immediately surrounding other relevant Valley Water and non-Valley Water projects, plans, and programs identified in the vicinity of the Project area in northern Santa Clara County.

Cumulative impact thresholds for GHG and energy are the same as the impact thresholds presented in Section 3.13, *Greenhouse Gas Emissions and Energy*. Cumulative impacts are considered significant if they would:

- **Cumulative Impact GHG-1:** Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on BAAQMD significance thresholds
- **Cumulative Impact GHG-2:** Conflict with an applicable plan, policy, or regulation adopted for reducing the emissions of GHGs
- **Cumulative Impact GHG-3:** Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy during project construction or operation
- **Cumulative Impact GHG-4:** Conflict with or obstruct a state or local plan for renewable energy or energy efficiency

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cumulative impact analysis for energy. Projects, plans, and programs considered in this analysis include those that would require construction equipment or ground disturbance. Based on these factors, the following projects, plans, and programs were determined to be relevant to the energy cumulative impact analysis:

- Valley Water Projects, Plans, and Programs
  - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
  - Valley Water Watershed Improvements (Almaden Lake, Permanente Creek, Coyote Creek, and Guadalupe River)
  - Seismic retrofit of on-stream facilities
  - Fish passage improvements
  - Pacheco Reservoir Expansion Project
  - SMP
  - Valley Water-wide Flood Protection Projects
  - Valley Water dam safety and seismic retrofit projects
  - South Bay Salt Ponds Restoration
  - Valley Water-wide Water Supply and Water Quality Improvements
- Non-Valley Water Projects, Plans, and Programs
  - Residential, Commercial, Industrial, and Recreation Area Development
  - Habitat Restoration Program

Cumulative impacts for the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative are analyzed below.

5.6.12.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to GHG emissions and energy. Table 5.6-34 summarizes the Proposed Project's contribution to cumulative impacts to GHG emissions and energy.

Table 5.6-34. Summary of Proposed Project Impact Contribution to Cumulative Greenhouse Gas Emissions and Energy Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on BAAQMD significance thresholds	SI	NCC	N/A	NCC
Cumulative Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for reducing the emissions of GHGs	SI	NCC	N/A	NCC
Cumulative Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy during project construction or operation	LTS	NCC	N/A	NCC
Cumulative Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on BAAQMD significance thresholds (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. While cumulative impacts of statewide GHG emissions may be significant, the incremental contribution of the Proposed Project non-flow measures would not exceed the BAAQMD's significance GHG threshold during construction or operation. Likewise, there would be no significant impacts to GHG emissions as a result of maintenance, monitoring, or adaptive management. Therefore, the Proposed Project would not generate GHG emissions that may have a significant impact to the environment, and would be **not cumulatively considerable**.

Cumulative Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for reducing the emissions of GHGs (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. While cumulatively significant conflicts with statewide GHG reduction plans, policies, and regulations may occur, the Proposed Project's flow and non-flow measures would not conflict with any applicable GHG plan, policy, or regulation. Likewise, there would be no conflicts as a result of maintenance, monitoring, or adaptive management. Therefore, the Proposed Project's incremental impacts would be **not cumulatively considerable**.

Cumulative Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy during project construction or operation (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. As with the Proposed Project, given current federal, state, and local laws, regulations, and plans designed to reduce energy consumption and increase use of renewable energy, these activities would not result in wasteful, inefficient, and unnecessary use of energy. There would be no cumulatively significant impacts to energy consumption. The Proposed Project's incremental contribution to Cumulative Impact GHG-3 would be **not cumulatively considerable**.

Cumulative Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. The construction and maintenance activities associated with Valley Water and non-Valley Water projects, plans, and programs listed above would have similar fuel and electricity requirements to those of the Proposed Project. In addition, the Proposed Project would have a negligible effect on the local energy consumption and would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. There would be no cumulatively significant impacts to plans for renewable energy or energy efficiency The Proposed Project's incremental contribution to Cumulative Impact GHG-4 would be **not cumulatively considerable**.

5.6.12.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

Because impacts related to GHG emissions and energy are based on the implementation of the proposed non-flow measures and there would be no impacts associated with the proposed flow measures, the cumulative impact analysis for the Non-flow Measures Only Alternative is identical to that of the Proposed Project. Table 5.6-35 summarizes those impacts.

Table 5.6-35. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Greenhouse Gas Emissions and Energy Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on BAAQMD significance thresholds	SI	NCC	N/A	NCC
Cumulative Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for reducing the emissions of GHGs	SI	NCC	N/A	NCC
Cumulative Impact GHG-3: Result in a significant environmental impact due to	LTS	NCC	N/A	NCC

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
wasteful, inefficient, or unnecessary consumption of energy during project construction or operation				
Cumulative Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on BAAQMD significance thresholds (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. While cumulative impacts of statewide GHG emissions may be significant, the incremental contribution of the Non-flow Measures Only Alternative would not exceed the BAAQMD's significance GHG threshold during construction or operation. Likewise, there would be no significant impacts to GHG emissions as a result of maintenance, monitoring, or adaptive management. Therefore, the Non-flow Measures Only Alternative would not generate GHG emissions that may have a significant impact to the environment and would be **not cumulatively considerable**.

Cumulative Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for reducing the emissions of GHGs (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. While cumulatively significant conflicts with statewide GHG reduction plans, policies, and regulations may occur, this alternative's non-flow measures would not conflict with any applicable GHG plan, policy, or regulation. Likewise, there would be no conflicts as a result of maintenance, monitoring, or adaptive management. Therefore, the Non-flow Measures Alternative's incremental impacts would be **not cumulatively considerable.**

Cumulative Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy during project construction or operation (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. As with the Non-flow Measures Only Alternative, given current federal, state, and local laws, regulations, and plans designed to reduce energy consumption and increase use of renewable energy, these activities would not result in wasteful, inefficient, and unnecessary use of energy. There would be no cumulatively significant impacts to energy consumption. The Non-flow Measures Only Alternative's incremental contribution to Cumulative Impact GHG-3 would be **not cumulatively considerable**.

Cumulative Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. The construction and maintenance activities associated with Valley Water and non-Valley Water projects, plans, and programs listed above would have similar fuel and electricity requirements to those of the Non-flow Measures Only Alternative. In addition, the Non-flow Measures Only Alternative would have a negligible effect on the local energy consumption and would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. There would be no cumulatively significant impacts to plans for renewable energy or energy efficiency. The Non-flow Measures Only Alternative's incremental contribution to Cumulative Impact GHG-4 would be **not cumulatively considerable**.

5.6.12.3 FAHCE-plus Alternative Cumulative Impact Analysis

The cumulative impacts related to GHG emissions and energy for the FAHCE-plus Alternative are identical to that of the Proposed Project. Table 5.6-36 summarizes those impacts.

Table 5.6-36. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Greenhouse Gas Emissions and Energy Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on BAAQMD significance thresholds	SI	NCC	N/A	NCC
Cumulative Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for reducing the emissions of GHGs	SI	NCC	N/A	NCC
Cumulative Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy during project construction or operation	LTS	NCC	N/A	NCC
Cumulative Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	LTS	NCC	N/A	NCC

Notes: LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on BAAQMD significance thresholds (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. While cumulative impacts of statewide GHG emissions may be significant, the incremental contribution of the FAHCE-plus Alternative, would not exceed the BAAQMD's significance GHG threshold during construction or operation. Likewise, there would be no significant impacts to GHG emissions as a result of maintenance, monitoring. or adaptive management. Therefore, the FAHCE-plus Alternative would not generate GHG emissions that may have a significant impact to the environment and would be **not cumulatively considerable**.

Cumulative Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for reducing the emissions of GHGs (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. While cumulatively significant conflicts with statewide GHG reduction plans, policies, and regulations may occur, the FAHCE-plus Alternative's flow and non-flow measures would not conflict with any applicable GHG plan, policy, or regulation. Likewise, there would be no conflicts as a result of maintenance, monitoring, or adaptive management. Therefore, the FAHCE-plus Alternative's incremental impacts would be **not cumulatively considerable**.

Cumulative Impact GHG-3: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy during project construction or operation (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. As with the FAHCE-plus Alternative, given current federal, state, and local laws, regulations, and plans designed to reduce energy consumption and increase use of renewable energy, these activities would not result in wasteful, inefficient, and unnecessary use of energy. There would be no cumulatively significant impacts to energy consumption. The FAHCE-plus Alternative's incremental contribution to Cumulative Impact GHG-3 would be **not cumulatively considerable**.

Cumulative Impact GHG-4: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. The construction and maintenance activities associated with Valley Water and non-Valley Water projects, plans, and programs listed above would have similar fuel and electricity requirements to those of the FAHCE-plus Alternative. In addition, the FAHCE-plus Alternative would have a negligible effect on the local energy consumption and would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. There would be no cumulatively significant impacts to plans for renewable energy or energy efficiency. The FAHCE-plus Alternative's incremental contribution to Cumulative Impact GHG-4 would be **not cumulatively considerable**.

5.6.13 Noise

The geographic study area for the cumulative impact analysis for noise and vibration encompasses the Stevens Creek and Guadalupe River watersheds and the areas immediately surrounding other relevant Valley Water and non-Valley Water projects, plans, and programs identified in the vicinity of the Project area in northern Santa Clara County.

Cumulative noise impact thresholds are the same as the impact thresholds presented in Section 3.14, *Noise*. Cumulative impacts are considered significant if they would:

- **Cumulative Impact NOISE-1:** Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Proposed Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels
- **Cumulative Impact NOISE-2:** Cause excessive ground-borne vibration or ground-borne noise levels

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cumulative impact analysis for noise and vibration. Projects, plans, and programs considered in this analysis include those that would require construction equipment or ground disturbance. Based on these factors, the following projects, plans, and programs were determined to be relevant to the noise and vibration cumulative impact analysis:

- Valley Water Projects, Plans, and Programs
    - 10-year Pipeline Rehabilitation (FY 2018 to FY 2027)
    - Valley Water Watershed Improvements (Almaden Lake, Permanente Creek, Coyote Creek, and Guadalupe River)
    - Seismic retrofit of on-stream facilities
    - Fish passage improvements
    - SMP
    - Pacheco Reservoir Expansion Project
    - Valley Water-wide Flood Protection Projects
    - Valley Water dam safety and seismic retrofit projects
    - South Bay Salt Ponds Restoration
    - Valley Water-wide Water Supply and Water Quality Improvements
- Non-Valley Water Projects, Plans, and Programs
    - Residential, Commercial, Industrial, and Recreation Area Development
    - Habitat Restoration Program

Cumulative impacts for the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative are analyzed below.

5.6.13.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to noise. Table 5.6-37 summarizes the Proposed Project's contribution to cumulative impacts to noise.

Table 5.6-37. Summary of Proposed Project Impact Contribution to Cumulative Noise Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels	SI	CC	MM NOISE-1	CC
Cumulative Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels	LTS	NCC	N/A	NCC

Notes: CC = cumulatively considerable, LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels (cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. In addition, there is the potential that construction and operation of Valley Water and non-Valley Water projects, plans, and programs would coincide with those of the Proposed Project. As a result, there is the potential for cumulatively significant impacts to noise, and because its impact is significant, the Proposed Project's contribution would be **cumulatively considerable**. Noise from the Proposed Project would be reduced through the implementation of MM NOISE-1. However, as discussed in Section 3.14.4, the impact would remain significant and unavoidable. Therefore, the Proposed Project's incremental contribution to Cumulative Impact NOISE-1 after mitigation would be **cumulatively considerable**.

Cumulative Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. However, the vibration impacts from a single project would likely not be compounded given that many ongoing and future projects are dispersed and not concentrated in a single area of Santa Clara County. In addition, given the short-term nature of the Proposed Project's activities, it is unlikely that the construction and operation of Valley Water and non-Valley Water projects, plans, and programs would coincide with those of the Proposed Project. There would be no cumulatively significant impacts to vibration. Vibration from the Proposed Project would be minimized and controlled through the implementation of BMP GEN-38. Therefore, the Proposed Project's incremental contribution to Cumulative Impact NOISE-2 would be **not cumulatively considerable**.

5.6.13.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

Because impacts related to noise are based on the implementation of the proposed non-flow measures and there would be no impacts associated with the proposed flow measures, the cumulative impact analysis for the Non-flow Measures Only Alternative is identical to that of the Proposed Project. Table 5.6-38 summarizes those impacts.

Table 5.6-38. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Noise Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels	SI	CC	MM NOISE-1	CC
Cumulative Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels	LTS	NCC	N/A	NCC

Notes: CC = cumulatively considerable, LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels (cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. In addition, there is the potential that construction and operation of Valley Water and non-Valley Water projects, plans, and programs would coincide with those of the Non-flow Measures Only Alternative. As a result, there is the potential for cumulatively significant impacts to noise, and because its impact is significant, the Non-flow Measures Only Alternative's contribution would be **cumulatively considerable**. Noise from the Non-flow Measures Only Alternative would be reduced through the implementation of MM NOISE-1. However, as discussed in Section 3.14.4, the impact would remain significant and unavoidable. Therefore, the Non-flow Measures Only Alternative's incremental contribution to Cumulative Impact NOISE-1 after mitigation would remain **cumulatively considerable**.

Cumulative Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. However, the vibration impacts from a single project would likely not be compounded given that many ongoing and future projects are dispersed and not concentrated in a single area of Santa Clara County. In addition, given the short-term nature of the Non-flow Measures Only Alternative's activities, it is unlikely that the construction and operation of Valley Water and non-Valley Water projects, plans, and programs would coincide with those of the Non-flow Measures Only Alternative. There would be no cumulatively significant impacts to vibration. Vibration from the Non-flow Measures Only Alternative would be minimized and controlled through the implementation of BMP GEN-38. Therefore, the Non-flow Measures Only Alternative's incremental contribution to Cumulative Impact NOISE-2 would be **not cumulatively considerable**.

5.6.13.3 FAHCE-plus Alternative Cumulative Impact Analysis

The cumulative impacts related to noise for the FAHCE-plus Alternative are identical to that of the Proposed Project. Table 5.6-39 summarizes those impacts.

Table 5.6-39. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Noise Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels	SI	CC	MM NOISE-1	CC
Cumulative Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels	LTS	NCC	N/A	NCC

Notes: CC = cumulatively considerable, LTS = less than significant impact, N/A = not applicable, NCC = not cumulatively considerable

Cumulative Impact NOISE-1: Cause a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or cause a substantial incremental increase in noise levels (cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion project, dam safety, and seismic retrofit projects as well as the non-Valley Water, could result in incrementally adverse impacts if their construction or operational timeframes overlap. In addition, there is the potential that construction and operation of Valley Water and non-Valley Water projects, plans, and programs would coincide with those of the FAHCE-plus Alternative. As a result, there is the potential for cumulatively significant impacts to noise, and because its impact is significant, the FHACE-plus Alternative's contribution would be **cumulatively considerable**. Noise from the FAHCE-plus Alternative would be reduced through the implementation of MM NOISE-1. However, as discussed in Section 3.14.4, the impact would remain significant and unavoidable. Therefore, the FACE-plus Alternative's incremental contribution to Cumulative Impact NOISE-1 after mitigation would remain **cumulatively considerable**.

Cumulative Impact NOISE-2: Cause excessive ground-borne vibration or ground-borne noise levels (not cumulatively considerable)

Cumulative projects, plans, and programs, such as Valley Water's watershed improvements, Almaden Lake Improvement Project, Pacheco Reservoir Expansion Project, dam safety, and seismic retrofit projects as well as the non-Valley Water projects, could result in incrementally adverse impacts if their construction or operational timeframes overlap. However, the vibration impacts from a single project would likely not be compounded given that many ongoing and future projects are dispersed and not concentrated in a single area of Santa Clara County. In addition, given the short-term nature of the FAHCE-plus Alternative's activities, it is unlikely that the construction and operation of Valley Water and non-Valley Water projects, plans, and programs would coincide with those of the FAHCE-plus Alternative. There would be no cumulatively significant impacts to vibration. Vibration from the FAHCE-plus Alternative would be minimized and controlled through the implementation of BMP GEN-38. Therefore, the FAHCE-plus Alternative's incremental contribution to Cumulative Impact NOISE-2 would be **not cumulatively considerable**.

5.6.14 Utilities

The geographic study area for the cumulative impact analysis for utilities includes solid waste generation and disposal facilities in the Project area and the communities in Santa Clara County located within those service areas.

The cumulative impact threshold for utilities is the same as the impact threshold presented in Section 3.15, *Utilities*. Cumulative impacts for utilities are considered significant if they would:

- **Cumulative Impact UTIL-1:** Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure

Both Valley Water and non-Valley Water projects, plans, and programs were considered in the cumulative impact analysis for utilities. Projects, plans, and programs considered in this analysis include those that would reduce or increase the amount of storage available at landfills in the Project area. Based on these factors, the following projects, plans, and programs were determined to be relevant to the utilities cumulative impact analysis:

- Valley Water Projects, Plans, and Programs
  - Valley Water Watershed Improvements (Almaden Lake, Permanente Creek, Coyote Creek, and Guadalupe River)
  - Pacheco Reservoir Expansion Project
  - Encampment Clean Up Program
- Non-Valley Water Projects, Plans, and Programs
  - Residential, Commercial, Industrial, and Recreation Area Development

Cumulative Impacts for the Proposed Project, Non-flow Measures Only Alternative, and FAHCE-plus Alternative are analyzed below.

5.6.14.1 Proposed Project Cumulative Impact Analysis

This section describes the Proposed Project's contribution to cumulative impacts to utilities. Table 5.6-40 summarizes the Proposed Project's contribution to cumulative impacts to utilities.

Table 5.6-40. Summary of Proposed Project Impact Contribution to Cumulative Utilities Impacts

Impact	Level of Cumulative Significance	Incremental Project Contribution	Applicable Project Mitigations	Incremental Impact after Mitigation
Cumulative Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure	SI	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure (not cumulatively considerable)

Non-project-related construction activity, including residential, commercial, industrial, and recreation-area development as well as ongoing Valley Water plans and projects for improvements within the Stevens Creek and Guadalupe River watersheds, such as the Almaden Lake Improvement Project, would generate solid waste and require the use of local landfills. Valley Water encampment cleanup activities would also require the use of local landfills. Landfills in the Project area, as listed in Table 3.15-1, currently have the capacity to accommodate these solid waste needs. As it pertains to Cumulative Impact UTIL-1, proposed flow measures would not require construction, ground disturbance, excavations, installations, vegetation removal, or other activities likely to result in the generation of solid or hazardous waste. As a result, flow measures as a part of the Proposed Project would not result in an incremental cumulative contribution to impacts to local landfills, or state or local solid waste standards.

Monitoring would require pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. These activities would not result in the generation of solid waste.

Proposed non-flow measures including removal of fish barriers, vegetation removal, installation of root wads and LWD, installation of rock or log weirs, and removal of culverts and riprap or other structures would result in the generation of solid waste, construction debris, and hazardous waste. Ground-disturbing activities associated with the Stevens Creek and Guadalupe River watersheds, such as the Almaden Lake Improvement Project, have the potential to disturb soils with high mercury levels and would require special disposal in accordance with federal, state, and local regulations regulating the proper disposal of hazardous waste. Valley Water projects, including the Proposed Project, would implement BMP GEN-3 (Avoid Exposing Soils with High Mercury Levels) which involves the treatment, remediation, and proper disposal of contaminated soil at a Class I landfill following established work practices and hazard control measures. Cumulative hazardous waste impacts would be less than significant.

In the future, fewer landfills would be available for use because of a lack of capacity. Zanker Material Processing Facility is projected to close in 2025. As a result, together the Proposed Project and other reasonably foreseeable probable future projects, plans, and programs could exceed future landfill capacities and result in significant cumulative impacts from solid waste. However, because of relatively minor amounts of solid waste generated, the Proposed Project's incremental contribution to this impact is not significant and would **be not cumulatively considerable**.

5.6.14.2 Non-flow Measures Only Alternative Cumulative Impact Analysis

The cumulative impacts related to utilities for the Non-flow Measures Only Alternative are similar to that of the Proposed Project. Table 5.6-41 summarizes those impacts.

Table 5.6-41. Summary of Non-flow Measures Only Alternative Impact Contribution to Cumulative Utilities Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure	SI	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure (not cumulatively considerable)

Because impacts related to utilities are based on the implementation of the proposed non-flow measures and there would be no impacts associated with the proposed flow measures, the cumulative impact analysis for the Non-flow Measures Only Alternative is similar to that of the Proposed Project. Proposed non-flow measures including removal of fish barriers, vegetation removal, installation of root wads and LWD, installation of rock or log weirs, and removal of culverts and riprap or other structures would result in the generation of solid waste, construction debris, and hazardous waste. Cumulative hazardous impacts would be less than significant.

In the future, fewer landfills would be available for use because of a lack of capacity. As a result, reasonably foreseeable probable future projects, plans, and programs could exceed future landfill capacities and result in significant cumulative impacts from solid waste. However, because of relatively minor amounts of solid waste generated, the Non-flow Measures Only Alternative's incremental contribution to this impact is not significant and would be **not cumulatively considerable**.

5.6.14.3 FAHCE-plus Alternative Cumulative Impact Analysis

The cumulative impacts related to utilities for the FAHCE-plus Alternative are similar to that of the Proposed Project. Table 5.6-42 summarizes those impacts.

Table 5.6-42. Summary of FAHCE-plus Alternative Impact Contribution to Cumulative Utilities Impacts

Impact	Level of Cumulative Significance	Incremental Alternative Contribution	Applicable Alternative Mitigations	Incremental Impact after Mitigation
Cumulative Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure	SI	NCC	N/A	NCC

Notes: CC = cumulatively considerable, N/A = not applicable, NCC = not cumulatively considerable, SI = significant impact

Cumulative Impact UTIL-1: Generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure (not cumulatively considerable)

As it pertains to Cumulative Impact UTIL-1, proposed flow measures would not require construction, ground disturbance, excavations, installations, vegetation removal, or other activities likely to result in the generation of solid or hazardous waste As a result, flow measures as a part of the FAHCE-plus Alternative would not result in an incremental cumulative contribution to impacts to local landfills, or state or local solid waste standards.

Monitoring would require pedestrian surveys, water and fish sampling and testing, data gathering to identify ecological functions and habitat values, monitoring those indicators over time, and assessing performance objectives. These activities would not result in the generation of solid waste.

Proposed non-flow measures including removal of fish barriers, vegetation removal, installation of root wads and LWD, installation of rock or log weirs, and removal of culverts and riprap or other structures would result in the generation of solid waste, construction debris, and hazardous waste. Cumulative hazardous waste impacts would be less than significant.

In the future, fewer landfills would be available for use because of a lack of capacity. Zanker Material Processing Facility is projected to close in 2025. As a result, reasonably foreseeable probable future projects, plans, and programs could exceed future landfill capacities and result in significant cumulative impacts from solid waste. However, because of relatively minor amounts of solid waste generated, the FAHCE-plus Alternative's incremental contribution to this impact is not significant would be **not cumulatively considerable**.

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Preparer	Role(s)	Qualification	Experience
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Holly Kennedy, PE	Principal In Charge Former Project Manager	Professional Civil Engineer MS, Water Resources Engineering and Management BS, Engineering	16 years
Leslie Tice, CEP	Project Manager CEQA Lead Quality Control	Certified Environmental Professional BS, Environmental Science and Policy	22 years
Michael Mayer, JD	FHRP Lead Quality Control Water Quality Lead Terrestrial Biology Technical Lead	JD, Law – Certificate in Environmental and Natural Resources Law MS, Wildlife and Fisheries Conservation BS, Wildlife and Fisheries Biology	25 years
Dawn Edwards	FHRP Lead Quality Control	MS, Environmental Science/Studies BS, Business Administration	14 years
Carol Snead	EIR Document Control Lead	MS, Geology BS, Geology	30 years
Betty Dehoney, CEP, PMP	Quality Control Strategic Guidance CEQA, ESA Former Project Manager	Certified Environmental Professional MS, Biology BA, Biology	30 years
Susanna Schippers	Lead Technical Editor	MA, Language, Reading, and Culture BA, Creative Writing	22 years
Carrie Ulrich	Technical Editor	MS, English BS, Environmental Studies	25 years
Lori Buffington	Technical Editor	Not applicable	35 years
Brian Schretzmann	GIS	BA, Geography BA, Economics	8 years
Jeffrey Weaver	Hydrology, Water Supply, Groundwater – Lead	Professional Engineer BS, Civil Engineering	20 years
Matthew Paquette	Recreation Resources – Lead	BA, Environmental Policy	18 years
John Spranza	Terrestrial Biology – Author	MS, Zoology BS, Aquatic Ecology	19 years

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Preparer	Role(s)	Qualification	Experience
John Lloyd	Cultural and Tribal Resources – Lead Author	Registered Professional Archaeologist MA, Linguistics BA, Anthropology	19 years
Sandy Flint	Cultural and Tribal Resources – Quality Control	Registered Professional Archaeologist MA, Anthropology BA, Anthropology	38 years
Natalie Bogan	Geology and Soils and Utilities – Lead Author	Masters, Environmental Management BA, Psychology	5 years
Tanya Kalaskar	Document Support	MS, Chemical Engineering	3 years
Keith Lay	Air Quality, GHG and Energy, and Noise – Lead Author	BSc, Civil Engineering	20 years
Stillwater Sciences			
Katherine Ayres	Aquatic Biological Resources – Lead Author Project Manager (Stillwater)	PhD, Biology	15 years
Lorna Thurston	Aquatic Biological Resources – Key Author Deputy Project Manager (Stillwater)	MS, Environmental Science & Policy	9 years
Nate Butler	Aquatic Biological Resources – Technical Lead Data Analysis & Graphics	PhD, Environmental Engineering	10 years
Ethan Bell	Aquatic Biological Resources – Senior Reviewer	MS, Fisheries Biology	20 years
Matt Drenner	Aquatic Biological Resources – Key Author	PhD, Forestry	7 years
Danielle Yaconelli	Aquatic Biological Resources – Key Author	BA, Environmental Studies	7 years
Matt McKechnie	Aquatic Biological Resources – Key Author	BS, Environmental Management and Protection	3 years
Anne Maher	Aquatic Biological Resources -- Technical Editor	BS, Environmental Science	1 year
Claire Carter	Aquatic Biological Resources – Technical Editor	BA, Anthropology	8 years
Kelli Wheat Dawson	Aquatic Biological Resources – Senior Technical Editor and Document Support	BA, English	21 years

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Preparer	Role(s)	Qualification	Experience
Emily Jadeski	Aquatic Biological Resources -- GIS Support	BS, Environmental Science and Geography	3 years
Flow West			
Anthony Falzone, MLA, CFM	Flow West Project Manager Hydrology – Lead Water Supply, Groundwater, and Water Supply – Quality Control	MLA, Environmental Planning BA, Economics with a Minor in Forestry	20 years
Christine Day	Hydrology, Groundwater, Water Quality, and Water Supply – Author	MA, Anthropology BS, Environmental Sciences	3 years
Mike Urkov, MPA	Water Quality, Water Supply, and Hydrology – Author	MA, Water Resources Administration BS, Political Economy of Natural Resources	25 years

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