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MERCED IRRIGATION DISTRICT
WATER & POWER


# Water Resources Management Plan

# Draft Programmatic Environmental Impact Report

March 2020

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# Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report

*Prepared for*

Merced Irrigation District

March 2020

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# Executive Summary

## Introduction

This Draft Programmatic Environmental Impact Report (PEIR) has been prepared by the Merced Irrigation District (MID or District) pursuant to Title 14 of *California Code of Regulations* Section 15168 to identify possible potential environmental impacts from implementation of certain portions of the Merced Irrigation District Water Resources Management Plan (WRMP, Proposed Program, or Program). A key objective of the Proposed Program is to protect the District's water rights and ensure the District remains financially sound. A complete description of Program objectives is provided in Section 1, Introduction.

## Proposed Program

MID has developed and is proposing to implement a WRMP that includes financial, policy, and infrastructure improvement recommendations over time. MID published the WRMP Summary Report and technical appendixes in February 2019. As part of the process to develop the WRMP, MID evaluated five alternatives that incorporated specific elements including system improvements, water user classification modifications, annexations, water transfers, and water rates. Through this evaluation, MID identified the Balanced Approach Alternative as the preferred approach for the District. To support the implementation of the Balanced Approach Alternative, MID has prepared this PEIR to disclose the potential environmental impacts associated with implementation of the WRMP. The Balanced Approach Alternative is referred to as the "Proposed Program" in this PEIR. Key components of the Proposed Program addressed in this PEIR are as follows:

- System Improvements – various projects to allow for full implementation of the Capital Improvement Plan and modernization of the system
- Class II to Class I Conversion – one-time opportunity for water users in the District's El Nido area to convert from Class II to Class I, for a fee
- Water Transfers – transfers of water when District water is available and when the Board of Directors determines it is in the best interests of the District

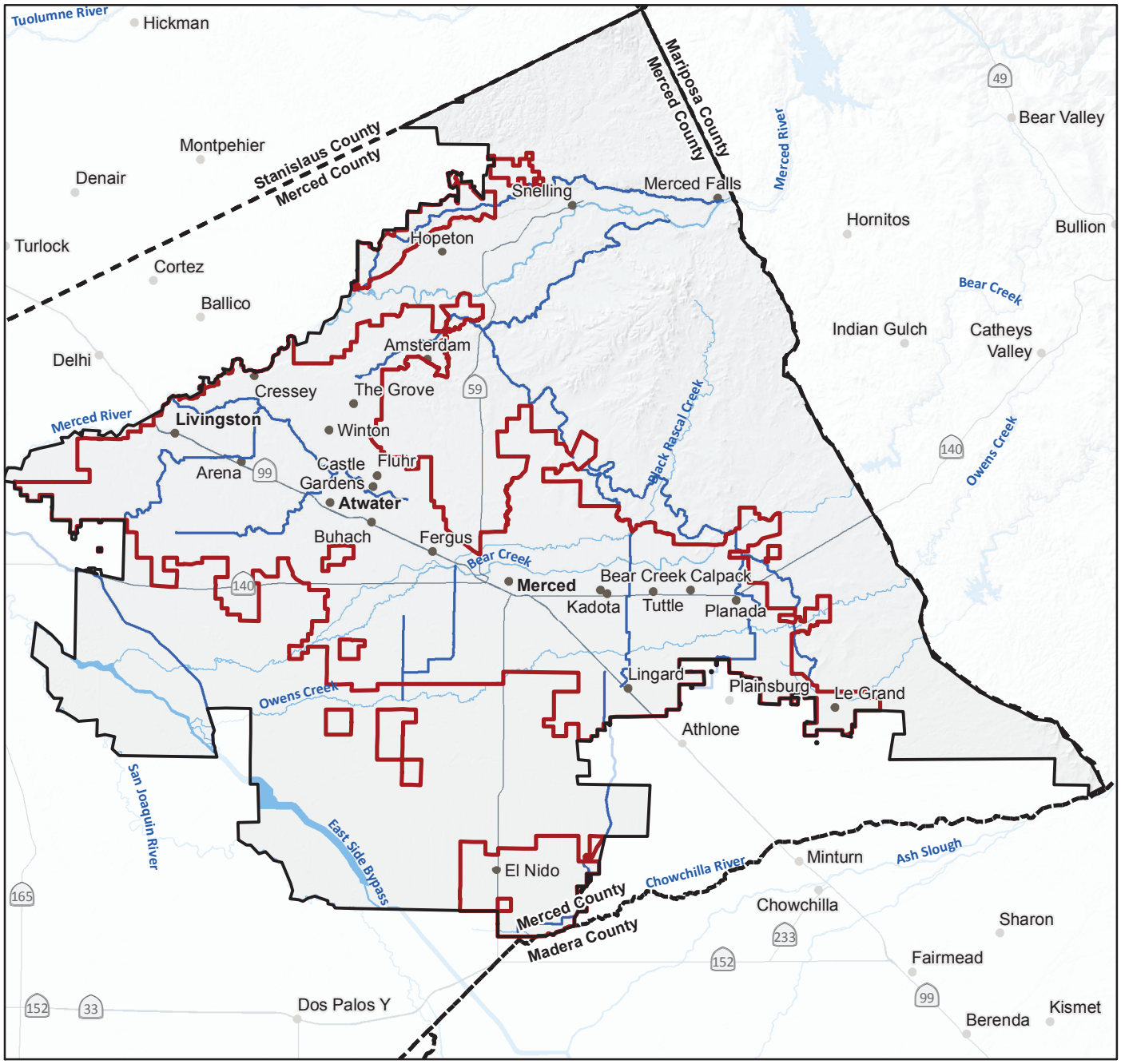
Other components (e.g., annexations and adjustments in future water rates) are not evaluated in this PEIR given no environmental impacts would occur as part of such activities. The Proposed Program would include no additional annexation beyond existing District boundaries.

## Purpose of this Document

MID determined the preparation of a PEIR was the most appropriate approach to addressing potential impacts resulting from implementation of the Proposed Program. This determination was based on the nature of the Proposed Program, which includes numerous projects and actions, several of which are closely related but not necessarily fully defined. The Draft PEIR has been prepared in accordance with the California Environmental Quality Act (CEQA). MID is the lead agency for the CEQA process and has independently evaluated, directed, and supervised the preparation of this document.

## Environmental Setting

MID is located in eastern Merced County in the northeastern corner of the San Joaquin Valley (Figure ES-1). The MID service area consists of approximately 166,000 acres and encompasses the cities of Merced, Atwater, and Livingston. The Program Area includes the MID service area and areas outside of the MID service area where capital improvements are planned as part of the Proposed Program.




LEGEND

- MID Program Area
- MID Service Area
- County
- Canal
- Natural Drainages
- Major River

VICINITY MAP


N

0 2.5 5
Miles

**FIGURE ES-1 PROGRAM AREA AND MID SERVICE AREA**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

MID was established in 1919 and quickly thereafter purchased an irrigation system and water rights as well as site selection for what would become Exchequer Dam. The dam was completed in 1926 and formed Lake McClure. From 1964 to 1967, MID constructed the Merced River Project, which includes New Exchequer Dam and Lake McClure, McSwain Dam and Reservoir, two powerhouses, and five recreation areas. In 2004, MID and the former El Nido Irrigation District (ENID) were consolidated under an agreement that provided landowners within the approximate 10,500-acre ENID service area boundary with 50 percent of the water supply allocation of MID landowners (on a per-acre basis). These new MID customers were designated Class II users to distinguish them from Class I users (original MID customers). As a result of the consolidation, MID assumed all assets and liabilities of ENID, including its water rights.

Currently, the District maintains over 850 miles of canals, laterals, drains, pipelines, natural streams, sloughs, tunnels, and 215 active groundwater wells to serve local customers (Figure ES-2). In an average year, MID provides irrigation water to over 100,000 acres of land. An additional 33,400 acres of irrigation lands within the MID service area are entitled to District water but are either served by private groundwater wells, in transition from agricultural production to urban development, or are generally fallowed. Irrigable lands within MID pay a standby fee and retain the right to request MID water deliveries throughout the irrigation season, regardless of previous use. When combined, this equates to a total MID customer base of approximately 133,500 acres.

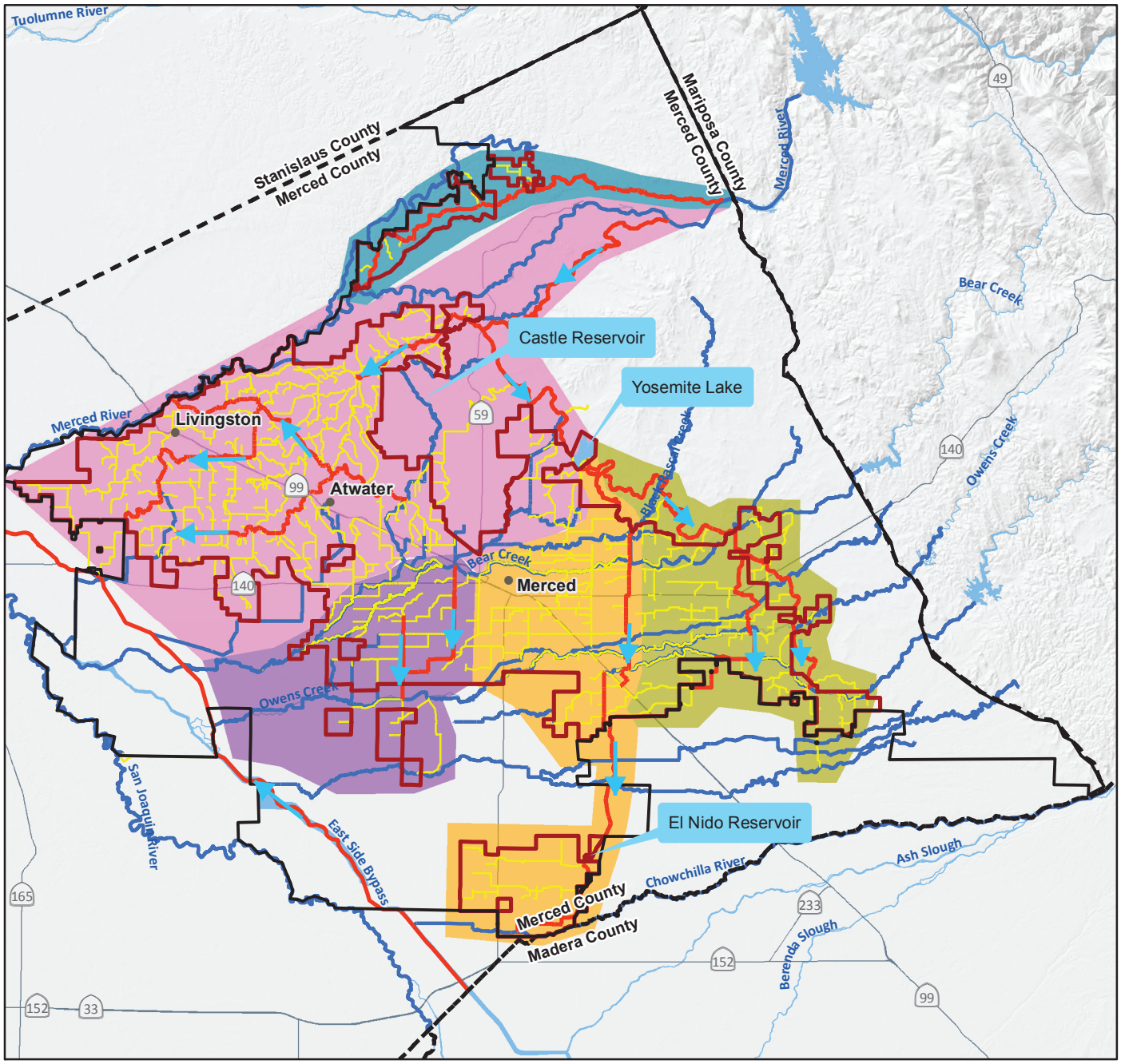
# Program Objectives/Purpose and Need

CEQA requires that an environmental impact report include a statement of project objectives. Similarly, the implementing regulations of the National Environmental Policy Act (NEPA) require that an environmental impact statement specify the purpose and need of the proposed action to frame the alternative methods of meeting the stated purpose of the action. Although this document is being prepared to satisfy CEQA requirements, MID has developed a purpose and need statement that can be used for subsequent supplemental documentation, as may be necessary, to complete future potential NEPA requirements. The objectives and the purpose and need statement assisted MID in selecting the Proposed Program and determining how best to implement the Proposed Program. MID will act as the lead agency under CEQA.

MID's primary objectives (goals) in implementing its WRMP include the following:

- Protect and maximize MID's water rights
- Ensure that MID remains financially sound
- Provide a reliable and affordable water supply to MID customers
- Continue to focus on MID customer service
- Promote sustainable management of groundwater resources
- Support the agricultural economic base of the region

The purpose of the Proposed Program is to implement the projects and actions identified in MID's WRMP to protect the District's water rights while ensuring the District remains financially sound. Fulfilling these goals allows the District to balance reasonable reliability with more favorable water rates for MID customers and a high level of customer service. This also allows MID to take a proactive role in promoting sustainable management of groundwater resources within the Merced Groundwater Subbasin and, ultimately, supporting the agricultural economic base of the region. These projects and actions, including system improvements and actions necessary to finance such improvements, are proposed to be implemented over time and in phases, in response to customer needs.




LEGEND

- MID Program Area
- MID Service Area
- County
- El Capitan, Deane Canal, & West Bear Creek System
- El Nido & Fairfield Canal System
- Le Grand & Planada Canal System
- Livingston & Escaladian Canal System
- Northside Canal System
- Canal
- Rivers, Creeks, and Drains
- Lateral
- Major River
- Flow Direction

VICINITY MAP


N

0 2.5 5
Miles

**FIGURE ES-2 MID WATER DISTRIBUTION SYSTEM**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

ch2m

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The need for the action stems from changing customer water needs and projected future crop shifts, land uses, future water supply reliability (including as a result of the requirements outlined in the 2015 Merced Falls Hydroelectric Project Final Environmental Impact Statement), infrastructure needs, financial uncertainty, and legislative actions.

# Summary of Environmental Impacts and Mitigation Measures

Table ES-1 summarizes each of the potential environmental impacts evaluated in this PEIR, proposed mitigation measures to avoid or reduce impacts as necessary, and residual impacts given the implementation of mitigation.

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|
| **3.1 Aesthetics and Visual Resources** | | |
| **Impact AES-1:** *Have a substantial adverse effect on a scenic vista.* | LTS | None required. |
| **Impact AES-2:** *Substantially degrade the existing visual character or quality of public views of the site and its surroundings.* | LTS | None required. |
| **Impact AES-3:** *Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.* | LTS | None required. |
| **3.2 Agricultural Resources and Land Use** | | |
| **Impact AG/LU-1:** *Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.* | LTS | None required. |
| **Impact AG/LU-2:** *Conflict with existing zoning for agricultural use or a Williamson Act contract.* | LTS | None required. |
| **Impact AG/LU-3***: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.* | LTS | None required. |
| **Impact AG/LU-4:** *Physically divide an established community.* | No impact | None required. |
| **Impact AG/LU-5:** *Cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.* | LTS | None required. |

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|
| **3.3 Air Quality** | | |
| **Impact AQ-1:** *Conflict with or obstruct implementation of the applicable air quality plan.* | LTS with mitigation | **MM AQ-1:** Reduce $PM_{10}$ and $NO_x$ emissions during construction<br>As defined by SJVAPCD, the following mitigation measures will be implemented, as appropriate, to reduce potential air quality impacts. The measures, appropriate for construction projects, include mitigation for both $PM_{10}$ and $NO_x$ emissions. The measures listed below also include the most stringent measures listed for projects considered to be significant or projects near sensitive receptors.<br><u>Fugitive Dust</u><br>Water will be applied every 4 hours to the area within 100 feet of a structure being demolished to reduce vehicle track-out.<br>Dust suppressants or ground cover will be applied to disturbed areas within 1 week upon completion of construction or demolition.<br>Demolition activities will be suspended when wind speeds exceed 25 miles per hour.<br>Unpaved roads that are frequently used during construction (e.g., more than 3 months) will have aggregate base applied or will be paved.<br><u>Exhaust Emissions – Construction Activities</u><br>***To reduce*** emissions associated with $NO_x$, to the extent feasible, MID will require construction contractors to use construction-related equipment powered by engines meeting, at a minimum, Tier II emission standards, as set forth in CCR Title 13 Section 2423 and 40 CFR 89.<br>To the extent feasible, construction equipment and truck routes will be located away from neighborhoods or sensitive receptors (e.g., hospitals, schools, and playgrounds).<br>**MM AQ-2:** Voluntary emission reduction agreement<br>To address mitigation of construction-related emissions that cannot be reduced by implementation of Regulation VIII and MM AQ-1, MID will enter into a Voluntary Emission Reduction Agreement with SJVAPCD. Under this agreement, MID will provide pound-for-pound mitigation of air emissions increases through a process that funds and implements emission reduction projects with SJVAPCD. |
| **Impact AQ-2:** *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.* | LTS | None required. |
| **Impact AQ-3:** *Expose sensitive receptors to substantial pollutant concentrations.* | LTS | None required. |

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|
| **Impact AQ-4:** *Result in other emissions such as those leading to odors adversely affecting a substantial number of people.* | LTS | None required. |
| **3.4 Biological Resources** | | |
| **Impact BR1:** *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS. This includes potential reduction in the number, restricted range, increased mortality, or lowered reproductive success that jeopardizes the long-term persistence of local populations of an endangered or threatened native anadromous or resident fish species.* | LTS with mitigation | **MM BR-1a:** Nesting birds<br>The following measures are recommended to avoid adverse effects on nesting birds (including loggerhead shrike, but not including Swainson's hawk or other special-status raptor species) that nest within or immediately adjacent to the project site.<br>• If construction occurs during the bird nesting season (generally February 15–August 31), preconstruction nesting bird surveys (two visits at least 1 week apart) will be conducted by a qualified biologist within the 14 days prior to construction to detect the presence of any nesting birds within or adjacent to the proposed project (within 400 feet for non-special-status raptors and within 100 feet for all other non-special-status birds). If construction occurs during the nonbreeding season for nesting birds (September 1–January 31), preconstruction surveys are not required.<br>• If the preconstruction nesting bird surveys detect actively nesting birds, the results of the surveys shall be submitted to CDFW within 3 days of completing the surveys. If any active non-special-status bird nests are found onsite, the applicant shall avoid initiating any construction activities within the standard buffers described above (i.e., 400 and 100 feet as appropriate). The applicant will then develop and implement a plan for the protection and monitoring of these nests, to be approved by CDFW, in a timely manner. The results of any protective measures instituted as a part of the protection and monitoring plan shall be provided to CDFW in electronic format within 1 week of implementation.<br>**MM BR-1b:** Burrowing owl<br>Adverse effects on burrowing owls will be mitigated as follows:<br>• The results of preconstruction surveys for burrowing owl, including negative findings, will be submitted to CDFW within 3 days of survey conclusion. If burrowing owls are found during the nesting season (i.e., February 15–August 31), no ground disturbance will occur within 250 feet of occupied burrows until a qualified biologist determines that fledging has occurred (i.e., the juveniles are no longer dependent upon the nest burrows). If burrowing owls are found during the non-nesting season (i.e., September 1–February 14), no ground disturbance will occur within 160 feet of occupied burrows.<br>• Alternatively, the applicant may retain a qualified biologist to conduct passive relocation of individuals from occupied burrows using one-way doors for a minimum of 3 consecutive days (only during the non-nesting season). Once the occupied burrows have been cleared, the |

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|
| | | applicant may backfill the burrows. If passive relocation is used, the applicant will also provide alternate natural or artificial burrows that are beyond 160 feet from the impact area and that are within or contiguous to a minimum of 6.5 acres of foraging habitat for each pair of relocated burrowing owls. One alternate natural or artificial burrow will be provided for each burrow that will be excavated within the project site. Artificial burrow creation, if used, will follow the guidelines in Trulio (1995) and the CDFW *Staff Report on Burrowing Owl Mitigation* (2012). The applicant will be responsible for reporting all observations of burrowing owl to CNDDB within 10 days of the sighting.<br>**MM BR-1c:** Tricolored blackbird<br>Adverse effects on nesting tricolored blackbird colonies will be mitigated as follows:<br>• MID will prepare a habitat management plan and incidental take permit application for submittal to and approval by CDFW prior to any loss of suitable nesting habitat for tricolored blackbird on a project site. The habitat management plan will, at a minimum, include the below provisions.<br>a) To avoid and minimize impacts on nesting tricolored blackbird, MID will not initiate grubbing, grading, or other soil/vegetation disturbance within 250 feet of project boundaries during the nesting season (March 15 through July 30). All project soil/vegetation disturbance will occur between August 1 and March 14 to the extent feasible.<br>b) Alternatively, if MID initiates project soil/vegetation disturbance between March 15 and July 30, surveys will be conducted for prospecting or nesting tricolored blackbird colonies in all potentially suitable nesting habitats that are within and out to 250 feet from the project boundaries. The surveys will be conducted by a qualified biologist during the season immediately preceding initiation of the project. The surveys will be conducted according to the following schedule: a total of two visits during early March 15 to July 30 with at least 1 month between survey visits.<br>c) If nesting colonies are found prior to initiation of project soil/vegetation disturbance in the year of the survey, a no work exclusion zone will be established within 250 feet of each active nesting colony until a qualified biologist determines that the young-of-the-year are no longer reliant upon the nest site.<br>d) Alternatively, MID may retain a qualified biologist to conduct daily monitoring of any active nesting colonies that are within 250 feet or less from project soil/vegetation disturbance to determine if the individuals are exhibiting any behaviors that would suggest that nest failure could occur. If the qualified biologist determines that disturbance is sufficient to cause nest failure, all activities within 250 feet of the nesting colony will be terminated until the young-of-the-year are no longer reliant upon the nest. |

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|
| | | e) To compensate for the loss of known nesting habitat for tricolored blackbird on a project site, MID will plant Himalayan blackberry at a minimum 2:1 compensation ratio. The compensation stands of Himalayan blackberry will be sited on the nearest suitable land controlled by MID or on nearby alternative land on which MID has acquired a conservation easement acceptable to CDFW. Compensation sites will be chosen to avoid any loss of existing natural wetland communities. Annual monitoring of the compensation stands will be conducted to determine if tricolored blackbirds are using the compensation habitat. If no evidence of use has been found after 5 years of monitoring, MID will be required to plant additional Himalayan blackberry at a minimum 1:1 compensation ratio on other lands under MID control within Merced County where there is no active episodic human disturbance that would preclude tricolored blackbirds from settling and nesting in the compensation habitat.<br><br>**MM BR-1d:** Western pond turtle<br><br>Adverse effects on western pond turtle will be mitigated as follows:<br><br>• During dewatering of any canal that is suitable for western pond turtle, the applicant shall retain a qualified biologist to monitor the dewatering and salvage any stranded western pond turtles that are observed. Salvage shall be conducted by net, and all individuals will be relocated to a downstream portion of the associated canal at least 500 feet downstream of the nearest boundary of the project site that has at least 300 linear feet of continuous aquatic habitat. Any non-native turtles (e.g., red-eared slider [*Trachemys scripta elegans*]) that is salvaged will not be released to the wild. The applicant will consult with CDFW in regards to the disposition of these latter individuals.<br><br>• When removing the top 12 inches of soil from any relatively undisturbed edge habitat on or near the project site (i.e., ungraded road shoulders and field edges that could provide potential egg-laying sites), the applicant will use a qualified biologist as a "spotter" whose responsibility is to watch for western pond turtle eggs or neonates that are overturned during earthmoving. If eggs or neonates are found, all earthmoving activities within 30 feet of the eggs or neonates will be temporarily halted until the eggs or neonates can be salvaged. The eggs or neonates will then be delivered to a nearby qualified wildlife rescue and rehabilitation facility that has been approved by CDFW. The eggs or neonates will be held by the wildlife rescue and rehabilitation facility until they are ready for release into downstream portions of the associated canals (i.e., at least 500 feet downstream from the nearest project boundary). Once the top 12 inches of soil has been removed, no further monitoring for western pond turtle eggs or neonates is required given that western pond turtle nests are shallow (i.e., less than 6 inches in depth).<br><br>**MM BR-1e:** California tiger salamander and western spadefoot<br><br>Adverse effects on CTS will be mitigated as follows:<br><br>• Concentrations of small mammal burrows and other suitable refugia that may support CTS will be avoided to the extent feasible. Prior to ground disturbance, linear routes will be mapped, |

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|
| | | marked in the field, and surveyed for burrows. Burrows within a vehicle access route that cannot be avoided and are susceptible to being crushed will be temporarily reinforced with PVC pipe or by other measures as deemed effective by a qualified biologist prior to allowing vehicle access (dry season only). Any reinforcing materials will be removed immediately after access is completed.<br>• Prior to any work within a project site with suitable CTS habitat or within 1 mile of suitable CTS habitat (or within 2 miles of known CTS occurrences where there is contiguous suitable habitat between the project and occurrence), a one-way exclusion fence will be established prior to the winter (i.e., prior to October 15) of the planned year of construction around the project site and will remain in place for the duration of the project. A qualified biologist will survey and delineate the fence route and be present during fence installation. Exit funnels or other appropriate exit structures for CTS will be provided no more than 60 feet apart along the entire fence alignment. The exclusion fence will be routinely inspected for repair for the duration of construction. Any damage, such as holes or gaps, will be repaired immediately.<br>• CTS found within a project site a will be captured by hand, contained in a 2-gallon plastic bucket with lid, and relocated immediately to the outside of the nearest portion of the exclusion fence (in a ground squirrel burrow if available, otherwise under a 2-foot by 2-foot piece of plywood covered with styrofoam insulation).<br>• Prior to any disturbance of potentially suitable aquatic CTS breeding habitat, a qualified biologist will conduct presence/absence surveys within the habitat in concurrence with the USFWS's *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander October* (2003).<br>• Prior to the start of work each morning within the CTS exclusion fence, a qualified biologist will check for CTS under equipment and materials that are to be moved that day. The qualified biologist will also check all excavated steep-walled holes or trenches for CTS. CTS will be removed by the qualified biologists and relocated immediately to the outside of the nearest portion of the exclusion fence (in a ground squirrel burrow if available, otherwise under a 2-foot by 2-foot piece of plywood covered with styrofoam insulation).<br>• A 10-mile-per-hour speed limit will be enforced at all project sites, except on roads with a posted speed limit. On roads with posted speed limits, construction traffic will be limited to the minimum safe speed.<br>• In the event that dead or injured CTS are found, the qualified biologist will consult with USFWS and CDFW to determine which, if any, additional protection measures will be implemented. These measures may include, but are not limited to, lower traffic threshold, more intensive monitoring, or controlled arrival and departures of construction traffic. |

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|
| | | • Implementation of the above measures that address CTS also apply to western spadefoot and will also mitigate/compensate for potential adverse effects to this species within and adjacent to project sites.<br>**MM BR-1f:** Vernal pool invertebrates<br>Adverse effects on federally listed and other special-status vernal pool invertebrates will be mitigated through formal consultation with USFWS, with the likely consulting federal agency being USACE. In the event of no federal nexus, the District will coordinate directly with USFWS through Section 10 of the FESA. The USACE's guidelines for formal consultation and mitigation approach include the following (this approach will also be followed as appropriate as part of potential direct coordination with USFWS through the federal Section 10 process):<br>• The precise location of the project site clearly delineated on either an original or high-quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1 in. = 24,000 in.). The map should include: quad name(s); county name; project name; type of project by category (development or other [specify]); and townships(s), ranges(s), section(s) in which the project is located.<br>• Detailed map(s) of proposed project site. The map should include: potential habitat of listed vernal pool plants and invertebrates (i.e., vernal pools, swales, and other areas that pond water in winter-spring) onsite and on adjacent property where vernal pool complexes cross property boundary; other special-status species locations/habitats; location(s) of any proposed onsite reserves; location(s) of all proposed project features (buildings, roads, parking lots, bike trails, hiking paths, fences, irrigated and non-native landscaped areas, detention basins, recreation fields, parks, and any other open spaces, etc.; location(s) of existing infrastructure within proposed reserves such as power lines, easements, pipelines or any other underground structures for which access and maintenance privileges exist; spatial buffers between the project features and avoided vernal pool resources; and watershed boundaries of wetlands, both avoided and affected to assist in evaluation of indirect effects.<br>• Area (in acres) directly and indirectly affected by the proposed project, including: total area of the project; estimated area of listed vernal pool species habitat filled/destroyed, including effects of interrelated and interdependent actions; estimated area of habitat of listed vernal pool invertebrates indirectly affected, estimated size of buffer between the project features and adjacent avoided or preserved area(s); land use of properties adjacent to both affected area(s) and avoided or preserved area(s); and map or discussion describing hydrological relationships of both affected and avoided wetlands with adjacent properties.<br>• Any conservation plan and/or conservation measures that the applicant proposes. To expedite consultation, such plans and measures should be developed during the informal consultation process with USFWS, prior to initiation of formal consultation and should include the following: specific provisions for endowments for future management, maintenance, and ownership of |

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|
| | | any vernal pool reserves included in the conservation proposal; specific locations and construction methods for any compensatory wetlands, and monitoring protocols, success criteria, and remediation protocols for any compensatory wetlands.<br>• A survey is required for any listed vernal pool plants if the proposed project is within the range of such species. If presence of listed invertebrates is not assumed and the proposed project occurs in an area where USFWS does not assume presence of listed invertebrates in the watershed, protocol surveys are necessary.<br>• In coordination with the requirements of any formal consultation regarding federally listed vernal pool invertebrates, MID will implement measures consistent with the formal consultation and *Draft Vernal Pool Mitigation and Monitoring Guidelines for U.S. Army Corps of Engineers South Pacific Division* (2016) for compensatory mitigation projects involving vernal pool habitats as required for processing of Department of the Army permits under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act.<br>**MM BR-1g:** Merced kangaroo rat and San Joaquin pocket mouse<br>Adverse effects on MKR and SJPM will be mitigated as follows:<br>• MKR and SJPM trapping efforts will be conducted by qualified biologists within all suitable habitat associated with a project. Meandering visual transect surveys for MKR burrow complexes and sign (e.g., tail drags, sand baths, seed caches) will be conducted by two biologists in all suitable habitat within and out to 100 feet from the project boundaries. All burrow complex locations that are found will be recorded using a global positioning system unit, while data on the number of burrows, level of activity, and general suitability for MKR will be recorded in field notes. Information on vegetation type and percent cover also will be recorded.<br>• Following completion of the visual transect surveys, potential trapping sites will be prioritized based on a combination of the level of MKR activity (as evidenced by burrow density and/or the presence of other sign, though some areas without obvious sign may also be trapped) and project area coverage. Live trap stations and trap lines then will be established (staked and recorded with a global positioning system unit) at the highest-priority sites.<br>• Traps (Sherman live traps [Model XLKR: 13 inches by 3.5 inches by 3 inches]) will be set near active burrows, dust baths, or tracks (particularly along evident runways). Ten or more traps (or a number determined by the surveyor) will be set in relatively tight clusters (5-foot trap spacing) at high activity areas. Traps also will be set at 30- to 50-foot intervals (two traps per station) along evident movement corridors. Traps will be baited with a mixture of millet, crimped oats, wild birdseed, or other suitable seed. Bedding (crumpled unbleached paper towel) will be placed at the inside end of each trap and will not be allowed to contact the tripping mechanism. Paper towels will be replaced each time an animal is captured in the trap. Traps will be opened and baited at sunset and checked one to two times per evening as deemed appropriate by the |

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
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| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|
| | | lead biologist. All traps will be closed after they have been checked at dawn. Trapping will be conducted at each trap site for 5 consecutive nights. Trapping will not be conducted during the week of a full moon, unless the sky is overcast and moonlight is substantially reduced. Trapping will not be conducted in December or January or in periods of cold or inclement weather detrimental to MKR.<br>• Trapped MKR or SJPM from donor sites will be held for no more than 2 days before moving them to a translocation site in 5-gallon plastic buckets with wire mesh tops. The buckets will contain approximately 2 inches of sand and approximately 4 ounces of millet seed.<br>• Trapped MKR or SJPM will then be translocated to nearby suitable translocation sites. The translocation sites will be chosen based on replicate habitat structure and plant communities, proximity to the donor site (less than 3 miles), absence of large numbers of kangaroo rats currently occupying the site (density threshold to be determined in consultation with CDFW), and high number of available burrows. To assess the current rodent population on a proposed translocation site before translocation of MKR, 2 nights of small mammal trapping will occur. After this, suitable translocation sites for hard-release of MKR will be prepared for introduction by creating artificial burrows using a soil or hand auger to drill artificial burrows into the ground at a 30º angle to approximately 24 inches in depth. Approximately 3 ounces of seed will be placed inside of each artificial burrow. To avoid any potential aggressive interactions among kangaroo rats, artificial burrows will be placed at least 50 feet apart. MKF will be placed inside of an artificial burrow approximately 1 hour before sunset. The entrance to the burrow will be blocked with a small paper bag filled with soil until after sunset. Upon darkness, the burrow will be unplugged, allowing individuals to exit on their own accord.<br>• Implementation of the above measures for MKR will also address SJPM.<br>**MM BR-1h:** San Joaquin kit fox and American badger<br>Adverse effects on San Joaquin kit fox and American badger will be mitigated as follows:<br>• If the early evaluation conducted for the proposed project (USFWS, 1999) determines that the project site represents San Joaquin kit fox habitat, the applicant will initiate discussions with CDFW and USFWS to determine appropriate project modifications to protect San Joaquin kit fox, including avoidance, minimization, restoration, preservation, or compensation measures. At a minimum, the applicant will conduct preconstruction surveys for dens, burrows, or other subterranean structures (i.e., potential dens) that could be occupied by the taxon. The preconstruction surveys will be conducted within no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities. Appropriate exclusion zones around potentially occupied subterranean habitat will then be observed where feasible as follows:<br>a) Potential den – 50 feet |

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| | | b) Atypical den – 50 feet<br>c) Known den – 100 feet<br>d) Natal/Pupping den – CDFW and USFWS must be contacted<br>• Where infeasible to use an exclusion zone, limited destruction of potential dens will be conducted. Destruction of potential dens will be accomplished by careful excavation until it is certain that no San Joaquin kit foxes are inside. The potential dens will be fully excavated, filled with dirt, and compacted to ensure that individuals cannot reenter or use the den during the construction period. If at any point during excavation, an individual is discovered inside the den, the excavation activities will cease immediately, and monitoring of the den will be conducted. Destruction of the den will be completed when in the judgment of the biologist, the individual has escaped, without further disturbance, from the partially destroyed den. Destruction of any known or natal/pupping den requires take authorization from CDFW and USFWS.<br>• Other applicable mitigation measures that address potential adverse effects on San Joaquin kit fox include the following:<br>a) Project-related vehicles will observe a daytime speed limit of 20 miles per hour throughout the site in all project areas, except on Merced County roads and State and federal highways. Night-time construction will be minimized to the extent possible. However, if it does occur, the speed limit will be reduced to 10 miles per hour. Off-road traffic outside of designated project areas will be prohibited.<br>b) To prevent inadvertent entrapment of San Joaquin kit foxes or other animals during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen fill or wooden planks will be installed. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If at any time a trapped or injured San Joaquin kit fox is discovered, CDFW and USFWS will be immediately contacted.<br>c) All construction pipes, culverts, or similar structures with a diameter of 4 inches or greater that are stored at a construction site for one or more overnight periods will be thoroughly inspected for San Joaquin kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If necessary, and under the direct supervision of a qualified biologist, the pipe may be moved only once to remove it from the path of construction activity, until the individual has escaped.<br>d) All food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in securely closed containers and removed at least once a week from the project site.<br>e) No firearms will be allowed on the project site. |

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| | | f) No pets, such as dogs or cats, will be permitted on the project site to prevent the harassment or mortality of San Joaquin kit foxes, or destruction of the taxon's dens.<br>g) Use of rodenticides and herbicides in project areas will be restricted. This is necessary to prevent primary or secondary poisoning of individuals and the depletion of prey populations on which they depend. All uses of such compounds will observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and federal legislation, as well as additional project-related restrictions deemed necessary by CDFW and USFWS. If rodent control must be conducted, zinc phosphide will be used because of its proven lower risk to San Joaquin kit fox.<br>h) A representative will be appointed by the applicant who will be the contact source for any employee or contractor who might inadvertently kill or injure a San Joaquin kit fox or who finds a dead, injured, or entrapped individual. The representative will be identified during the employee education program, and their name and telephone number will be provided to CDFW and USFWS.<br>i) An employee education program will be prepared and delivered to all contractors, their employees, applicant personnel, and and/or agency personnel involved in the project. The program will consist of a brief presentation by persons knowledgeable in San Joaquin kit fox biology and legislative protection to explain endangered species concerns. The program, at a minimum, will include the following:<br>i. Description of the San Joaquin kit fox and its habitat needs<br>ii. Description of known occurrences of San Joaquin kit fox in the project area<br>iii. Explanation of the status of the taxon and its protection under the CESA and FESA<br>iv. List of measures being taken to reduce adverse effects to the taxon during project construction and implementation<br>v. A fact sheet conveying the above information will be prepared for distribution to the previously referenced people and anyone else who may enter the project site<br>j) Upon completion of the project, all areas subject to temporary ground disturbances including storage and staging areas, temporary roads, and pipeline corridors will be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to temporary disturbance means any area that is disturbed during the project, but after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas will be determined on a site-specific basis in consultation with CDFW and USFWS.<br>k) In the case of trapped animals, escape ramps or structures will be installed immediately to allow the animal(s) to escape, or CDFW and USFWS will be contacted for guidance. |

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| | | l) Any contractor, employee, or applicant or agency personnel who is responsible for inadvertently killing or injuring a San Joaquin kit fox shall immediately report the incident to their representative. The representative will contact CDFW immediately in the case of a dead, injured, or entrapped San Joaquin kit fox. The CDFW contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden.<br>m) The Sacramento Fish and Wildlife Office and CDFW will be notified in writing within 3 working days of the accidental death or injury to a San Joaquin kit fox during project-related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured individual and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species.<br>n) New sightings of San Joaquin kit fox will be reported to the CNDDB. A copy of the reporting form and a topographic map clearly marked with the location where the San Joaquin kit fox was observed will also be provided to USFWS at the following address: Endangered Species Division, 2800 Cottage Way, Suite W2605, Sacramento, California 95825-1846.<br>• Implementation of the above measures that address San Joaquin kit fox will also mitigate/compensate for potential adverse effects to American badger within the project site.<br>**MM BR-1i:** Swainson's hawk and white-tailed kite<br>Adverse effects on nesting Swainson's hawks and white-tailed kites will be mitigated as follows.<br>• If active Swainson's hawk or white-tailed kite nests are detected during preconstruction surveys, a no-disturbance buffer zone of 500 feet will be implemented during the nesting season (March 1–September 15) or until August 15 if Management Authorization is provided by Swainson's Hawk Technical Advisory Committee (2000). Furthermore, a nest monitoring plan will be developed and implemented for all active nests. If monitoring demonstrates that nesting individuals are being adversely affected, the no-disturbance zone will be increased in 100-foot increments until all adverse effects are eliminated.<br>• Compensation for loss of suitable Swainson's hawk foraging habitat (mostly with reservoir construction) will be conducted as follows: habitat acquisition (through fee title or conservation easement) at a 1:1 ratio for nest sites within 1 mile; 0.75:1 for nest sites within 5 miles, 0.5:1 for nest sites within 10 miles. Note that habitat acquisition can be "stacked" with mitigation for loss of agricultural land as long as the acquired land is planted in a suitable crop for Swainson's hawk foraging in 3 out of every 5 years. Compensation for loss of suitable white-tailed kite foraging habitat will be conducted concurrently with compensation for loss of suitable Swainson's hawk habitat. |

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| | **MM BR-1j:** Tree-roosting bats<br>Adverse effects on tree-roosting bats (i.e., western red bat and hoary bat) will be mitigated as follows:<br>• A qualified biologist will conduct a survey for tree-roosting bats at all suitable roosting habitat within 120 feet of the project boundaries. The survey will consist of the following: (1) daytime visual searches for individuals roosting in the foliage of onsite or adjacent large trees and (2) evening Anabat or similar bioacoustic equipment surveys to show presence of foraging individuals. The surveys will be conducted on 2 consecutive days/nights during the 7 days prior to construction during months when these species may be present in the project area (i.e., March 1 to October 15).<br>• If the survey determines that individuals are present in onsite or adjacent roosting habitat (i.e., riparian woodland, orchards, or other nearby mature trees), no construction activities that result in fugitive noise, vibration, light, or dust shall occur within 120 feet of the roost site while it is occupied.<br>• Ongoing evening surveys will be continued until 2 consecutive nights without any nearby detections have occurred (other than during the pupping season) and will then be terminated. Construction must then start within the next 2 days.<br>• No additional evening surveys will be required at occupied sites and their 120-foot setback that are found during the pupping season (May 15 to July 15). Construction activities at such site will be avoided until after mid-July. Construction must then start within the next 2 days.<br>• All project night lighting shall be shielded and directed away from suitable roosting habitat.<br>**MM BR-1k:** Blunt-nosed leopard lizard<br>Adverse effects on blunt-nosed leopard lizard must be mitigated through avoidance given that the species is California fully protected, and authorization of “take” is not allowed. As such, adverse effects on blunt-nosed leopard lizards will be mitigated as follows:<br>• A final clearance survey will be conducted to ensure that no blunt-nosed leopard lizards are present and no burrows have become established within the project site and a 50-foot avoidance buffer.<br>• All burrows suitable for potential use by blunt-nosed leopard lizard will be avoided by project activities.<br>• If suitable burrows that may serve as potential refugia for blunt-nosed leopard lizard cannot be avoided within the project site and a minimum 50-foot avoidance buffer cannot be maintained, then additional surveys to detect the species will be completed in accordance with the CDFG’s *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard* (2004).<br>• If no individual blunt-nosed leopard lizards are observed and no burrows are identified within the project site and a 50-foot avoidance buffer during the final clearance survey, then project activities may proceed.<br>• When possible, conduct project activities when lizards are inactive (generally when temperatures are below 77°F or above 95°F). |

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| | | • All vehicle operators will check under vehicles and equipment prior to operation, or if left idle.<br>• If a blunt-nosed leopard lizard is observed during project preconstruction or clearance surveys, USFWS and CDFW will be notified for further guidance.<br>**MM BR-1l:** Valley elderberry longhorn beetle<br>Adverse effects on valley elderberry longhorn beetle will be mitigated consistent with the USFWS's *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (*Desmocerus californicus dimorphus*) (2017). Mitigation measures in the framework include the following:<br>• Avoidance and minimization measures<br>• Transplanting of elderberries<br>• Monitoring<br>• Compensatory mitigation measures<br>Specific detail and guidance in the implementation of the above mitigation measures is outlined in the USFWS's *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (*Desmocerus californicus dimorphus*) (2017).<br>**MM BR-1m:** Sanford's arrowhead and other special-status plant species<br>Adverse effects on Sanford's arrowhead will be mitigated as follows:<br>• No less than 25 percent of the potentially affected plugs (1 foot by 1 foot by 1 foot), with no fewer than three individual Sanford's arrowhead plants per plug will be transplanted to an unlined portion of the occupied canal(s) located immediately downstream from the project boundaries. The plug source locations shall be selected randomly to assure the greatest potential genetic diversity of the plants.<br>• The transplantation program shall not be bound by any survivorship monitoring standards given that it is expected that some of the source population will be unaffected by the project. However, the applicant will monitor the transplanted Sanford's arrowhead to evaluate the efficacy of such transplantation as it relates to future mitigation efforts for this species.<br>• Monitoring shall occur for 3 consecutive years after transplantation and a final report submitted to CDFW by October of the final year of monitoring.<br>Adverse effects on other special-status plants will be mitigated as follows:<br>• Mitigation will be consistent with the *Policy on Mitigation Guidelines Regarding Impacts to Rare, Threatened, and Endangered Plants* and will be accomplished through conference and coordination with CNPS. CNPS endorses the following measures:<br>– Avoiding the impact altogether by not taking a certain action<br>– Minimizing the impact by limiting the degree or magnitude of the action<br>– Rectifying the impact by repairing, rehabilitating, or restoring the affected environment |

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| | | – Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the project<br>– Compensating for the impact by replacing or providing substitute resources or environments elsewhere<br>Note that multiple measures may be necessary to effectively mitigate adverse effects to a given plant species but will always be at the discretion of MID as long as the effects can be reasonably expected to avoid, minimize, or compensate for the anticipated effects. |
| **Impact BR-2:** *Have a substantial adverse effect on State or federally protected wetlands (including but not limited to marsh, vernal pool, and coastal), riparian habitat, essential fish habitat (EFH), or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW and USFWS through direct removal, filling, hydrological interruption, or other means.* | LTS with mitigation | **MM BR-1f:** Vernal pool invertebrates<br>Adverse effects on federally listed and other special-status vernal pool invertebrates will be mitigated through formal consultation with USFWS, with the likely consulting federal agency being USACE. In the event of no federal nexus, the District will coordinate directly with USFWS through Section 10 of the FESA. The USACE's guidelines for formal consultation and mitigation approach include the following (this approach will also be followed as appropriate as part of potential direct coordination with USFWS through the federal Section 10 process):<br>• The precise location of the project site clearly delineated on either an original or high-quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1 in. = 24,000 in.). The map should include: quad name(s); county name; project name; type of project by category (development or other [specify]); and townships(s), ranges(s), section(s) in which the project is located.<br>• Detailed map(s) of proposed project site. The map should include: potential habitat of listed vernal pool plants and invertebrates (i.e., vernal pools, swales, and other areas that pond water in winter-spring) onsite and on adjacent property where vernal pool complexes cross property boundary; other special-status species locations/habitats; location(s) of any proposed onsite reserves; location(s) of all proposed project features (buildings, roads, parking lots, bike trails, hiking paths, fences, irrigated and non-native landscaped areas, detention basins, recreation fields, parks, and any other open spaces, etc.; location(s) of existing infrastructure within proposed reserves such as power lines, easements, pipelines or any other underground structures for which access and maintenance privileges exist; spatial buffers between the project features and avoided vernal pool resources; and watershed boundaries of wetlands, both avoided and affected to assist in evaluation of indirect effects.<br>• Area (in acres) directly and indirectly affected by the proposed project, including: total area of the project; estimated area of listed vernal pool species habitat filled/destroyed, including effects of interrelated and interdependent actions; estimated area of habitat of listed vernal pool invertebrates indirectly affected, estimated size of buffer between the project features and adjacent avoided or preserved area(s); land use of properties adjacent to both affected area(s) |

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| | | and avoided or preserved area(s); and map or discussion describing hydrological relationships of both affected and avoided wetlands with adjacent properties.<br>• Any conservation plan and/or conservation measures that the applicant proposes. To expedite consultation, such plans and measures should be developed during the informal consultation process with USFWS, prior to initiation of formal consultation and should include the following: specific provisions for endowments for future management, maintenance, and ownership of any vernal pool reserves included in the conservation proposal; specific locations and construction methods for any compensatory wetlands, and monitoring protocols, success criteria, and remediation protocols for any compensatory wetlands.<br>• A survey is required for any listed vernal pool plants if the proposed project is within the range of such species. If presence of listed invertebrates is not assumed and the proposed project occurs in an area where USFWS does not assume presence of listed invertebrates in the watershed, protocol surveys are necessary.<br>• In coordination with the requirements of any formal consultation regarding federally listed vernal pool invertebrates, MID will implement measures consistent with the formal consultation and Draft Vernal Pool Mitigation and Monitoring Guidelines for U.S. Army Corps of Engineers South Pacific Division (2016) for compensatory mitigation projects involving vernal pool habitats as required for processing of Department of the Army permits under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act.<br>**MM BR-2:** Freshwater marsh and other aquatic habitats<br>The following shall be implemented to mitigate for anticipated impacts on freshwater marsh and aquatic habitats (including vernal pools) that may be affected by the Proposed Program:<br>**Avoid and Minimize Impacts on Freshwater Marsh and Aquatic Habitats**. Prior to Program implementation, an aquatic resource (wetland) delineation will be conducted to demarcate the boundaries of aquatic resources, including wetlands, and other regulated habitats in the Program Area. The delineation results will inform the final design such that all regulated habitats will be avoided to the extent feasible while still meeting engineering criteria for the Proposed Program.<br>**Reduce Indirect Wetland Impacts**. Best management practices associated with the Program's stormwater pollution prevention plan shall be implemented to reduce potential for indirect impact on freshwater wetland and aquatic habitats.<br>**Revegetate Upslope Areas**. Disturbed soils upslope of freshwater wetlands and aquatic habitats (e.g., levee slopes and other disturbed areas) will be revegetated to minimize the transport of eroded soils into downslope wetlands. Revegetation work will comply with protocols described in the Program's stormwater pollution prevention plan. |

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| | | **Compensatory Mitigation**. Implementation of the Proposed Program could result in the temporary and permanent loss of wetland habitat (including vernal pools). The Section 404 permitting process will determine the appropriate compensatory habitat mitigation (a minimum of 1:1 replacement), as necessary. Compensatory mitigation could include, but is not limited to, the following:<br>• The purchase of credits at an approved mitigation bank for mitigation proposed for impacts on vernal pools at an approved mitigation bank that services the impact area. Mitigation credits may also be used to satisfy mitigation requirements for other resources, such as those associated with special-status amphibians.<br>• Where permanent freshwater wetland impacts cannot be avoided and mitigation banks are not considered a viable options, freshwater wetlands will be mitigated onsite with wetland enhancement and restoration and/or creation at a minimum ratio of 1:1 that will ensure no net loss of habitat functions and values. Restored and/or created wetlands would become fully functional in a period of 2 to 3 years from completed restoration/creation. For onsite mitigation to occur, the Program will create a wetland mitigation and monitoring plan prior to construction. The mitigation and monitoring plan will be prepared in accordance with the 2008 Mitigation Rule and 2015 Regional Compensatory Mitigation and Monitoring Guidelines (or current USACE and Central Valley Regional Water Quality Control Board guidelines) for compliance with Clean Water Act Sections 404 and 401 and will establish required replacement ratios, success criteria, and monitoring protocols. |
| **Impact BR-3:** *Substantially interfere with the movement of any native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites.* | LTS | None required. |
| **Impact BR-4:** *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or 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 | None required. |
| **3.5 Cultural, Paleontological, and Tribal Cultural Resources** | | |
| **Impacts CUL-1, CUL-2, and CUL-4:** *Substantial adverse change in the significance of a historical resource, archaeological resource, tribal cultural resources, or disturb human remains.* | LTS with mitigation | **MM CUL-1:** Conduct cultural resources inventory<br>The Proposed Program could cause an adverse effect on cultural resources as defined in CEQA Guidelines Section 15064.5. During the planning and design phase for capital improvements and prior to ground-disturbing activities, MID will appoint a qualified CRS to conduct an inventory of the project locations of a particular facility or group of facilities and make evaluations for cultural |

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| | | resources. The archaeological and architectural resources surveys will consist of intensive pedestrian surveys to assess impacts on cultural resources as necessary. The surveys will be completed in areas where ground disturbance would occur within previously undisturbed areas or in areas that have not been adequately surveyed within the past 5 years. The CRS will meet the U.S. Secretary of the Interior's Professional Qualifications Standards, as published in 36 CFR 61.<br>Potential impacts will be assessed prior to any project construction taking place, in accordance with CEQA regulations.<br>**MM CUL-2:** Monitoring Plan<br>A qualified CRS will complete a construction monitoring program to be implemented according to recommendations. Monitoring and mitigation comprise a number of required activities that may prescribe measures to ensure avoidance of resources, or compensate for the loss of significant cultural resources due to unavoidable impacts resulting from the exigencies of a project's construction. The objectives of monitoring are to protect extant historical resources and unique archaeological resources, to identify at the time of discovery any archaeological materials exposed during ground disturbance, and to protect such resources from damage until recommendations of eligibility for the CRHR can be made. |
| **Impact CUL-3:** *Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.* | LTS with mitigation | **MM CUL-3:** Conduct cultural resources awareness training<br>A qualified CRS will prepare the cultural resources portion of the Worker Environmental Awareness Program; worker environmental awareness training will be required for all personnel before working at proposed construction sites. The training will emphasize and educate workers regarding sensitivity for cultural resources on the site and procedures should cultural resources be encountered.<br>**MM CUL-4:** Protect resources upon discovery<br>If cultural resources are discovered during ground-disturbing activities, construction and maintenance work near the discovery would cease, and the area would be protected by a 50-foot buffer until the find could be evaluated by a qualified archaeologist. Mitigation measures recommended by the archaeologist will be implemented; cultural resource mitigation measures will be consistent with guidance and standards in Section 15126.4 of the CEQA Guidelines.<br>**MM CUL-5:** Protect human remains upon discovery<br>If human remains are discovered, the discovery would be treated in accordance with the requirements of Section 750.5(b) of the California Health and Safety Code. Pursuant to Section 7050.5(c) of the California Health and Safety Code, if the coroner determines that the human remains are of Native American origin, Merced County would ensure that the discovery is treated in accordance with the provisions of PRC Section 5097.98(a)–(d). |

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| | | **MM CUL-6:** Conduct paleontological resources awareness training<br>Prior to working at the site, all personnel involved in earthmoving activities will receive Paleontological Resources Awareness Training. Workers will be informed that fossils of scientific importance may be encountered during deeper excavations and must be reported immediately if encountered. The training will provide information about the appearance of fossils, their scientific importance, and proper notification procedures. This training will also give specific information on potentially high-sensitivity sediments within the formations that may be encountered.<br>**MM CUL-7:** Paleontological Resources Monitoring and Mitigation Plan<br>Prior to construction, a Paleontological Resources Monitoring and Mitigation Plan will be drafted as necessary. This plan will identify the need for monitoring of construction-related excavations in areas underlain by geologic units of moderate, high, or unknown paleontological sensitivity. This report will also identify a Paleontological Resources Specialist to lead the monitoring and mitigation activities, and Paleontological Resources Monitors as necessary to conduct the monitoring and mitigation. |
| **3.6 Geology and Soils** | | |
| **Impact GEO-1:** *Seismic-related ground failure, including liquefaction that would directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death.* | LTS | None required. |
| **Impact GEO-2:** *Substantial soil erosion or loss of topsoil.* | LTS | None required. |
| **Impact GEO-3:** *Unstable geologic unit, or would become unstable as a result of the Proposed Program, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.* | LTS | None required. |
| **Impact GEO-4**: *Substantial direct or indirect risks to life or property from expansive soil.* | LTS | None required. |
| **3.7 Greenhouse Gases** | | |
| **Impact GHG-1:** *Generate GHG emissions, either directly or indirectly, that may have a significant impact on environment.* | LTS | None required. |
| **Impact GHG-2:** *Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.* | LTS | None required. |

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| **3.8 Groundwater Resources** | | |
| **Impact GW-1:** *Violate any water quality standards or waste discharge requirements or otherwise substantially degrade groundwater quality.* | LTS | Not required. |
| **Impact GW-2:** *Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Proposed Program may impede sustainable groundwater management of the basin.* | LTS | None required. |
| **Impact GW-3:** *Conflict with or obstruct implementation of a sustainable groundwater management plan.* | LTS | Not required. |
| **3.9 Hydrology and Water Quality** | | |
| **Impact SW-1:** *Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality.* | LTS | None required. |
| **Impact SW-2:** *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 offsite.* | LTS | None required. |
| **Impact SW-3:** *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 substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or offsite.* | LTS | None required. |
| **Impact SW-4:** *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 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 | None required. |

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| **Impact SW-5:** *In a flood hazard zone, risk release of pollutants due to project inundation.* | LTS | None required. |
| **Impact SW-6:** *Conflict with or obstruct implementation of a water quality control plan*. | LTS | None required. |
| **3.10 Noise** | | |
| **Impact NOI-1:** *Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Proposed Program in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.* | LTS | None required. |
| **Impact NOI-2:** *Generation of excessive groundborne vibration or groundborne noise levels.* | LTS | None required. |
| **Impact NOI-3:** *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the Program Area to excessive noise levels.* | LTS | None required. |
| **3.11 Public Services and Utilities** | | |
| **Impact Pub-1:** *A substantial adverse physical impact associated with the provision of new or physically altered governmental facilities or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection, police protection, schools, parks, and/or other public facilities.* | LTS | None required. |
| **Impact Pub-2:** *Require or result in the relocation or construction of new or expanded water, wastewater treatment, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.* | LTS | None required. |

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|
| **Impact Pub-3:** *Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.* | LTS | None required. |
| **Impact Pub-4:** *Have sufficient water supplies available to serve the Proposed Program and reasonably foreseeable future development during normal, dry, and multiple dry years.* | LTS | None required. |
| **Impact Pub-5:** *Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.* | LTS | None required. |
| **Impact Pub-6:** *Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.* | LTS | None required. |
| **Impact Pub-7:** *Comply with federal, State, and local management and reduction statutes and regulations related to solid waste.* | LTS | None required. |
| **3.12 Transportation and Traffic** | | |
| **Impact TT-1:** *Conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.* | LTS | None required. |
| **Impact TT-2:** *Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).* | LTS | None required. |
| **Impact TT-3:** *Result in inadequate emergency access.* | LTS | None required. |
| **Impact TT-4:** *Result in a roadway operating at an acceptable LOS (LOS C for rural areas and LOS D for urban areas [Policy CIR-1.5]) to deteriorate to an unacceptable LOS (e.g., LOS D, E, or F in rural areas and LOS E or F in urban areas).* | LTS | None required. |

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| PEIR Section and Impact | Level of Significance | Mitigation Measures |
|---|---|---|

Notes:

°F = degrees Fahrenheit
CCR = California Code of Regulations
CDFW = California Department of Fish and Wildlife
CESA = California Endangered Species Act
CFR = Code of Federal Regulations
CNDDB = California Natural Diversity Database
CNPS = California Native Plant Society
CRHR = California Register of Historic Resources
CRS = Cultural Resources Specialist
CTS = California tiger salamander
FESA = federal Endangered Species Act
GHG = greenhouse gas
LOS = level of service
LTS = less than significant impact
MM = Mitigation Measure
MKR = Merced kangaroo rat
NMFS = National Marine Fisheries Service
$NO_x$ = oxides of nitrogen
$PM_{10}$ = particulate matter less than 10 micrometers in aerodynamic diameter
PRC = Public Resources Code
PVC = polyvinyl chloride
SJPM = San Joaquin pocket mouse
SJVAPCD = San Joaquin Valley Air Pollution Control District
USACE = U.S. Army Corps of Engineers
USFWS = U.S. Fish and Wildlife Service

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# Acronyms and Abbreviations

| | |
|---|---|
| °F | Fahrenheit |
| µg/m$^3$ | micrograms per cubic meter |
| AB | Assembly Bill |
| AB 52 | Assembly Bill 52 |
| ADT | average daily trip |
| AF | acre-feet |
| AFY | acre-feet per year |
| ARB | California Air Resources Board |
| AWMC | Agricultural Water Management Council |
| bgs | below ground surface |
| BMP | best management practice |
| Board | Board of Directors |
| BP | before present |
| BPS | Best Performance Standards |
| C2VSim-FG | California Central Valley Groundwater-Surface Water Simulation Model Fine Grid |
| CAA | Clean Water Act |
| CAAQS | California Ambient Air Quality Standards |
| Cal/OSHA | California OSHA |
| CalEEMod | California Emission Estimator Model |
| Caltrans | California Department of Transportation |
| CAP | Climate Action Plan |
| CCIC | Central California Information Center |
| CCR | *California Code of Regulations* |
| CCV | California Central Valley |
| CDFW | California Department of Fish and Wildlife |
| CEQA | California Environmental Quality Act |
| CESA | California Endangered Species Act |
| CFR | *Code of Federal Regulations* |
| cfs | cubic feet per second |
| CHRIS | California Historical Resource Information System |
| CIP | Capital Improvement Plan |
| CNDDB | California Natural Diversity Database |
| CNEL | Community Noise Equivalent Level |

| | |
|---|---|
| CNPS | California Native Plant Society |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalent |
| County | Merced County |
| CRHR | California Register of Historic Resources |
| CRS | Cultural Resources Specialist |
| CTS | California tiger salamander |
| CVP | Central Valley Water Project |
| CWA | Clean Water Act |
| CY | cubic yard(s) |
| dB | decibel |
| dBA | decibels on the A-weighted scale |
| District | Merced Irrigation District |
| DPS | distinct population segment |
| DSO | Ditch Service Operator |
| DWR | California Department of Water Resources |
| EEC | Environmental Evaluation Checklist |
| EFH | Essential Fish Habitat |
| EIS | environmental impact statement |
| ENID | El Nido Irrigation District |
| EO | Executive Order |
| EPA | U.S. Environmental Protection Agency |
| FDOT | Florida Department of Transportation |
| FEMA | Federal Emergency Management Agency |
| FERC | Federal Energy Regulatory Commission |
| FESA | federal Endangered Species Act |
| FMMP | Farmland Mapping and Monitoring Program |
| FR | *Federal Register* |
| g | gravity |
| GAMAQI | *Guidance for Assessing and Mitigating Air Quality Impacts* |
| GHG | greenhouse gas |
| gpm | gallons per minute |
| I-5 | Interstate 5 |
| ISR | Indirect Source Review |
| LCW | long-crested weir |

| | |
|---|---|
| $L_{eq}$ | equivalent noise level |
| LOS | level of service |
| LSA | Lateral Service Area |
| MAGPI | Merced Area Groundwater Pool Interests |
| MCAG | Merced County Association of Governments |
| MCC | Merced County Code |
| mg/L | milligram per liter |
| MID | Merced Irrigation District |
| MIRWMP | Merced Integrated Regional Water Management Plan |
| MKR | Merced kangaroo rat |
| MM | mitigation measure |
| MMRP | Mitigation Monitoring and Reporting Plan |
| MOU | Memorandum of Understanding |
| mya | million years ago |
| NAAQS | National Ambient Air Quality Standards |
| NAHC | Native American Heritage Commission |
| NEPA | National Environmental Policy Act |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| NHPA | National Historic Preservation Act |
| NHTSA | National Highway Traffic Safety Administration |
| NMFS | National Marine Fisheries Service |
| $NO_2$ | nitrogen dioxide |
| NOA | naturally occurring asbestos |
| NOP | Notice of Preparation |
| $NO_x$ | oxides of nitrogen |
| NRHP | National Register of Historic Places |
| OPR | Governor's Office of Planning and Research |
| OSHA | U.S. Occupational Safety and Health Administration |
| PEIR | Programmatic Environmental Impact Report |
| PG&E | Pacific Gas and Electric Company |
| $PM_{10}$ | particulate matter less than 10 micrometers in aerodynamic diameter |
| $PM_{2.5}$ | particulate matter less than 2.5 micrometers in aerodynamic diameter |
| ppm | parts per million by volume |
| PRC | California Public Resources Code |
| RCNM User Guide | *Roadway Construction Noise Model User's Guide* |
| ROG | reactive organic gases |

| | |
|---|---|
| RTP | Regional Transportation Plan |
| RWQCB | California Regional Water Quality Control Board |
| SB | Senate Bill |
| SCADA | supervisory control and data acquisition |
| SDSO | Senior Ditch Service Operator |
| SED | Substitute Environmental Document |
| SGMA | Sustainable Groundwater Management Act |
| SIP | State Implementation Plan |
| SJPM | San Joaquin pocket mouse |
| SJR Region | San Joaquin River Hydrologic Region |
| SJVAB | San Joaquin Valley Air Basin |
| SJVAPCD | San Joaquin Valley Air Pollution District |
| $SO_2$ | sulfur dioxide |
| SOI | sphere of influence |
| SR | State Route |
| SWP | State Water Project |
| SWPPP | stormwater pollution prevention plan |
| SWRCB | State Water Resources Control Board |
| TAC | toxic air contaminants |
| TDS | total dissolved solids |
| U.S. | United States |
| USACE | U.S. Army Corps of Engineers |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| VdB | vibration decibels |
| VFD | variable-frequency drive |
| VMT | vehicle miles traveled |
| vpd | vehicles per day |
| WBM | Water Balance Model |
| WMP | Water Management Plan |
| WRMP | Water Resources Management Plan |
| YARTS | Yosemite Area Regional Transportation Service |

SECTION 1

# Introduction

Merced Irrigation District (MID or the District) has developed and is proposing to implement a Water Resources Management Plan (WRMP, Proposed Program, or Program) that includes financial, policy, and infrastructure recommendations. MID published the WRMP Summary Report and technical appendixes in February 2019. As part of the process to develop the WRMP, MID evaluated five alternatives that incorporated specific elements including system improvements, water user classification modifications, annexations, water transfers, and water rates. Through this evaluation, MID identified the Balanced Approach Alternative as the preferred approach for the District. To support the implementation of the Balanced Approach Alternative, MID has prepared this Programmatic Environmental Impact Report (PEIR) to disclose the potential environmental impacts associated with implementation of the WRMP. The Balanced Approach Alternative is referred to as the "Proposed Program" in this PEIR.

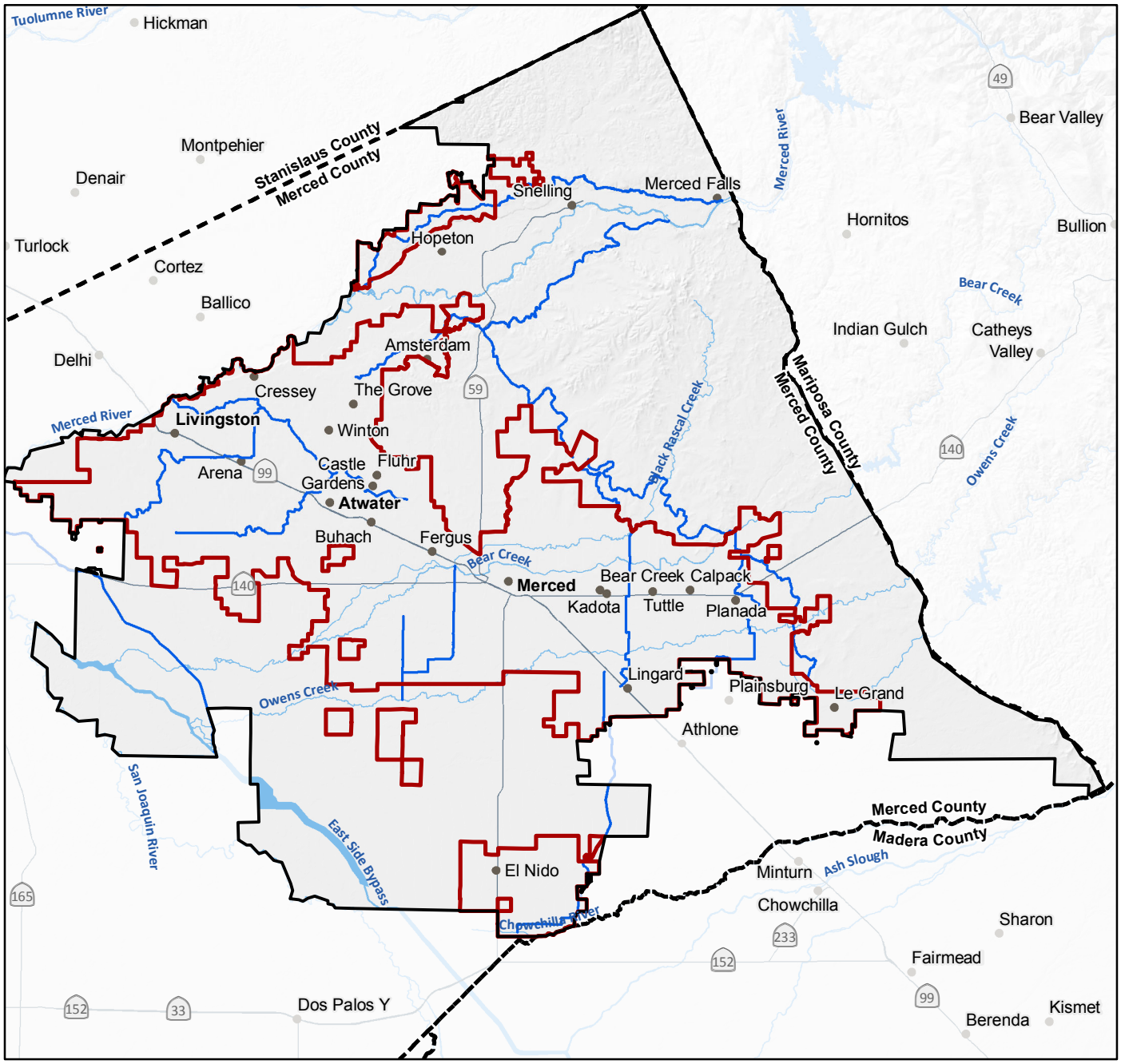
This introduction defines the Program Area, provides background on the history of the District, describes the current MID system, summarizes the development of the WRMP and Proposed Program, defines terminology used in this PEIR, describes the purpose and use of this PEIR, establishes the program objectives, and introduces other regulatory requirements associated with implementation of the Proposed Program. MID intends to use this PEIR as the basis for California Environmental Quality Act (CEQA) compliance for future actions associated with implementation of the Proposed Program, including subsequent project-specific environmental review, as necessary.

## 1.1 Background

MID is located in eastern Merced County in the northeastern corner of the San Joaquin Valley (Figure 1-1). The MID service area consists of approximately 166,000 acres and encompasses the cities of Merced, Atwater, and Livingston. The Program Area includes the MID service area and areas outside of the MID service area where capital improvements are planned as part of the Proposed Program.

MID was established in 1919 and soon thereafter purchased an irrigation system and water rights as well as site selection for what would become Exchequer Dam. The dam was completed in 1926 and formed Lake McClure. From 1964 to 1967, MID constructed the Merced River Project, which includes New Exchequer Dam and Lake McClure, McSwain Dam and Reservoir, two powerhouses, and five recreation areas. In 2004, MID and the former El Nido Irrigation District (ENID) were consolidated under an agreement that provided landowners within the 10,500-acre ENID service area boundary with 50 percent of the water supply allocation of MID landowners (on a per-acre basis). These new MID customers were designated Class II users to distinguish them from Class I users (original MID customers). As a result of the consolidation, MID assumed all assets and liabilities of ENID, including its water rights.

Currently, the District maintains over 850 miles of canals, laterals, drains, pipelines, natural streams, sloughs, tunnels, and 215 active groundwater wells to serve local customers (Figure 1-2). In an average year, MID provides irrigation water to over 100,000 acres of land. An additional 33,400 acres of irrigation lands within the MID service area are entitled to District water but are either served by private groundwater wells, in transition from agricultural production to urban development or are fallow. Irrigable lands within MID pay a standby fee and retain the right to request MID water deliveries throughout the irrigation season, whether they have used MID water in the past or not. When combined, this equates to a total MID customer base of approximately 133,500 acres.




LEGEND

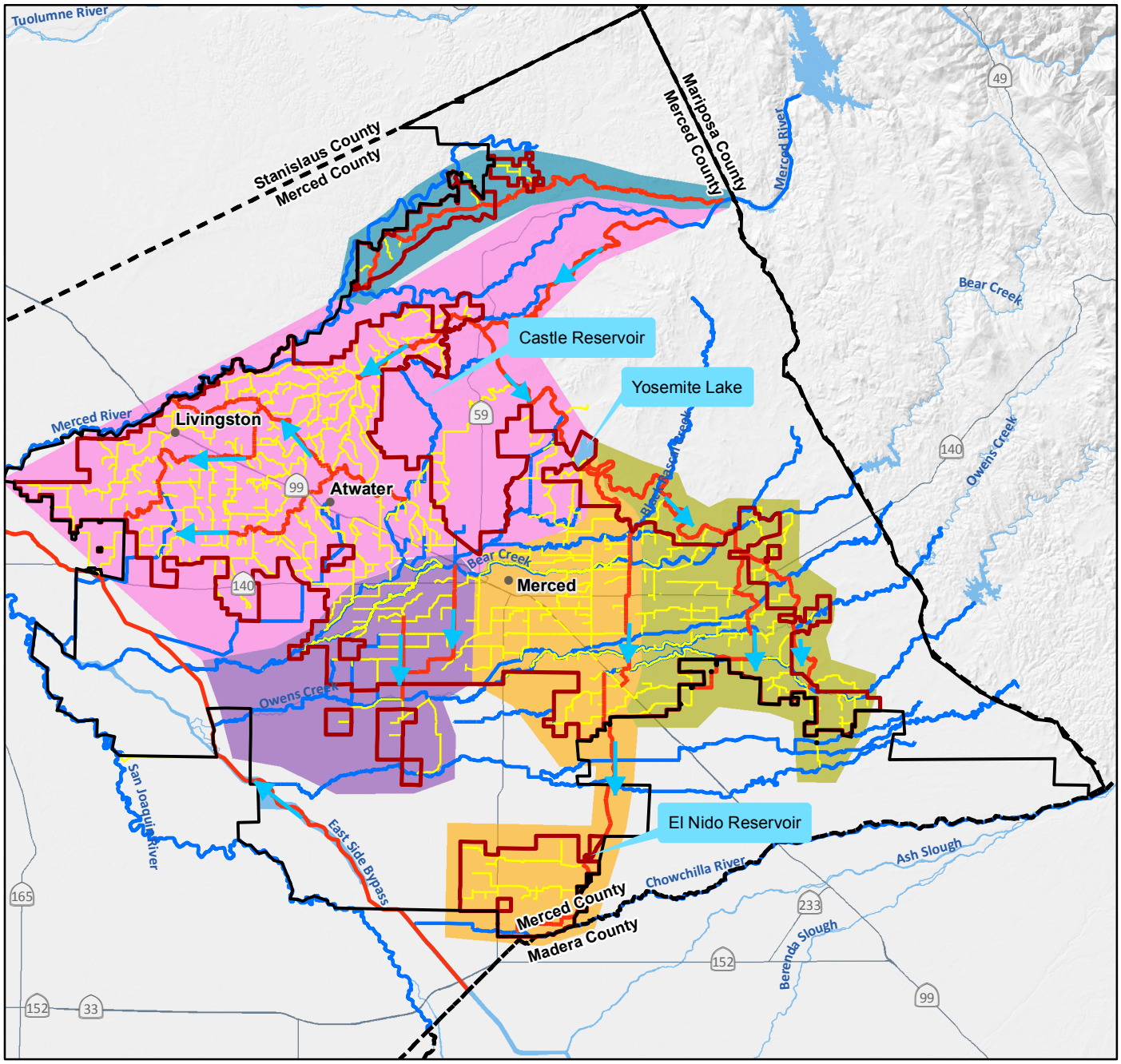
- MID Program Area
- MID Service Area
- County
- Canal
- Natural Drainages
- Major River

VICINITY MAP


N

0 2.5 5
Miles

**FIGURE 1-1 PROGRAM AREA AND MID SERVICE AREA**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA




LEGEND

- MID Program Area
- MID Service Area
- County
- El Capitan, Deane Canal, & West Bear Creek System
- El Nido & Fairfield Canal System
- Le Grand & Planada Canal System
- Livingston & Escaladian Canal System
- Northside Canal System
- Canal
- Rivers, Creeks, and Drains
- Lateral
- Major River
- Flow Direction

VICINITY MAP


N

0 2.5 5
Miles

**FIGURE 1-2 MID WATER DISTRIBUTION SYSTEM**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

ch2m

\\SACFPP01\PROJ\MERCEDIRRIGATIONDIST\481767MERCEDID\PEIR\GIS\MAPFILES\PEIR_PD_FIGURES\MID_WATERDISTSYSTEM_20180821.MXD ED035443 8/27/2018 12:08:24 PM

MID manages surface water and groundwater conjunctively to meet customer demands. Surface water from the Merced River provides MID's primary water supply. MID maintains its various pre- and post-1914 water rights, allowing MID to provide high-quality surface water to its customers, conjunctively manage its groundwater resources, and at times augment the supply of other water and irrigation districts, refuges, and irrigated lands. Conjunctively managed groundwater also serves an important role as a secondary supply to meet customer demands in dry years.

### 1.1.1 Water Resources Management Plan

The increasing complexity of water issues, both locally and at the State and federal level, led MID to re-evaluate current practices and priorities to ensure protection of the District's future water supplies and its ability to meet its customers' water needs while remaining financially sound, over time. The District initiated a comprehensive evaluation of the District's water resources, on-farm practices, land use trends, water supply system, current and future water supply availability and reliability, and financial position. The evaluation showed how future changes are likely to affect water supply and demand during the next 3 decades.

As part of the development of the WRMP, the MID Board of Directors (Board) identified the following six goals that reflect the District's long-term priorities and will help guide decision making by the Board and MID staff over the next 30 years:

1. Protect and maximize MID's water rights
2. Support continued financial stability of MID
3. Provide a reliable and affordable water supply to MID customers
4. Provide continued focus on MID customer service
5. Promote sustainable management of groundwater resources
6. Support the agricultural economic base of the region

Several internal and external drivers were considered in meeting these goals. Internal drivers included land and water use trends, infrastructure needs, and District finances. External drivers were future water supply reliability and legislative actions. Some of the key internal and external drivers for MID embarking on the development of this WRMP are summarized in Table 1-1. The WRMP provides specific, prioritized recommendations for MID facility improvements, as well as more general recommendations, all of which are addressed in this PEIR.

During development of the WRMP, initial assessments of the current and future conditions affecting MID were conducted, including significant public outreach and involvement. In-depth technical assessments of the District's surface water and groundwater resources, on farm practices, land use trends, water supply system, current and future water supply availability and reliability, and financial position were completed to provide necessary technical detail and analysis and guide the development of the WRMP. These studies also considered the regulatory drivers in the region and policy issues of the District (Table 1-1). The information obtained from these studies was used to develop and project current and future water use within the District. To facilitate this analysis, a systemwide operational water balance model (WBM) was developed to simulate the primary water components of MID's overall system. Information derived from the WBM was used to develop alternatives to address changes in land use, regulatory changes, available resources, and customer-driven issues and concerns. The culmination of this effort was the WRMP, which was completed in 2018. Through the WRMP process, the District identified their overall Proposed Program and initiated the development of this PEIR to support its implementation. The Proposed Program is presented in Section 2, Program Description and Alternatives, of this PEIR.

Table 1-1. Internal and External Drivers for the WRMP

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Internal Drivers | External Drivers |
|---|---|
| To best serve its customers today and in the future, MID must address changing water use, infrastructure needs, and significant financial uncertainty.<br>**Future Land and Water Use Trends**<br>• Urban growth is expected to reduce the irrigated agricultural acreage within MID, resulting in increased demand for regional groundwater for urban use and reduced demand for surface water for agricultural use.<br>• Permanent crop acreage is expected to increase, resulting in hardened water demand.<br>• The prevalence of drip- or micro-irrigation methods is expected to increase, resulting in higher on-farm water use efficiency. At the same time, this reduces the amount of surface water available to recharge groundwater supplies through on-farm deep percolation.<br>**Infrastructure Needs**<br>• To improve the reliability of critical infrastructure, capital improvements are needed. The proper functioning of critical infrastructure is a prerequisite for District water deliveries to its customers.<br>• To improve system efficiency and customer service, regulating reservoirs, canal automation, and improved flow measurement and control are needed. These modernization projects will allow the District to better meet the needs of growers, particularly those who transition to permanent crops and prefer drip- or micro-irrigation methods.<br>**Financial Uncertainty**<br>• Droughts may result in reduced revenue from hydropower and water sales. Uncertain and variable water supply availability makes financial planning difficult.<br>• Over time, the District has been able to save money by deferring capital improvements and modernization projects. However, to maintain regular water deliveries and meet changing customer service expectations in the future, MID's infrastructure needs must be addressed. | In an era of greater hydrologic variability, including potentially longer periods of water scarcity, there are increasing and diverse demands for water in addition to regular legislative actions that affect District operations and its water supply.<br>**Future Water Supply Reliability**<br>• Changes resulting from the Merced River Hydroelectric Project FEIS (FERC, 2015) are expected to reduce surface water availability and reliability, resulting in more frequent water shortages.<br>• SWRCB and Cal/EPA recently released the Bay-Delta Plan SED, calling for significant increase in flows in the San Joaquin River and its tributaries including the Merced River. Such flow objectives would severely reduce MID's surface water availability and reliability, resulting in more frequent water shortages.<br>**Legislative Actions**<br>• The SGMA, enacted in 2014, requires the formation of a local groundwater sustainability agency and adoption of a locally based sustainable groundwater management plan. MID and its local partners are required to implement the plan to achieve long-term groundwater sustainability in the Merced Groundwater Subbasin.<br>• The Water Conservation Act of 2009 (SB X7-7) requires all water suppliers to increase water use efficiency. MID is required to (1) develop, adopt, and update an agricultural water management plan; (2) provide for the measurement of water delivered to customers (by volume); (3) adopt a pricing structure for water based, at least in part, on quantity delivered; and (4) implement additional efficient management practices. |

Source: CH2M HILL, 2019.

Notes:

Bay-Delta Plan SED = *Draft Revised Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the Bay-Delta: San Joaquin River Flows and Southern Delta Water Quality* (SWRCB and Cal/EPA, 2016)

Merced River Hydroelectric Project FEIS = *Final Environmental Impact Statement for Hydropower Licenses, Merced River Hydroelectric Project—FERC Project No. 2179-043, Merced Falls Hydroelectric Project—FERC Project No. 2467-020 California*

SB = Senate Bill

SGMA = Sustainable Groundwater Management Act

SWRCB = State Water Resources Control Board

### 1.1.2 Program Summary and Implementation

This PEIR evaluates potential impacts associated with implementation of the Proposed Program. The overarching objective of the WRMP was to identify the key challenges and issues facing the District and to develop a comprehensive plan to protect the District's water supplies into the future while remaining financially sound over time. The WRMP evaluated the District's water resources, on-farm practices, land use trends, water supply system and infrastructure, current and future water supply availability and reliability, and financial position while accounting for regional regulatory drivers and District policy issues. MID considered various options related to District policies, improvements to infrastructure, and financial management strategies to achieve the WRMP goals.

Preparation and implementation of the WRMP incorporated a phased approach (including the preparation of this PEIR) as described below.

**Phase 1** consisted of an initial assessment that included stakeholder outreach and technical information gathering. During Phase 1, the Board, with key stakeholder opinion, developed and endorsed six goals to guide the planning effort (listed in Subsection 1.1.1). These goals reflect generally the District's long-term priorities and will help guide decision making by the Board and MID staff over the next 30 years.

**Phase 2** included continued stakeholder engagement, preparation of technical studies that supported the evaluation of project alternatives, and concluded with WRMP development and a broad agreement on a preferred alternative. The preferred alternative reflects a balanced approach for management of MID water resources.

The WRMP Summary Report and technical appendices summarize the work completed during Phases 1 and 2 and provide recommendations for future management of the District's water resources, organizational management, and finances (CH2M HILL, 2019).

**Phase 3** addresses compliance with CEQA, including completion of this PEIR document to support implementation of the WRMP. Depending on the particular project or action, subsequent supplemental environmental documentation will be developed as necessary, and tiered from this PEIR. Some actions (such as out-of-basin water transfers) are anticipated to potentially require additional CEQA analysis once buyer-specific place of use and conveyance facilities are identified.

Future phases would include financial and implementation planning, engineering, design, and construction.

## 1.2 Terminology Used within this Document

Several terms are unique to the WRMP and this document. Terms that are specific to this PEIR are defined as follows:

**Action(s) and project(s)** – The Proposed Program includes a variety of proposed activities. Proposed capital improvements are referred to as "projects" under the Proposed Program. Proposed activities that are not capital improvement projects are referred to as "actions." For example, proposed water transfers are considered "actions."

**Elements** – To develop the WRMP, projects or actions within five program elements were considered: *system improvements, Class II to Class I conversion, annexations, water transfers, and water rates*. The elements are described in Section 2, Program Description and Alternatives.

**Project categories** – For the purposes of this PEIR, proposed projects have been grouped into categories on the basis of anticipated similarity of impacts, including likely ground disturbance. The categories are described in Section 2, Program Description and Alternatives.

**Project components** – In the WRMP, proposed capital improvement projects are grouped into four primary components: *critical, modernization, conjunctive water use management, and general maintenance* and are organized by canal subsystems. The components are described in Section 2, Program Description and Alternatives. This term is not used in sections subsequent to Section 2.

**Program Area** – The Program Area is the MID service area and areas where capital improvements are proposed (Figure 1-1).

**Proposed Program** – The Proposed Program is the Balanced Approach Alternative as described in the WRMP and Section 2, Program Description and Alternatives.

**Study Area** – The Study Area is the area that was considered in the impact analyses under each environmental resource area. The Study Area for each environmental resource area varies as applicable and is defined and described in the introduction to each subsection in Section 3, Environmental Setting, Impacts, and Mitigation.

## 1.3 Purpose and Use of this Programmatic Environmental Impact Report

MID determined the preparation of a PEIR was the most appropriate approach to addressing potential impacts resulting from implementation of the Proposed Program. This determination was based on the nature of the Proposed Program, which includes numerous projects and actions, several of which are closely related but not necessarily fully defined. As indicated in the CEQA Guidelines (Section 15168(a)), an agency should prepare a PEIR rather than a project-level EIR when a number of related actions are proposed and are as follows:

- Linked geographically
- Logical parts in the chain of contemplated actions
- In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program
- 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

This document identifies proposed projects/actions that are well-defined (and, therefore, evaluated at a "project level") as well as other projects/actions that require further definition to fully evaluate. Such less-defined projects/actions are described and assessed at a broad, programmatic level of analysis and are anticipated to require subsequent environmental documentation, as necessary.

The intended use of this PEIR is to (1) provide full compliance with CEQA requirements for the well-defined portions of the Proposed Program and (2) to serve as a first-tier document for future implementation of the less-defined portions of the Proposed Program. Implementation of the Proposed Program would occur in several phases over an approximate 30-year period. It is uncertain at this time how implementation phasing would occur for all elements of the Proposed Program. However, after this PEIR is certified, the Board would establish policies to guide implementation, as necessary.

During the planning and design phases for future capital improvement projects, the District would evaluate the potential environmental impacts of constructing a particular project, including location of a facility or group of facilities. This evaluation and siting process would be completed to determine if additional environmental documentation is required beyond this PEIR and to potentially screen out locations (where feasible) that would result in the potential for significant impacts. A standardized approach would be used, including completion of a "Site-specific Project/Action Environmental Evaluation Checklist" (EEC; Appendix A) to determine if additional site-specific resource evaluations are

necessary for any given project. This standard approach would determine if additional CEQA analysis is required and would provide a consistent process for identifying potential impacts and implementing mitigation requirements identified in this PEIR as well as other mitigation measures that may be identified in subsequent site-specific environmental documents.

As reflected in the EEC, the less-defined elements of the Proposed Program would be evaluated in light of this PEIR to determine whether additional CEQA review is required as follows (CEQA Guidelines Section 15168(c)):

- If a later activity will have effects that were not examined in this PEIR, a new Initial Study would be prepared leading to either an EIR or a Negative Declaration.
- If the District found that pursuant to Section 15162, no new effects could occur or no new mitigation measures would be required, the District would conclude the activity was within the scope of the projects covered by the PEIR, and no new environmental document would be required.
- The District would incorporate feasible mitigation measures and alternatives developed in the PEIR into subsequent actions in the Program.

If determined necessary through the EEC process, the additional CEQA analysis for future actions would be tiered from this PEIR.

This PEIR discloses relevant information to interested parties and invites such parties to play a role in both the decision-making process and the implementation of that decision. It also provides federal, State, and local decision makers with detailed information concerning any potentially significant environmental impacts associated with the Proposed Program.

## 1.4 Project Objectives/Purpose and Need

CEQA requires an EIR include a statement of project objectives. Similarly, the implementing regulations of the National Environmental Policy Act (NEPA) require an environmental impact statement (EIS) specify the purpose and need of the proposed action to frame the alternative methods of meeting the stated purpose of the action. Although this document is being prepared to satisfy CEQA requirements, MID has developed a purpose and need statement that can be used for subsequent documentation, as necessary, to complete future potential NEPA requirements. The objectives and the purpose and need statements assisted MID in selecting the Proposed Program and determining how best to implement the Proposed Program. MID will act as the lead agency under CEQA.

MID's primary objectives (goals) in implementing its WRMP include the following:

- Protect and maximize MID's water rights
- Ensure that MID remains financially sound
- Provide a reliable and affordable water supply to MID customers
- Continue to focus on MID customer service
- Promote sustainable management of groundwater resources
- Support the agricultural economic base of the region

The purpose of the Proposed Program is to implement the projects and actions identified in MID's WRMP to protect the District's water rights while ensuring the District remains financially sound. Fulfilling these goals allows the District to balance reasonable reliability with more favorable water rates for MID customers and a high level of customer service. This also allows MID to take a proactive role in promoting sustainable management of groundwater resources in the Merced Groundwater Subbasin and, ultimately, supporting the agricultural economic base of the region. These projects and actions, including system improvements and actions necessary to finance such improvements, are proposed to be implemented over time and in phases, in response to customer needs.

The need for the action stems from changing customer water needs and projected future crop shifts, land uses, future water supply reliability (including as a result of the requirements outlined in the 2015 Merced Falls Hydroelectric Project FEIS), infrastructure needs, financial uncertainty, and legislative actions.

# 1.5 Consultation and Coordination

## 1.5.1 Notice of Preparation and Public Scoping

The District issued a CEQA Notice of Preparation (NOP) for this PEIR to the Governor's Office of Planning and Research State Clearinghouse on May 18, 2017 (Appendix B). In accordance with CEQA Guidelines, the NOP was subject to a 30-day comment period ending June 16, 2017. The NOP indicated that impacts on various resource areas such as biological and groundwater resources could occur as a result of implementation of portions of the Proposed Program. Impacts on these resource areas are evaluated in Section 3, Environmental Setting, Impacts, and Mitigation. In addition, the environmental analysis contained in this PEIR is based on comments received on the NOP during the public scoping process (Appendix B), site reconnaissance visits, bimonthly Board meetings, and available technical information. Technical reports and authorities consulted are listed in Section 7, References.

MID also held a public scoping meeting on May 25, 2017, to facilitate public and agency comments. The scoping process was designed to solicit input from the public; federal, State, and local agencies; and other interested parties on the scope of issues that should be addressed in this PEIR. During the meeting, a presentation on the WRMP and Proposed Program was provided. In addition, technical staff were present to answer questions pertaining to the WRMP, Proposed Program, and the overall CEQA process. Appendix B to this PEIR summarizes comments received during the comment period and at the scoping meeting.

Board meetings occur at least once a month, and are an additional avenue for public input. During these meetings, the public is invited to provide comments pertaining to ongoing MID activities. Updates on the environmental documentation and key implementation issues were presented and discussed during Board meetings conducted during the preparation of this PEIR.

## 1.5.2 Circulation of this Programmatic Environmental Impact Report

This Draft PEIR will be circulated for a 45-day public comment and review period. Public comments on the Draft PEIR will be incorporated into a Final PEIR. MID will then consider whether to certify the Final PEIR. After MID certifies the document, MID will adopt findings of fact and a mitigation monitoring and reporting program. If the Final PEIR identifies significant and unavoidable impacts, the Board will need to issue a statement of overriding concerns outlining the reasons for proceeding given the identified impacts.

MID is releasing this Draft PEIR for the 45-day public comment and review period beginning March 10, 2020. After the review period has closed, MID will prepare written responses to substantive environmental issues raised in public comments. To be considered, public comments must be received at MID's main office by 5:00 p.m. on April 23, 2020. Comments should be sent to the following:

Mr. Bryan Kelly, Deputy General Manager
Merced Irrigation District
744 W. 20th Street
Merced, CA 95340

MID will also accept comments on the Draft PEIR at their regularly scheduled monthly Board meetings. The Board meetings are scheduled for the first Tuesday of each month. Board meetings may be held on

the third Tuesday of each month on an as-needed basis. The meeting(s) are typically held at the following location, unless otherwise posted:

Merced Civic Center
678 West 18th Street
Merced, CA 95340

### 1.5.3 Areas of Potential Controversy

MID has identified the following areas of potential controversy with respect to the Proposed Program:

- Potential impacts associated with water transfers
- Potential impacts/benefits related to groundwater
- Potential impacts on waters of the United States including vernal pools
- Potential impacts on threatened, endangered, or rare species
- Potential impacts on air quality

This Draft PEIR addresses each of these areas of potential controversy.

## 1.6 Potentially Required Permits and Approvals

This PEIR discusses the Proposed Program and potential impacts at a level of detail appropriate for a long-term planning document. This PEIR generally evaluates projects and actions associated with the Proposed Program, and identifies site-specific projects and actions that are currently known and proposed.

When implementing CEQA, several federal and State laws and policies must be considered, depending on the project type. At this stage of development, it is anticipated that the approvals presented below would potentially be required to implement portions of the Proposed Program. As the components of the Proposed Program become more defined, the list below will become more defined. A summary of the potential approvals required to implement some projects is listed below, and more detail is provided in Section 5, Consultation and Coordination.

- **Federal Clean Water Act Section 404 Permit** – U.S. Army Corps of Engineers
- **Federal Endangered Species Act Section 7 Consultation** – U.S. Fish and Wildlife Service and/or National Marine Fisheries Service
- **Federal Fish and Wildlife Coordination Act Report** – U.S. Fish and Wildlife Service
- **California Department of Fish and Wildlife 1600 Streambed Alteration Agreement** – California Department of Fish and Wildlife
- **California Endangered Species Act consultation** – California Department of Fish and Wildlife
- **Federal Clean Water Act Section 401 Water Quality Certification** – California Regional Water Quality Control Board
- **Federal Clean Water Act Section 402 General Construction Activity Stormwater Permit** – California Regional Water Quality Control Board
- **National Historic Preservation Act Section 106 authorization** – California Department of Parks and Recreation, Office of Historic Preservation
- **Encroachment Permits** – Merced County Public Works Departments and California Department of Transportation
- **Landowner Agreements**

SECTION 2

# Program Description and Alternatives

Merced Irrigation District (MID or District) developed and intends to implement an integrated and forward-looking Water Resources Management Plan (WRMP). The WRMP is a strategic plan based on achieving a set of goals (listed in Section 1, Introduction) including ensuring the continued protection of MID's water rights in a financially sound manner to support the region's agricultural economy while promoting the sustainable management of its groundwater resources. The WRMP evaluated a number of District needs and options to address those needs over time, including infrastructure improvements, land use projections, future surface water and groundwater demand and use, and associated financial implications. As part of the WRMP development and evaluation of alternatives, the "Balanced Approach Alternative" was selected as the District's preferred approach because it best aligned with MID's goals and provides maximum flexibility to help guide future decision making. The Balanced Approach Alternative, is referred to in the WRMP and in this Programmatic Environmental Impact Report (PEIR) as the "Proposed Program."

This PEIR evaluates projects (e.g., proposed regulating reservoirs) and actions (e.g., proposed water transfers) that are well defined (and therefore evaluated at a "project level"), as well as projects and actions that will require further definition to fully evaluate. Such undefined projects/actions included in the Proposed Program (e.g., the Main Canal Improvements at Tunnel No. 1 Project) are evaluated at a "program level" in this PEIR, and are anticipated to require subsequent environmental documentation as necessary. Required documents would be tiered from this PEIR. Projects/actions included as part of the Proposed Program are specified in the descriptions that follow.

## 2.1 Proposed Program

As part of the process to develop the WRMP, MID evaluated five alternatives that incorporated specific elements including system improvements, water user classification modifications, annexations, water transfers, and water rates. Key components of the Proposed Program are as follows:

- System Improvements – various projects to allow for full implementation of the Capital Improvement Plan (CIP) and modernization of the system
- Class II to Class I Conversion – one-time opportunity for water users in the District's El Nido area to convert from Class II to Class I, for a fee
- Water Transfers – transfers of water when District water is available and when the Board of Directors determines it is in the best interests of the District

Other components (e.g., annexations and adjustments in future water rates) are not evaluated in this PEIR given no environmental impacts would occur as part of such activities. The Proposed Program would include no additional annexation beyond existing District boundaries.

Timing and phasing of projects/actions are presented in the following sections to the extent they are currently known. Overall program implementation is based on the draft schedule developed in the WRMP. The timing and phasing for implementation of any specific project or action is dependent on many factors, such as funding availability, year-to-year repair and rehabilitation priorities, project-specific environmental review, and securing agreements with cooperating partners, where applicable. It is anticipated that program implementation would differ to some degree from what is outlined currently as the requisite supporting activities are completed, with corresponding shifts in District priorities, as determined necessary.

Some projects/actions under the Proposed Program are currently more conceptual in nature and have not been developed to a level of detail to support impact analysis. Such projects/actions are expected to be better defined as they progress through preliminary and final design. These projects/actions have been evaluated at a programmatic level, and are anticipated to potentially require additional evaluation and/or documentation. As part of implementation of the Proposed Program, the District intends to use a "Site-specific Project/Action Environmental Evaluation Checklist" (EEC; Appendix A) to help make certain potential impacts are identified and addressed. Necessary mitigation would be implemented based on the Mitigation Monitoring and Reporting Plan (MMRP) included in the Executive Summary of this PEIR. Consistent use of the EEC and the MMRP would allow the District to accommodate the majority of changes in priorities or funding availability by accounting for environmental resources and subsequent changes in conditions (e.g., species or habitat presence). The EEC is further explained in Subsection 2.1.1, Site-specific Project/Action Environmental Evaluation Checklist.

### 2.1.1 Site-specific Project/Action Environmental Evaluation Checklist

As the Proposed Program is implemented, individual projects/actions that are a part of the Proposed Program will be evaluated in the light of this PEIR to determine whether additional analysis is needed and if an additional environmental document must be prepared. The District intends to use the following approach with respect to individual projects/actions to be implemented as part of the overall Proposed Program, as specified in California Environmental Quality Act (CEQA) Guidelines Section 15168(c):

- If a later activity would have effects that were not examined in the PEIR, a new Initial Study would need to be prepared leading to either an Environmental Impact Report or a Negative Declaration.
- If the District finds that pursuant to Section 15162, no new effects could occur or no new mitigation measures would be required, the District could approve the activity as being within the scope of the project covered by the PEIR, and no new environmental document would be required.
- The District would incorporate feasible mitigation measures developed in the PEIR into subsequent actions in the Proposed Program.
- Where the subsequent activities involve site-specific activities, the District has developed an EEC (Appendix A) to document site evaluation and activity, to determine whether the environmental effects of the operation were covered in this PEIR.

This PEIR is intended to serve as a first-tier document for future implementation of the Proposed Program. Implementation of the Proposed Program would occur in several phases over an extensive time, estimated to be approximately 30 years. It is currently uncertain precisely how implementation phasing would occur. Additional environmental review requirements for future projects/actions would be tiered from this PEIR and conducted, as necessary.

During the planning and design phase for infrastructure improvements, the District would evaluate the potential environmental impacts of constructing a particular project, including locating a particular facility or group of facilities. This initial evaluation and siting would be conducted so as to determine if additional environmental documentation is required beyond this PEIR, as well as to screen out potential locations (where feasible) that would result in the potential for significant but avoidable impacts. A standardized approach would be incorporated using the EEC described above (Appendix A) to guide site-specific resource evaluations for project locations that have been determined (that is, locations associated with existing facilities requiring maintenance or modification) as well as those projects that have not been sufficiently developed to support a site-specific analysis. This approach would facilitate consistent identification of impacts and implementation of mitigation requirements identified in this PEIR (as well as others that might be identified in subsequent site-specific environmental documents) for implementation of the Proposed Program.

The projects/actions included as part of the Proposed Program are described in greater detail below, including implementation schedule, construction methods, and operational information where such information is available. Subsequent environmental review requirements would be evaluated within the context of the Proposed Program and this PEIR. Additional documentation may be required in some cases; whereas, the analysis and mitigation in this PEIR would suffice in others.

### 2.1.2 System Improvements

The MID CIP (Section 6 of the WRMP) includes infrastructure improvement recommendations that were developed with input from MID Customers, information from several recently completed infrastructure evaluations, and new regulations such as the Water Conservation Act of 2009 (SB X7-7) (requiring increased monitoring and flow measurement to improve water accounting). The CIP focuses on the following primary issues and challenges for the District:

- Maintaining aging infrastructure
- Limiting uncontrolled spills from the District
- Delivering high-quality surface water to the high-grounds areas currently dependent on groundwater supplies
- Improvements that address operational issues associated with dead-end laterals
- Improving or adding flow measurement capabilities on canals
- Reducing water order response times to improve customer service
- Limiting the potential for catastrophic failure of critical portions of the irrigation system
- Enhancing conjunctive water use management opportunities

The projects identified in the CIP are grouped into four primary components: *critical*, *modernization*, *conjunctive water use management*, and *general maintenance* [1] and are organized by canal subsystems. These components are described as follows:

- **Critical projects** are intended to address areas of potential risk to District operations. They address potential failure modes at several key facilities within the District. Critical projects are where failure of such facilities would result in an interruption of service for an extended period. The first critical project includes improvements to the Main Canal at Tunnel No. 1. The remaining facilities, including the Main Canal at Head, Crocker Dam, Crocker-Huffman Diversion Dam, and the head of the Fairfield Canal at Lake Yosemite, require a condition and seismic assessment to determine necessary repairs and costs. Assessments to characterize these critical projects are also proposed and identified in Section 6, Infrastructure Plan, of the WRMP. As engineering evaluations of other components of MID's water conveyance system are completed, additional projects would likely be assigned to this component.
- **Modernization projects** would be focused on improving customer service and system efficiency. Projects such as water regulating reservoirs, improved flow measurement and control, and automation of major conveyance facilities would result in greater operational flexibility while improving water conservation. Modernization projects would be located throughout the District.
- **Conjunctive water use management projects** would combine use of both surface water and groundwater to optimize beneficial use in wet and dry years. Projects could include new or improved recharge basins to allow surface water to recharge groundwater aquifers and the

[1] General maintenance projects are referred to as "Programmatic" projects in the WRMP.

installation of District facilities, such as booster pumps, in high-ground areas to provide surface water to growers who rely on groundwater as their only source of irrigation water.

- **General maintenance projects** would entail long-term capital projects to update and maintain MID infrastructure. Projects include pipeline replacements, canal relining, table topping[2] and/or pipelining dead-end laterals, and modifications to existing road siphons. These projects are located throughout the District.

For the purposes of this PEIR, proposed projects from the CIP have been grouped into the following four categories based on the anticipated similarity of impacts, including likely ground disturbance:

- Main Canal Improvements at Tunnel No. 1 Project
- Canal and lateral operations and flow measurement projects
  - Canal rebuilding/lining and table topping dead-end facilities
  - Canal automation and flow measurement improvements
  - Siphon modifications
  - Interties
  - Pipelining or rerouting open channels on customer property
- Reservoirs and recharge basins
- Conjunctive water use management projects
  - Highlands projects
  - Stormflow diversions
  - Merced River Water Recovery Project

#### 2.1.2.1 Main Canal Improvements at Tunnel No. 1 Project

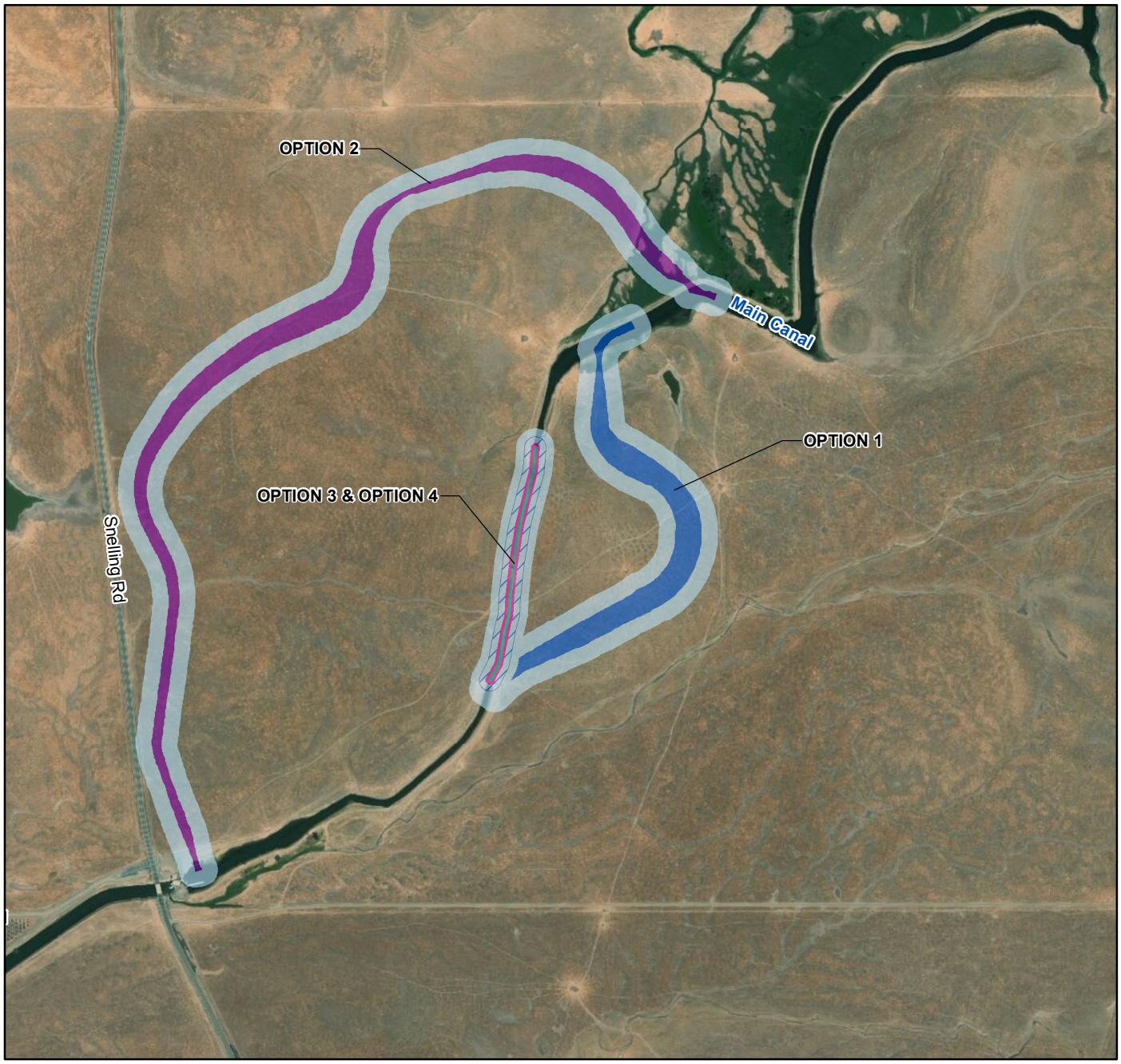
The proposed improvements of the Main Canal in the northeastern portion of the District is the first project currently identified as critical. This project would address the potential for catastrophic failure of a critical portion of the irrigation system in the event of a tunnel failure. The proposed project site is east of the intersection of East Youd Road and Snelling Road, and west of the existing Main Canal alignment, as shown on Figure 2-1. MID intends to evaluate at least three options: (1) construction of an open channel on a new alignment north of the existing alignment, (2) construction of an open channel on a new alignment south of the existing alignment, (3) an open channel along the existing tunnel alignment, and (4) rehabilitation of the existing tunnel. Assuming one of the four options is selected and further details regarding the project are developed, subsequent environmental review would be completed.

**Option 1: Open Channel on New Alignment South of the Existing Alignment**

As shown on Figure 2-1, under the new open-channel option, approximately 3,600 linear feet of new canal would be constructed south of an existing section of the Main Canal. The existing canal section that includes a tunneled portion would be abandoned at the completion of the project. The canal would be lined with concrete and riprap as necessary to reduce erosion.

Construction activities would primarily include excavation and construction of a new canal approximately 3,600 feet long by 50 feet wide at the bottom of the channel by a maximum of 75 feet deep, and abandonment of the existing excavated earthen-tunneled canal section, including portions of the canal upstream of the tunnel. Excavated spoils, estimated at 900,000 cubic yards (CY) of material, would be stockpiled onsite and/or in and along the portion of the Main Canal that would be abandoned.

[2] Table topping involves placement of fill along canal banks to increase bank height and, therefore, increase capacity in the canal. The purpose of table topping is to provide additional capacity to prevent overtopping when there is an unexpected influx of water in the canal.




LEGEND

- Option 1: Open Channel on New Alignment South of the Existing Alignment
- Option 2: Open Channel on New Alignment North of the Existing Alignment
- Option 3: Open Channel along Existing Tunnel Alignment
- Option 4: Rehabilitation of Existing Tunnel
- Temporary Construction Easement
- Temporary Construction Easement (Option 4 Only)

N

0 500 1,000
Feet

VICINITY MAP


**FIGURE 2-1 MAIN CANAL IMPROVEMENTS AT TUNNEL NO. 1 PROJECT**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

Suitable material would be segregated and used as a dirt source to repair canal banks when needed. Unsuitable material for canal maintenance would remain onsite permanently. Temporary workspace of approximately 100 feet on either side of the new canal prism would be required. It is possible that blasting would be required as part of this option, and this would be addressed in subsequent environmental review when the project option is chosen.

Abandonment of the existing tunnel would include placement of a 100-CY plug at the upstream entrance of the tunnel, consisting of soil material excavated from the new canal, and may include a concrete facing.

Total construction footprint, including staging and laydown areas, would be approximately 55 acres. A new permanent footprint associated with the new canal and associated infrastructure would be approximately 50 acres. Approximately 100 CY of demolition debris would be generated during construction. Construction traffic would access the site by way of existing public roads, ranch roads, and MID canal banks. Activities requiring maximum workers and truck traffic would include site excavation, backfill, and concrete placements. Table 2-1 includes anticipated construction schedule, workforce, and equipment for these general activities.

Table 2-1. Main Canal Improvements at Tunnel No. 1 Project – Option 1: Open Channel on New Alignment South of Existing Alignment, Construction Work Days, Workforce, and Equipment[a]

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity | Work Days | Personnel Required | Equipment Required[b] |
|---|---|---|---|
| Site Clearing | 60 | 12 to 16 | 3 Bulldozers with brush attachments<br>1 Grader<br>1 Backhoe<br>1 Loader<br>5 Dump trucks |
| Earthwork<br>(topsoil stripping and stockpiling) | 20 | 3 to 5 | 2 Bulldozers/scrapers<br>1 Loader |
| Earthwork<br>(90% canal construction) | 180 | 22 to 26 | 8 Scrapers<br>3 Bulldozers<br>1 Loader<br>3 Grader<br>2 Compactors<br>2 Water trucks |
| Earthwork<br>(10% canal construction) | 100 | 21 to 26 | 2 Excavator<br>2 Bulldozers<br>1 Loader<br>10 Dump trucks<br>1 Water truck<br>5 Ready-mix trucks |
| Earthwork<br>(spreading stockpiled topsoil upon completion) | 20 | 5 to 10 | 2 Bulldozers<br>1 Loader<br>1 Water truck |
| Dust Control | Duration of each | 3 | 3 Water truck |
| Plugging Existing Tunnel | 15 | 10 to 15 | 1 Backhoe/excavator<br>1 Small crane (5–10 ton)<br>1 Generator<br>1 Concrete pump<br>5 Ready-mix trucks<br>1 Water truck |

[a] Table lists anticipated maximum requirements for each construction phase.
[b] Equipment required periodically during the work days of each construction activity.

Construction of the new channel could occur any time of the year; however, to avoid impacts on water deliveries, the two tie-ins to the new channel would occur outside of the irrigation season (November 1 through March 1). Project construction is estimated to take approximately 24 months and is expected to commence in 2021.

**Option 2: Open Channel on New Alignment North of the Existing Alignment**

As shown on Figure 2-1, under the new open-channel option, approximately 7,800 linear feet of new canal would be constructed north of an existing section of the Main Canal. The existing canal section that includes a tunneled portion would be abandoned at the completion of the project. The canal would be lined with concrete and riprap as necessary to reduce erosion.

Construction activities would primarily include excavation and construction of a new canal approximately 7,800-feet long by 50 feet wide at the bottom of the channel by a maximum of 70 feet deep, and abandonment of the existing excavated earthen-tunneled canal section, including portions of the canal upstream and downstream of the tunnel. Concrete lining may be placed along the new section of canal where fill is required. Excavated spoils, estimated at 850,000 CY of material, would be stockpiled onsite and/or in and along the portion of the Main Canal that would be abandoned.

Suitable material would be segregated and used as a dirt source to repair canal banks when needed. Unsuitable material for canal maintenance would remain onsite permanently. Temporary workspace of approximately 100 feet on either side of the new canal prism would be required. It is possible that blasting would be required as part of this option, and this would be addressed in subsequent environmental review when the project option is chosen.

Abandonment of the existing tunnel would include placement of a 100-CY plug at either end of the tunnel, consisting of soil material excavated from the new canal, and may include a concrete facing. The existing canal would also be backfilled.

Total construction footprint, including staging and laydown areas, would be approximately 75 acres. A new permanent footprint associated with the new canal and associated infrastructure would be approximately 60 acres. Approximately 100 CY of demolition debris would be generated during construction. Construction traffic would access the site by way of existing public roads, ranch roads, and MID canal banks. Activities requiring maximum workers and truck traffic would include site excavation, backfill, and concrete placements. Table 2-2 includes anticipated construction schedule, workforce, and equipment for these general activities.

Table 2-2. Main Canal Improvements at Tunnel No. 1 Project – Option 2: Open Channel on New Alignment North of Existing Alignment, Construction Work Days, Workforce, and Equipment[a]

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity | Work Days | Personnel Required | Equipment Required[b] |
|---|---|---|---|
| Site Clearing | 60 | 12 to 16 | 3 Bulldozers with brush attachments<br>1 Grader<br>1 Backhoe<br>1 Loader<br>5 Dump trucks |
| Earthwork<br>(topsoil stripping and stockpiling) | 20 | 3 to 5 | 2 Bulldozers/scrapers<br>1 Loader |
| Earthwork<br>(90% canal construction) | 180 | 22 to 26 | 8 Scrapers<br>3 Bulldozers<br>1 Loader<br>3 Graders<br>2 Compactors<br>2 Water trucks |

Table 2-2. Main Canal Improvements at Tunnel No. 1 Project – Option 2: Open Channel on New Alignment North of Existing Alignment, Construction Work Days, Workforce, and Equipment[a]

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity | Work Days | Personnel Required | Equipment Required[b] |
|---|---|---|---|
| Earthwork<br>(10% canal construction) | 100 | 24 to 29 | 2 Excavator<br>2 Bulldozers<br>1 Loader<br>10 Dump trucks<br>1 Water truck<br>10 Ready-mix trucks |
| Earthwork<br>(spreading stockpiled topsoil upon completion) | 20 | 5 to 10 | 2 Bulldozers<br>1 Loader<br>1 Water truck |
| Dust Control | Duration of each | 3 | 3 Water trucks |
| Plugging Existing Tunnel<br>(each end) | 30 | 10 to 15 | 1 Backhoe/excavator<br>1 Small crane (5–10 ton)<br>1 Generator<br>1 Concrete pump<br>5 Ready-mix trucks<br>1 Water truck |

[a] Table lists anticipated maximum requirements for each construction phase.
[b] Equipment required periodically during the work days of each construction activity.

Construction of the new channel could occur any time of the year; however, to avoid impacts on water deliveries, the two tie-ins to the new channel would occur outside of the irrigation season (November 1 through March 1). Project construction is estimated to take approximately 24 months and is expected to commence in 2021.

**Option 3: Open Channel along Existing Tunnel Alignment**

As shown on Figure 2-1, under the option for an open channel along the existing tunnel alignment, approximately 1,600 linear feet of tunneled canal would be excavated to form an open channel.

Activities would primarily include excavation and construction of an approximate 1,600-foot-long by 50-foot-wide open-channel canal at the bottom. Temporary workspace of approximately 100 feet on either side of the new channel alignment would be required. Excavation would result in an estimated 575,000 CY of material and would be stockpiled on site. Suitable material would be segregated and used as a dirt source to repair canal banks when needed. Unsuitable material for canal maintenance would remain onsite permanently. Total construction footprint, including staging and laydown areas, would be approximately 40 acres. A new permanent footprint associated with the tunnel rehabilitation would be approximately 25 acres. Approximately 100 CY of demolition debris would be generated during construction. It is possible that blasting would be required as part of this option, and this would be addressed in subsequent environmental review when the project option is chosen.

Construction traffic would access the site by way of existing public roads, ranch roads, and MID canal banks. Activities requiring maximum workers and truck traffic would include site excavation, backfill, and concrete placements. Table 2-3 includes anticipated construction schedule, workforce, and equipment for these general activities. Work on the existing tunnel would occur outside of the irrigation season, between November 1 and March 1. Project construction is estimated to take approximately 12 months and is expected to commence in 2021.

Table 2-3. Main Canal Improvements at Tunnel No. 1 Project – Option 3: Open Channel along Existing Tunnel Alignment, Construction Work Days, Workforce, and Equipment[a]

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity | Work days | Personnel Required | Equipment Required[b] |
|---|---|---|---|
| Site Clearing | 60 | 12 to 16 | 3 Bulldozers with brush attachments<br>1 Grader<br>1 Backhoe<br>1 Loader<br>5 Dump trucks |
| Earthwork<br>(topsoil stripping and stockpiling) | 20 | 3 to 5 | 2 Bulldozers/scrapers<br>1 Loader |
| Earthwork<br>(90% canal construction) | 180 | 22 to 26 | 8 Scrapers<br>5 Bulldozers<br>1 Loader<br>3 Graders<br>2 Compactors<br>2 Water trucks<br>1 Generator<br>5 Ready-mix trucks |
| Earthwork<br>(10% canal construction) | 100 | 19 to 24 | 2 Excavator<br>2 Bulldozers<br>1 Loader<br>10 Dump trucks<br>1 Water truck<br>1 Generator |
| Earthwork<br>(spreading stockpiled topsoil upon completion) | 20 | 5 to 10 | 2 Bulldozers<br>1 Loader<br>1 Water truck |
| Dust Control | duration of each | 3 | 3 Water trucks |

[a] Table lists anticipated maximum requirements for each construction phase.
[b] Equipment required periodically during the work days of each construction activity.

### Option 4: Rehabilitation of Existing Tunnel

As shown on Figure 2-1, under this option, approximately 1,600 linear feet of existing earthen-tunneled canal would be rehabilitated.

Construction activities would primarily include tunnel invert ground preparation, erosion infill, and invert slab placement (approximately 6 to 8 inches thick); tunnel liner erosion infill and lining (approximately 4 to 6 inches thick); tunnel portals stabilization (soil nails and shotcrete) and surface drainage improvements; upstream and downstream canal bank erosion repair and stabilization (approximately 300 linear feet upstream and 50 linear feet downstream); and existing shaft stabilization or plugging.

Tunnel capacity is currently being evaluated and may be increased as part of this option. Increasing the tunnel capacity would include all of the work described above in addition to excavation inside the tunnel to increase the cross-sectional area.

Temporary workspace of approximately 50 feet on either side of the tunnel alignment would be required. Total construction footprint, including staging and laydown areas, would be approximately 6.5 acres. No new permanent footprint would result with the tunnel rehabilitation. Approximately 100 CY of demolition debris would be generated during construction if the capacity of the tunnel were not increased, and 9,000 CY of demolition debris would be generated if the tunnel capacity were increased. Some of the debris from increasing the tunnel capacity may be used to fill voids in the tunnel bottom and stabilize canal banks along the Main Canal. Construction traffic would access the site by way

of existing public roads, ranch roads, and MID canal banks. Activities requiring maximum workers and truck traffic would include backfill and concrete pours. Table 2-4 includes anticipated construction schedule, workforce, and equipment for these general activities.

Table 2-4. Main Canal Improvements at Tunnel No. 1 Project – Option 4: Rehabilitation of Existing Tunnel, Construction Work Days, Workforce, and Equipment[a]

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity | Work Days | Personnel Required | Equipment Required[b] |
|---|---|---|---|
| Site Clearing | 10 | 5 to 10 | 2 Bulldozers with brush attachments<br>1 Grader<br>1 Backhoe<br>1 Loader<br>5 Dump trucks |
| Earthwork<br>(topsoil stripping and stockpiling) | 15 | 3 to 5 | 2 Bulldozers<br>1 Loader |
| Increase Tunnel Capacity | 100 | 15 to 20 | 1 Bulldozer<br>2 Loaders<br>1 Grader<br>2 Compactors<br>2 Dump trucks<br>1 Water truck<br>1 Generator |
| Tunnel Rehabilitation<br>(90% canal construction) | 180 | 22 to 26 | 1 Bulldozer<br>2 Loaders<br>1 Grader<br>2 Compactors<br>2 Dump trucks<br>1 Water truck<br>1 Generator<br>5 Concrete trucks<br>2 Concrete pumps<br>2 Concrete pump trucks |
| Canal and Portal Stabilization<br>(10% canal construction) | 100 | 19 to 24 | 2 Excavators<br>1 Bulldozers<br>1 Loader<br>5 Dump trucks<br>1 Water truck<br>5 Ready-mix trucks<br>1 Generator<br>1 Concrete pump<br>1 Concrete pump truck |
| Earthwork<br>(spreading stockpiled topsoil upon completion) | 20 | 4 to 6 | 1 Bulldozer<br>1 Compactor<br>1 Grader<br>1 Loader<br>1 Water truck |
| Dust Control | Duration of each | 1 | 1 Water truck |

[a] Table lists anticipated maximum requirements for each construction phase.

[b] Equipment required periodically during the work days of each construction activity.

Work on the existing tunnel would occur outside of the irrigation season (November 1 through March 1). Project construction is estimated to take approximately 12 months and is expected to commence in 2021.

**Operations and Maintenance**

Operations and maintenance activities for the open-channel options would generally include similar activities that are currently performed under Existing Conditions within the Program Area. Activities would include MID operations staff accessing the canals and control structures on an as-needed basis to operate and maintain flow control gates and conduct routine maintenance and inspections. During the winter, vegetation control, inspections, and repairs would be required.

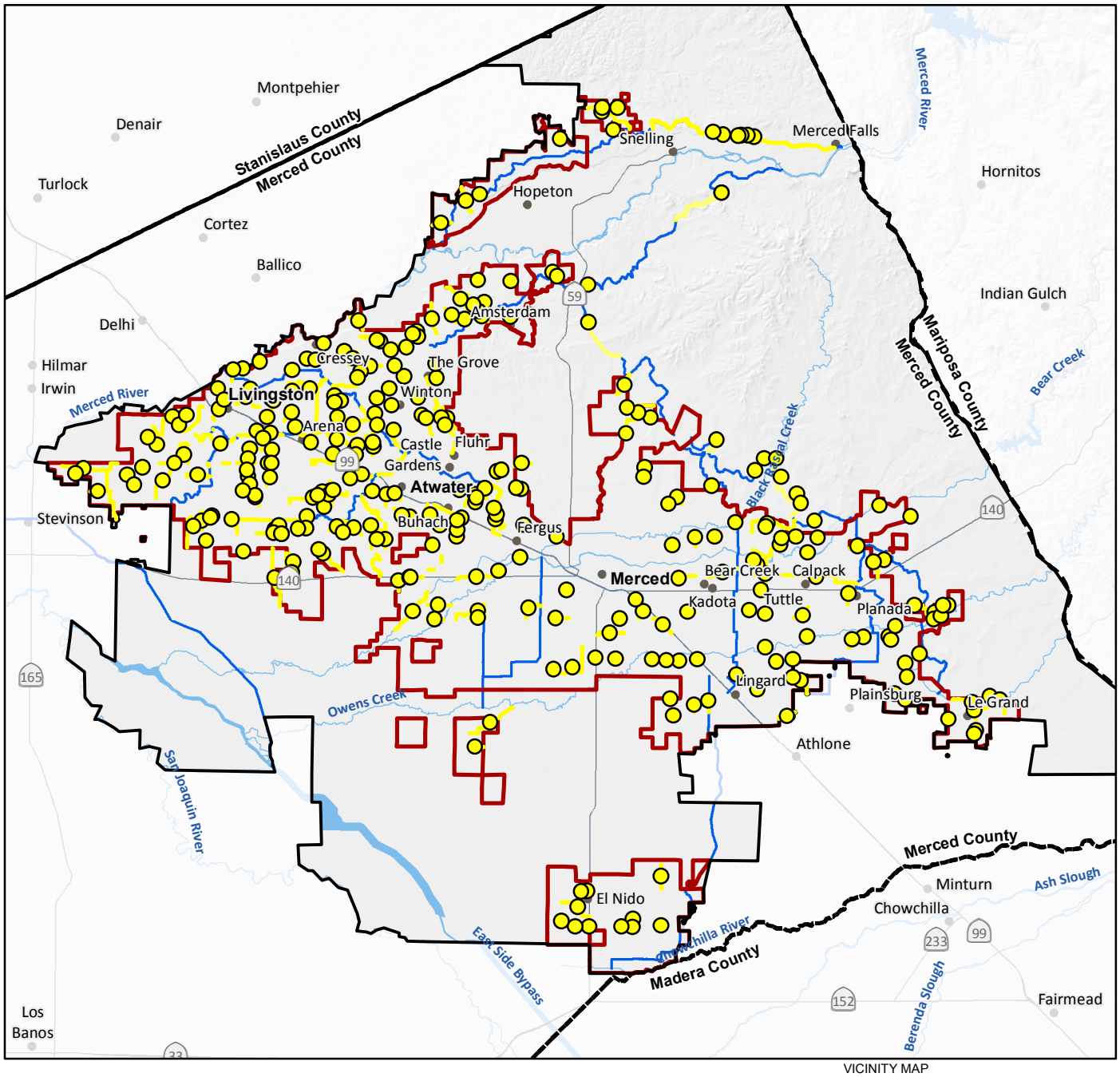
#### 2.1.2.2 Canal and Lateral Operations and Measurement Projects

Various improvements to canal and lateral infrastructure are proposed throughout the District as part of the Proposed Program. Improvements would improve conveyance system efficiency and flexibility to meet the needs of local growers, reduce uncontrolled spills, improve operations at dead-end facilities, improve or add flow measurement on canals and laterals, and improve customer service. Canal and lateral infrastructure improvements are described below.

**Canal Rebuilding/Lining and Table Topping Dead-end Facilities**

Up to 81 canal rebuilding/lining projects and 230 table topping dead-end lateral facilities projects are proposed throughout the Program Area. (See Figure 2-2 for project locations and Figure 2-3 for an example project.) Projects would include (1) rebuilding canal sections that exhibit excessive leakage and/or ponding, which could include relining approximately 300,000 feet of existing lined canals where the liner is dilapidated, and lining approximately 100,000 feet of previously unlined canals (through approximately 81 individual projects); and (2) table topping up to approximately 800,000 linear feet of dead-end lateral facilities at 230 locations (through approximately 230 individual projects, although it is possible that some locations may be done at one time); (3) flume rehabilitation where structural wood members would be replaced or pipelining of the flume would occur (the Northside Canal flumes projects); and (4) pipelining existing canal sections that require excessive maintenance. The majority of canal rebuilding projects would entail completely collapsing and re-compacting the existing banks inside of the existing right-of-way using the native material onsite. Canal relining would require the removal of existing lining and placement of new lining. Canals that are currently unlined would require vegetation clearing prior to placement of lining. Some projects may include transitions to existing structures and the removal and/or replacement of delivery structures and pipeline crossings. Construction activities would include the removal of up to 6 inches of concrete, collapsing the existing canal banks, and re-shaping and re-compacting the soil within the existing canal. Demolition would generate up to 500 CY of material per project. New or replacement linings would consist of up to 4 inches of fiber reinforced concrete. Excavation of up to 5,000 CY of material would be required for each project. Excess fill material would likely be available onsite as a result of canal reshaping; however, some projects might require imported soil material of up to 2,500 CY. Imported material required to complete the project would come from local sources. If existing soil conditions are not suitable for reuse, excavated materials would be spread onsite on outer canal banks or given to an adjacent farmer. Debris and rubbish, including old lining material, would be the contractor's responsibility to dispose of at a facility that complies with federal, state, and local regulations.

Dead-end lateral facility banks would be raised by building on top of existing banks. Organic material would be removed from the canal slopes and drivable banks, and banks would be raised to an elevation equal to the head of the upstream supply canal. Material to raise the bank would most likely be imported, originating from local sources located within the Program Area or within the site itself. In sections of canal with structural defects such as excessive leakage or seepage, that section of canal would be completely collapsed and rebuilt. Demolition activities would generate up to 100 CY of material per project.




LEGEND

- MID Program Area
- MID Service Area
- Canal Relining; Dead-end Laterals; Northside Canal Seepage Reduction
- Canal
- Natural Drainages
- Water Lines
- Canal Rebuilding/Lining and Table Topping Dead-end Facilities

VICINITY MAP


**FIGURE 2-2 CANAL REBUILDING/LINING AND TABLE TOPPING DEAD-END FACILITIES PROJECT LOCATIONS**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

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Miles

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ch2m


LEGEND

Dead-end Lateral

VICINITY MAP


**FIGURE 2-3 TYPICAL CANAL RELINING AND TABLE TOPPING DEAD-END FACILITIES PROJECTS**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

N

0 200 400
Feet

Alternatively, for about 50 percent of the projects, it is expected that dead-end portions of the canal would be pipelined, typically within the same right-of-way as the open-channel facility. Dead-end pipelined facility modifications would typically include raising standpipes and extending concrete boxes to a minimum of 1 foot above the high water mark of the upstream supply canal. If a box structure is in poor condition, it would be replaced with either a cast-in-place or precast box. Some pipelines that are in poor condition or undersized may be replaced. Pipelines at or near the end of their service life would be replaced throughout the Program Area. Replaced pipelines would typically be installed in the same location as the existing pipeline, however, pipelines may be rerouted. Typical replacement would include: removal and disposal of existing pipe; excavation and installation of a new pipe equal to or greater than the existing pipe diameter; installation of air vents approximately every 500 feet along the right-of-way; and replacement of boxes and deliveries, as needed. Typically, new pipe would be either reinforced concrete or polyvinyl chloride (PVC). Excavation would only be required for those that need replacement, up to approximately 10,000 CY per project. Import of backfill material, up to 2,500 CY, may be necessary on some projects. Demolition activities would generate up to 100 CY of material per project. It should be noted that for two projects, construction would occur adjacent to and on the Merced Regional Airport property (Dead-end Lateral Modifications at Booster 14 Lateral B and Dead-end Lateral Maintenance at an Existing Open Channel) and within approximately 2 miles of a private airstrip, Bonanza Hills Airport (Main Canal Improvements at Tunnel No. 1 Project and Northside Canal Seepage Reduction Project). Construction at the Merced Regional Airport would require approximately 1 week. The work would involve raising boxes to table top the facility. Equipment would be limited to concrete trucks and a concrete pumper.

For proposed canal rebuilding/lining and table topping dead-end facility projects, truck trips would generally be limited to up to 10 trips, if import of backfill material is not required. If import of backfill material is required, approximately 50 to 100 truck trips would be needed, depending on the amount of import required. Construction traffic would access the sites by way of existing public roads, ranch roads, and MID canal banks. Table 2-5 includes the anticipated maximum number of construction days, workforce, and equipment required to complete any of the proposed canal rebuilding/lining and table topping dead-end facility improvements.

Table 2-5. Canal and Lateral Operations and Measurement Projects – Canal Rebuilding/Lining Canals and Table Topping Dead-end Facilities Construction Work Days, Workforce, and Equipment[a]

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity | Work Days | Personnel Required | Equipment Required[b] |
|---|---|---|---|
| Demolition/Modification of Existing Facilities | 40 days | 6 | 1 Backhoe (with hydraulic hammer)<br>1 Excavator<br>2 Loader/dozers<br>1 Water truck<br>1 Dump truck<br>1 Concrete truck/pumping equipment (modification projects) |
| Construction | 90 days | Up to 10 | 1 Backhoe (with hydraulic hammer)<br>1 Water truck<br>1 Dump truck<br>1 Concrete truck/pumping equipment<br>1 Ready-mix truck |
| Dust Control | Duration of each | 1 | 1 Water truck |

[a] Table lists anticipated maximum requirements for each construction location within the various rebuilding, lining, and table topping canal sections. Some projects, smaller in scale, would require far fewer construction workers and work days, and less equipment than projects of greater scale and complexity.

[b] Equipment required periodically during the work days of each construction activity.

Projects associated with canal rebuilding/lining would generally result in an average disturbance area of up to 10 acres per project. It is possible that up to three projects may result in a disturbance area of up 25 acres. From 2019 through 2032, up to three canal rebuilding/lining projects would be implemented annually, and from 2033 through 2040, up to five would be implemented each year. The maximum annual disturbance area from 2019 through 2032 would range from 30 to 45 acres, depending on when the three larger projects are implemented. Annual maximum disturbance from 2033 through 2040 would range from 80 to 95 acres. Canal rebuilding/lining projects would not result in a new permanent footprint. The majority of projects are anticipated to require approximately 2 to 3 months to construct; however, larger projects would require approximately 6 months of construction. Work would be scheduled to occur outside of the irrigation season between November 1 and March 1. Work would occur within the MID canals and rights-of-way.

Table topping dead-end facilities projects would result in an average disturbance area of up to 6 acres per project. From 2019 through 2033, up to two table topping dead-end facilities projects would be implemented annually, and from 2034 through 2040, up to twelve would be implemented each year. The maximum annual disturbance area from 2019 through 2033 would be 12 acres, and annual maximum disturbance from 2034 through 2040 would be 42 acres. Table topping dead-end facilities projects would not result in a new permanent footprint. Construction of each table topping dead-end facilities project would take approximately 1 month. Work would be scheduled to occur outside of the irrigation season between November 1 and March 1. Work would occur within the MID canals and rights-of-way.

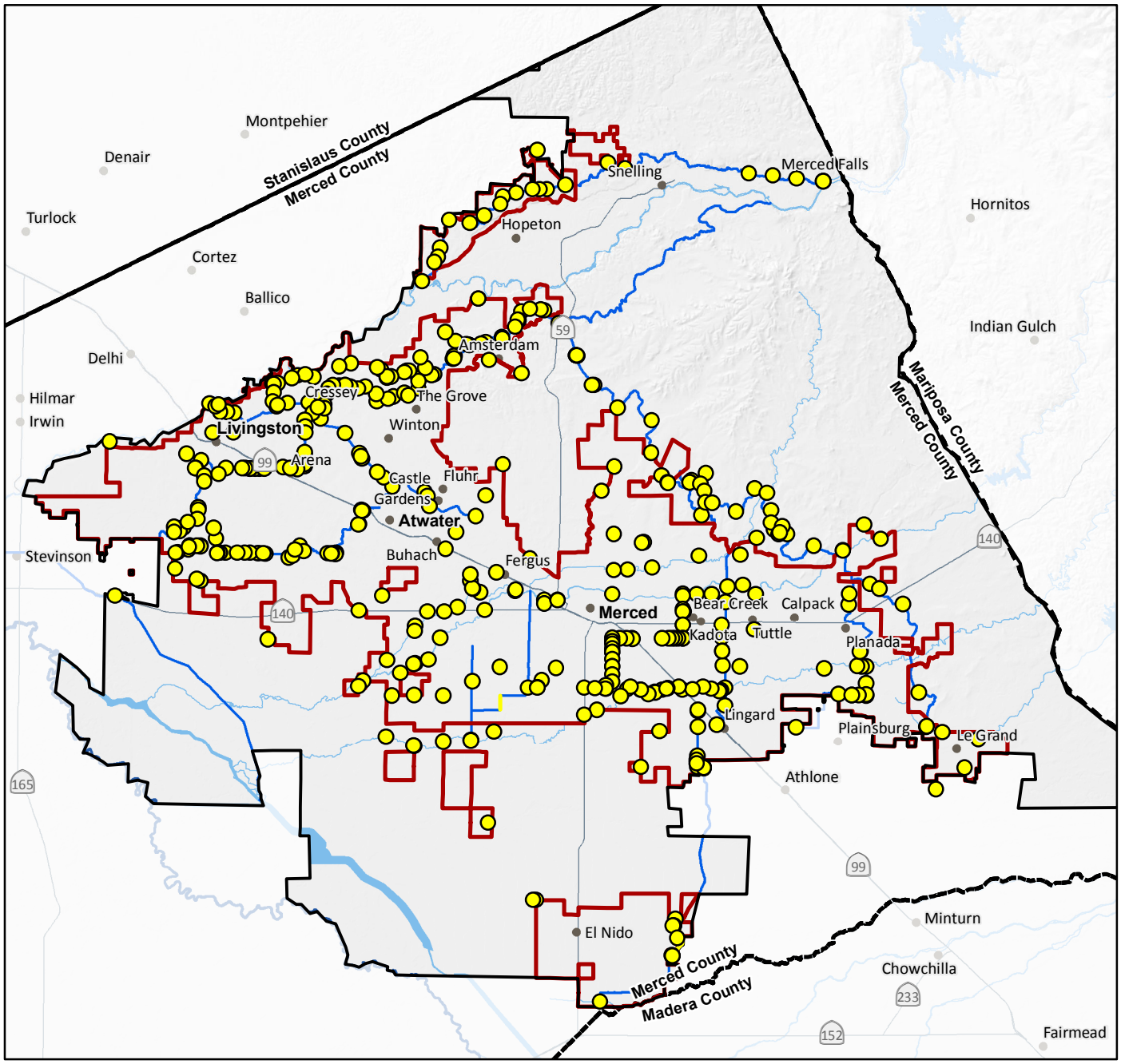
**Canal Automation and Flow Measurement Improvements**

Up to 31 canal automation and level control projects and up to 150 flow measurement improvement projects are currently proposed throughout the Program Area. (See Figure 2-4 for project locations and Figure 2-5 for an example project.)

Automation and level control projects would typically include the installation of long-crested weirs (LCWs), control automation devices such as potentiometers on canal control gates and level instruments to monitor canal water surface elevations, installation of supervisory control and data acquisition (SCADA) equipment, and modification to or removal of existing check structures to aid in improved operation of the canal system.

One specific automation project that is proposed is the Le Grand Canal near Black Rascal Automation Project. Historically, after the irrigation season is complete, MID removes a portion of the Le Grand Canal bank and creates a coffer dam in Le Grand Canal to provide stormwater drainage to Black Rascal Creek in an effort to reduce flooding risks. The proposed project would involve installing two gate structures, one structure in the Le Grand Canal and one on the right bank of the Le Grand Canal to allow for automated drainage into Black Rascal Creek. The proposed gate structure would allow MID to regulate flows without having to build a coffer dam annually. Lining upstream and downstream in the canal would be placed to prevent erosion. Armoring at the proposed discharge point to Black Rascal Creek would be implemented to prevent localized erosion. Flow measurement improvements would include installation of additional flow measurement structures and devices (such as weirs, measurement flumes, and flow conditioners) and installation of SCADA equipment to increase the District's ability to track water deliveries and support water balance activities.

These types of projects would require the removal and relocation of existing facilities such as gates, check structures, pressure reducers, culverts, and acoustic doppler meters; installation of new structures and devices at new facilities or at existing check structures; raising canal banks to accommodate new higher water levels; and modification of existing SCADA systems or installation of new SCADA systems. With the exception of the Le Grand Canal near Black Rascal Automation Project, which would not require any demolition activities where soil would be displaced, demolition activities associated with canal automation projects would generate up to 50 CY of material per project.




LEGEND

- MID Program Area
- MID Service Area
- County
- Canal
- Natural Drainages
- Major River
- Canal Automation and Flow Measurement Improvements

VICINITY MAP


**FIGURE 2-4 CANAL AUTOMATION AND FLOW MEASUREMENT PROJECT LOCATIONS**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

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Miles



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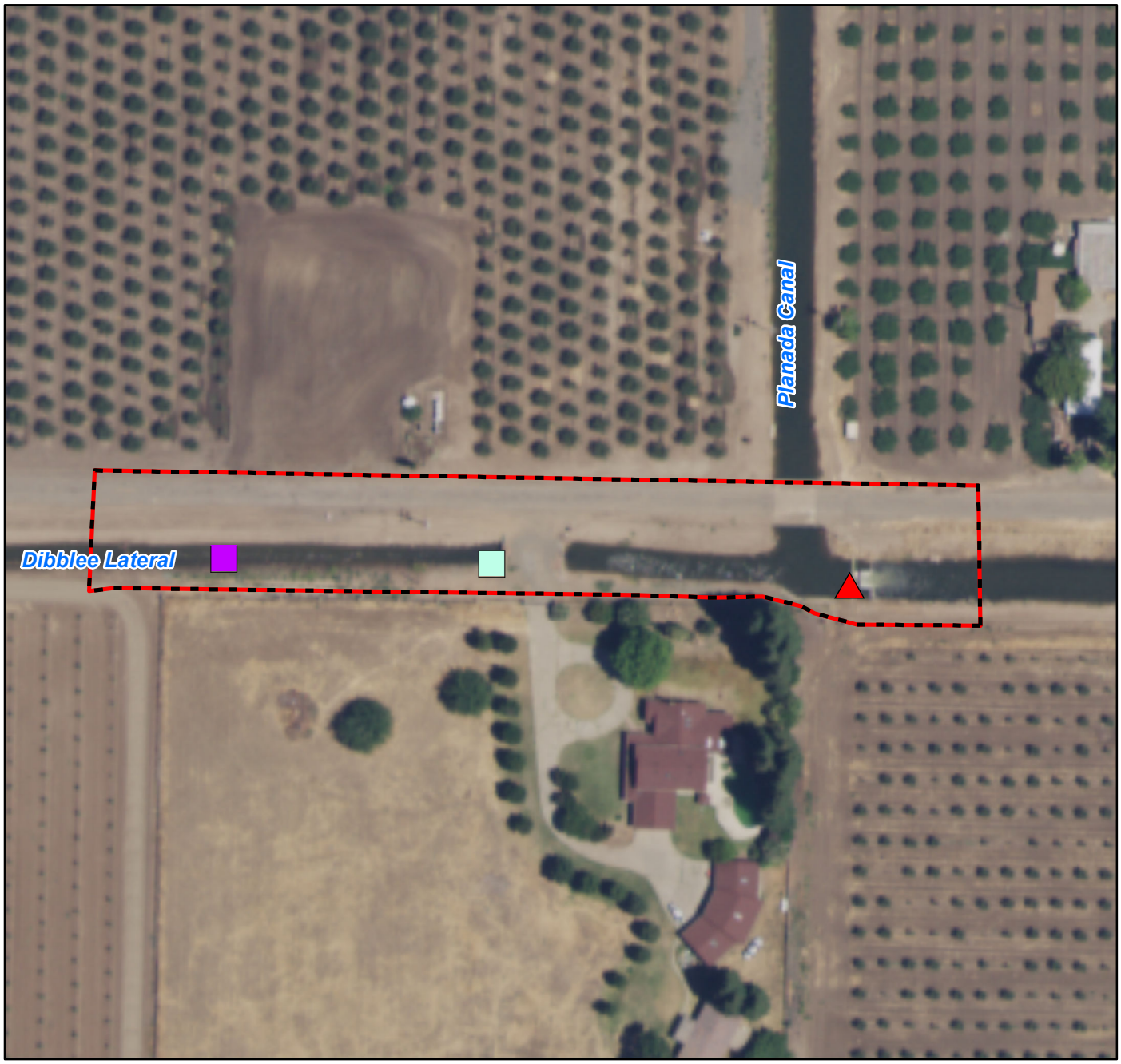



LEGEND

- Construction Footprint
- Lateral Flow Control Gate
- New Replogle Flume
- Replace Existing Check Structure with a New LCW

N

0 50 100
Feet

VICINITY MAP


**FIGURE 2-5 TYPICAL FLOW MEASUREMENT AND AUTOMATION PROJECT – IMPROVED CONTROL AT THE BIFURCATION OF THE PLANADA CANAL AND DIBBLEE LATERAL**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom

Flow measurement projects would not include a demolition phase. Approximately 500 CY of material would be excavated for each of the canal automation projects. With the exception of the Le Grand Canal near Black Rascal Automation Project, which would require approximately 110 truck trips for armoring and concrete, truck trips would generally be limited to up to 10 trips. Construction traffic would access the sites by way of existing public roads, ranch roads, and MID canal banks. Table 2-6 provides estimates of construction vehicles and information for a typical canal automation or flow measurement project. Construction activities would occur within existing MID rights-of-way.

For canal automation and flow measurement projects, construction would require a relatively small disturbance area (1 acre per project except for the Le Grand Canal near Black Rascal Automation Project, which would require up to 2 acres). Canal automation projects would take approximately 6 months to construct (up to 8 months for the Le Grand Canal near Black Rascal Automation Project), and flow measurement projects would require 2 months of construction. Up to 10 projects would occur each year, and the majority of the work would be scheduled to occur outside of the irrigation season between November 1 and March 1. With the exception of the Le Grand Canal near Black Rascal Automation Project, which would result in a new permanent footprint of approximately 0.6 acre, canal automation and flow measurement projects would not require a new permanent footprint.

Table 2-6. Canal and Lateral Operations and Measurement Projects – Canal Automation, Flow Measurement Improvements, Siphon Modifications, and Interties Construction Work Days, Workforce, and Equipment[a]
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

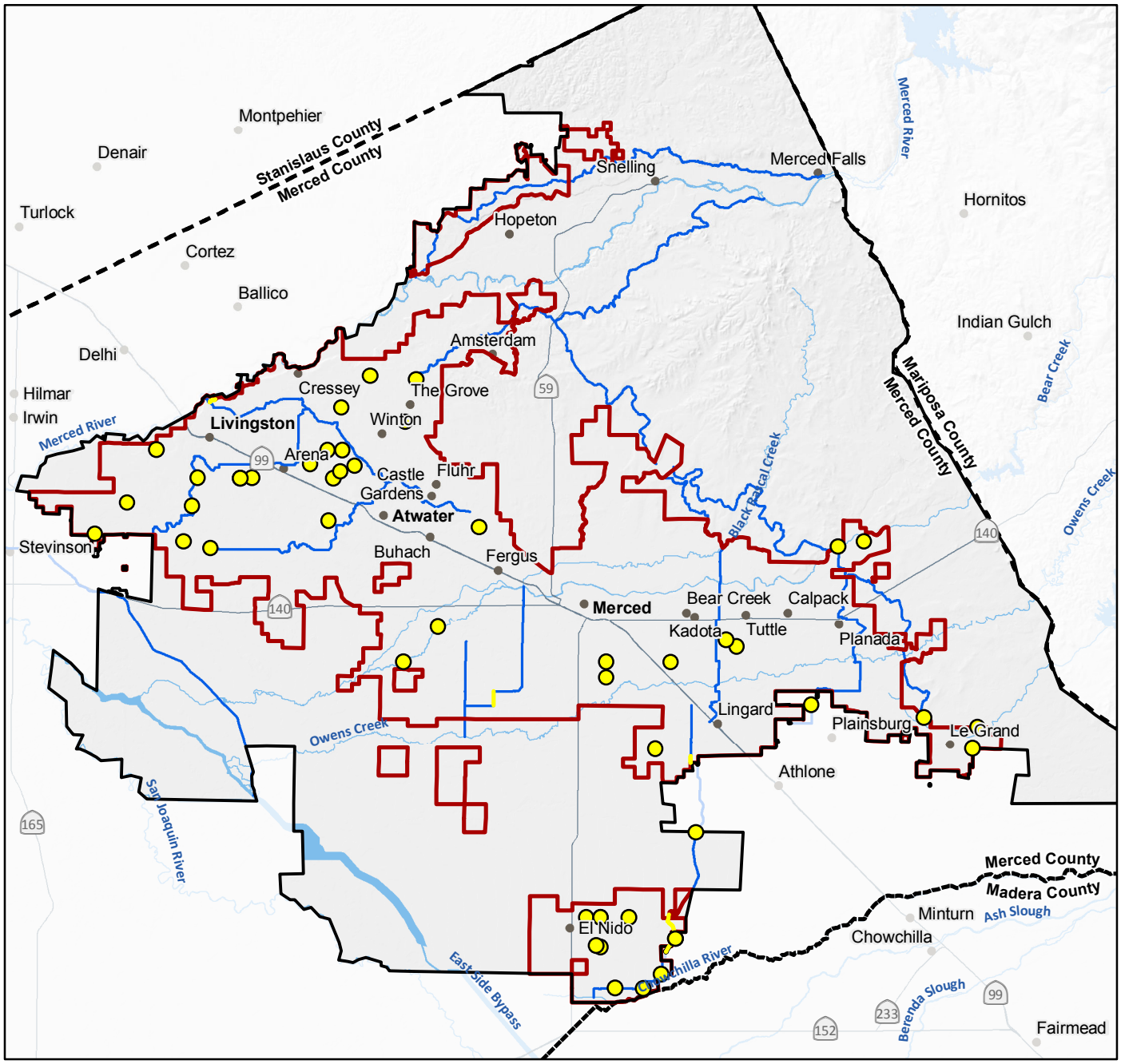
| Activity | Work Days | Personnel Required | Equipment Required[b] |
|---|---|---|---|
| Demolition/Modification of Existing Facilities | 40 days (all projects except Le Grand Canal near Black Rascal Automation Project, which does not have demolition or modification activities) | 3 | 1 Backhoe (with hydraulic hammer)<br>1 Excavator<br>1 Water truck<br>1 Dump truck<br>1 Concrete truck/pumping equipment |
| Construction | 90 days (115 days for Le Grand Canal near Black Rascal Automation Project) | Up to 6 | 1 Backhoe (with hydraulic hammer)<br>1 Water truck<br>1 Dump truck<br>1 Concrete truck/pumping equipment |
| SCADA Equipment Installation | 10 days | Up to 5 | 1 Backhoe<br>1 Water truck<br>1 Dump truck<br>1 Concrete truck/pumping equipment |
| Dust Control | Duration of each | 1 | 1 Water truck |

[a] Table lists anticipated requirements for each construction location within the various canal automation and flow measurement improvement projects. Some projects, smaller in scale, would require far fewer construction workers and work days, and less equipment than projects of greater scale and complexity.

[b] Equipment required periodically during the work days of each construction activity.

### Siphon Modifications

Up to 50 locations to extend and/or enlarge existing road siphons, including construction of necessary headwalls are proposed. (See Figure 2-6 for project locations and Figure 2-7 for an example project.) Siphons and headwall structures would require modifications to and/or demolition of existing structures, replacement of siphons, and construction of new headwall structures. Excavation activities would result in approximately 500 CY of material and would likely be limited to construction of new siphons and associated headwall structures and would be balanced onsite. Up to 200 CY of soil would be imported for each project. Concrete forms and concrete placement would also be required for construction of new required structures.




LEGEND

- MID Program Area
- MID Service Area
- County
- Canal
- Natural Drainages
- Major River
- Siphon Modifications

VICINITY MAP


**FIGURE 2-6 SIPHON MODIFICATION PROJECT LOCATIONS**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

N
0 2.5 5
Miles


LEGEND

Parr Lateral

Parr Lateral

VICINITY MAP


**FIGURE 2-7 TYPICAL SIPHON MODIFICATION PROJECT – PARR LATERAL AT LIBERTY AVENUE**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

N

0 75 150
Feet

Construction activities would occur within existing MID rights-of-way. The total construction footprint, including staging and laydown areas, would be approximately 1 acre for each siphon construction location. Truck trips would generally be limited to 1 or 2 trips during demolition and up to 20 during construction. Construction traffic would access the sites by way of existing public roads, ranch roads, and MID canal banks. Table 2-6 includes the anticipated maximum number of construction days, workforce, and equipment required to complete any of the siphon modification projects.

Siphon modification projects would result in an average disturbance area of up to 1 acre per project. Up to five projects would occur in 1 year, resulting in up to 5 acres of total disturbance per year. Siphon modification projects would not result in a new permanent footprint. Siphon projects would generally last up to approximately 7 months and would be scheduled to occur outside of the irrigation season between November 1 and March 1.

**Interties**

Up to 11 intertie projects would occur throughout the Program Area to increase water supply reliability and reduce bottlenecks in canals, laterals, and creeks. (See Figure 2-8 for project locations and Figure 2-9 for an example project.) Intertie projects include the installation of booster pumps, pipelines, and variable-frequency drive (VFD) pumps; and interconnecting canals or laterals.

Booster pumps would be installed in an approximate 6-foot by 6-foot covered precast concrete box. A service pole and associated panel backboard would be installed where necessary to connect to the existing power grid. Pipeline improvements, generally ranging up to 40 feet, would consist of belowgrade pipe installation from the booster stations to the downstream canal or lateral being interconnected by the intertie project. Pipes would be installed via open-cut method, with the exception of one project, the Tuttle Lateral to Well 98 Intertie. The Tuttle Lateral to Well 98 Intertie would require approximately 1,300 linear feet of pipe.

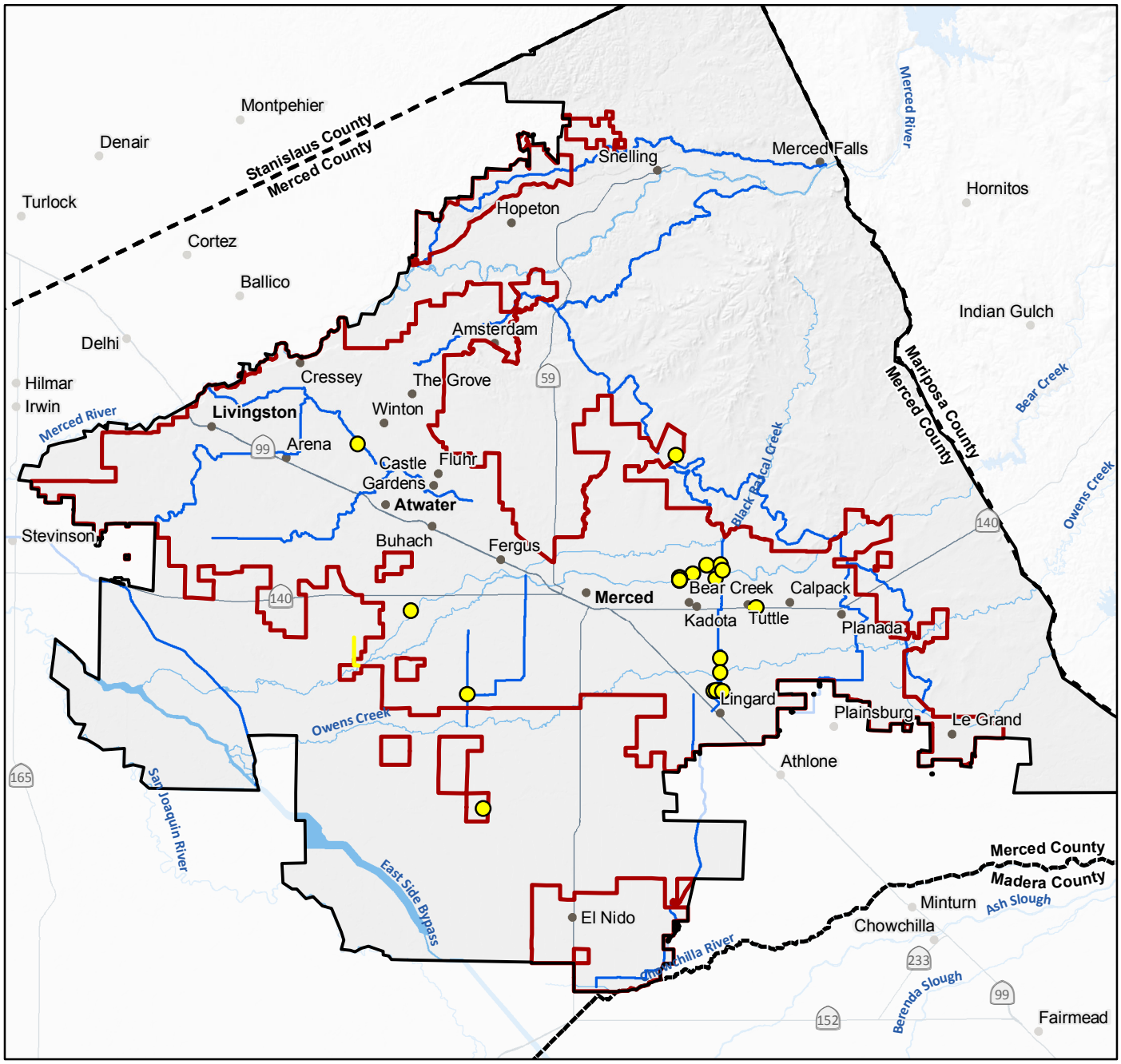
Earthwork associated with both the booster pumps and pipelines would potentially include canal bank raises to allow for additional facility capacity and freeboard flexibility for operation of the booster pumps.

Interconnection of canals and laterals would involve minor earthwork including excavation, canal embankment construction, construction of control structures, and general site grading to connect the canals. Soil excavation would be approximately 10,000 CY per project and would be balanced onsite. Demolition activities would generate approximately 20 CY of material per project. Truck trips would generally be limited to 1 or 2 trips; however, one project, the Bloss Intertie Project would require approximately 50 truck trips. Construction traffic would access the sites by way of existing public roads, ranch roads, and MID canal banks. Table 2-6 includes the anticipated maximum number of construction days, workforce, and equipment required to complete any of the intertie projects.

Intertie projects would generally result in an average disturbance area of up to 2.5 acres per project. No more than one project would occur in 1 year, resulting in up to 2.5 acres of total disturbance per year. Each project would not exceed approximately 0.2 acre of new permanent footprint. Projects are anticipated to require up to approximately 12 months to construct. Work could occur any time of the year, but tie-ins would be scheduled to occur outside of the irrigation season between November 1 and March 1. Work would occur within the MID canals and right-of-way.

**Pipelining, Rerouting, and New Channel Construction on Customer Property**

Projects would be implemented as necessary when MID customers approach the District requesting to change the configuration of the facility on their property so that they can maximize their land for crop use. These projects are owner-funded and constructed under MID supervision. Projects may include pipelining existing sections of canal or realigning existing canal sections with a new channel or pipeline. Locations for these types of improvements are currently unknown but would be located within the Program Area. Work could occur any time of the year, but tie-ins would be scheduled to occur outside of the irrigation season between November 1 and March 1.




LEGEND

- MID Program Area
- MID Service Area
- County
- Canal
- Natural Drainages
- Major River
- Interties

VICINITY MAP


**FIGURE 2-8 INTERTIE PROJECT LOCATIONS**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

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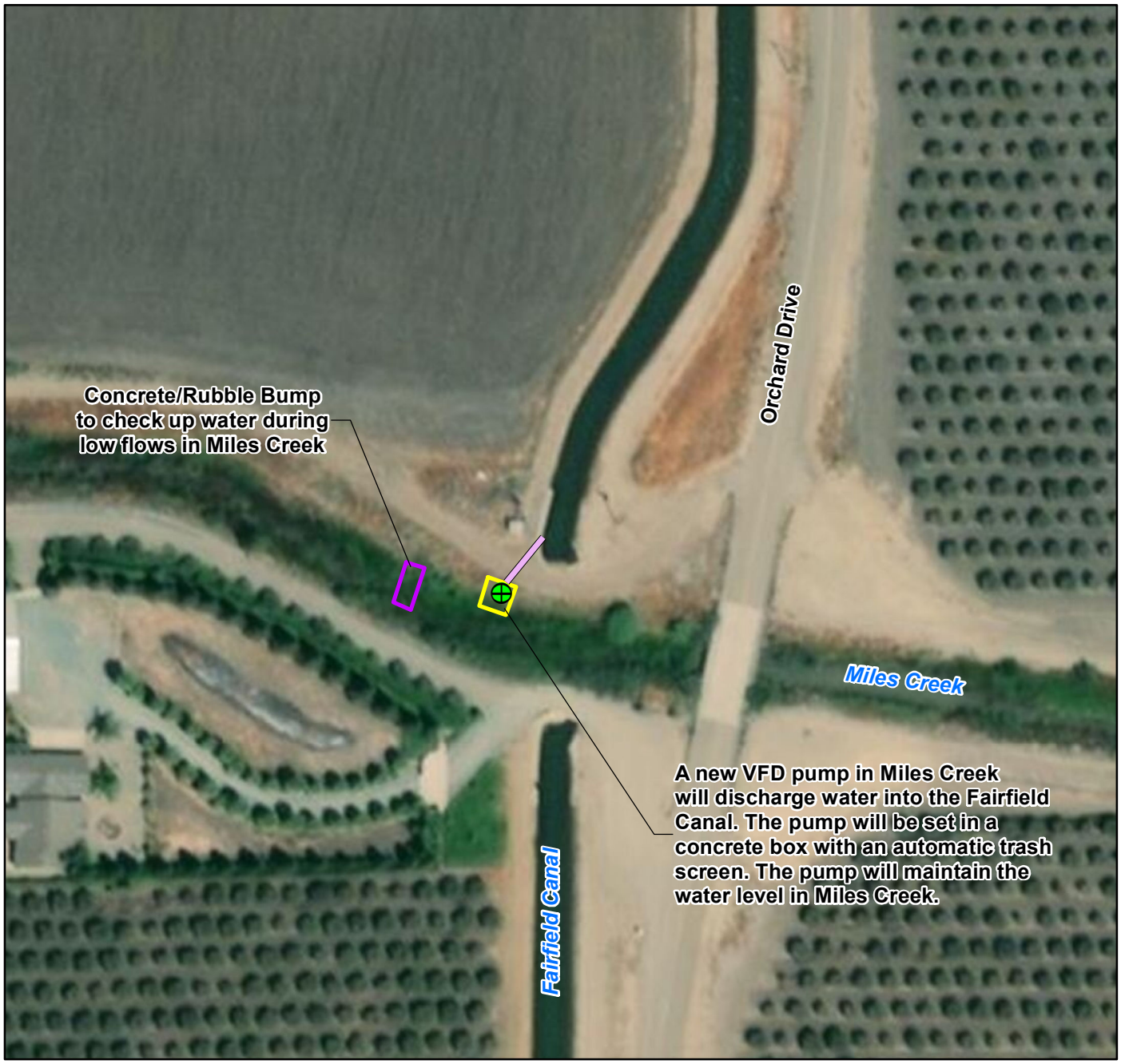
Miles




LEGEND

- New VFD Pump to Maintain Water Level in Miles Creek
- New Pipeline
- New Concrete Box with Automatic Trash Screen
- New Concrete/Rubble Bump

N

0 50 100
Feet


**FIGURE 2-9 TYPICAL INTERTIE PROJECT – PROPOSED MODIFICATIONS TO SUPPLEMENT FAIRFIELD CANAL WITH WATER FROM MILES CREEK**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**Operations and Maintenance for Canal/Lateral Operations and Flow Measurement Projects**

Newly constructed canal- and lateral-related infrastructure would be operated in conjunction with the existing system and would provide more streamlined operations. Long-term facility operations and maintenance activities would vary between the irrigation season and the winter shutdown periods. During irrigation season, each site would be accessed as necessary using existing access roads to make flow adjustments, check gate operations, and perform routine inspections of the facilities. During the winter shutdown, the operations and maintenance activities may include infrequent repairs and cleaning of canal gates and appurtenances, and annual inspections.

### 2.1.2.3 Reservoirs and Recharge Basins

Eleven new regulating reservoirs and increased capacity at one existing reservoir are proposed as part of the modernization projects. The proposed reservoirs would provide increased flexibility for water deliveries to laterals and turnouts both upstream and downstream of each proposed facility. The new or expanded reservoirs would allow for improved management toward achieving downstream canal target flow rates as required and automated monitoring and control to reduce canal operational spills. Summary information for each of the proposed reservoir projects is presented in Table 2-7. As shown in Table 2-7, reservoir projects are proposed to commence in 2019 and would be constructed as funding and landowner agreements are finalized through 2032.

Table 2-7. Reservoirs and Recharge Basins
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Name | Proposed Improvements | Location | Proposed Schedule |
|---|---|---|---|
| Increase Capacity of El Nido Reservoir | Increase reservoir storage capacity | **El Nido and Fairfield Canal System** | **2019** |
| McCoy Basin Reservoir | Regulating reservoir; VFD pumps; new automatic water level and flow control structures; emergency LCW; pump; SCADA | **Livingston Escaladian Canal System** | **2022** |
| Hadley Lateral Reservoir | Reservoir; VFD pumps; relocation of Lopac gate and Hadley Lateral flow control gate; new automatic flow control structure; new flow measurement structure; relocation of one turnout on an adjacent agricultural property; emergency LCW; SCADA | **Le Grand and Planada Canal System** | **2023, 2024** |
| Bear Creek Regulating Reservoir | Regulating reservoir; multiple VFD pumps; trash screens; earthen dam; flow measurement weir; solar panels; “concrete/rubber bump”; stilling wells; sensors | **Livingston Escaladian Canal System** | **2020** |
| Deadman Creek Regulating Reservoir | Regulating reservoir; automatic water level and flow control structures; VFD pumps | **El Capitan, Deane Canals, and West Bear Creek System** | **2024, 2025** |
| Le Grand Reservoir | Regulating reservoir; new LCW; VFD pumps; modifications to existing flow measurement device | **Le Grand and Planada Canal System** | **2024, 2025** |
| Atwater Canal Regulating Reservoir and Recharge Basin | Regulating reservoir, recharge basin; new LCWs; two-cell reservoir; LCW inlet and manual gate; flow control; Replogle flume | **Livingston Escaladian Canal System** | **2026, 2027, 2032** |

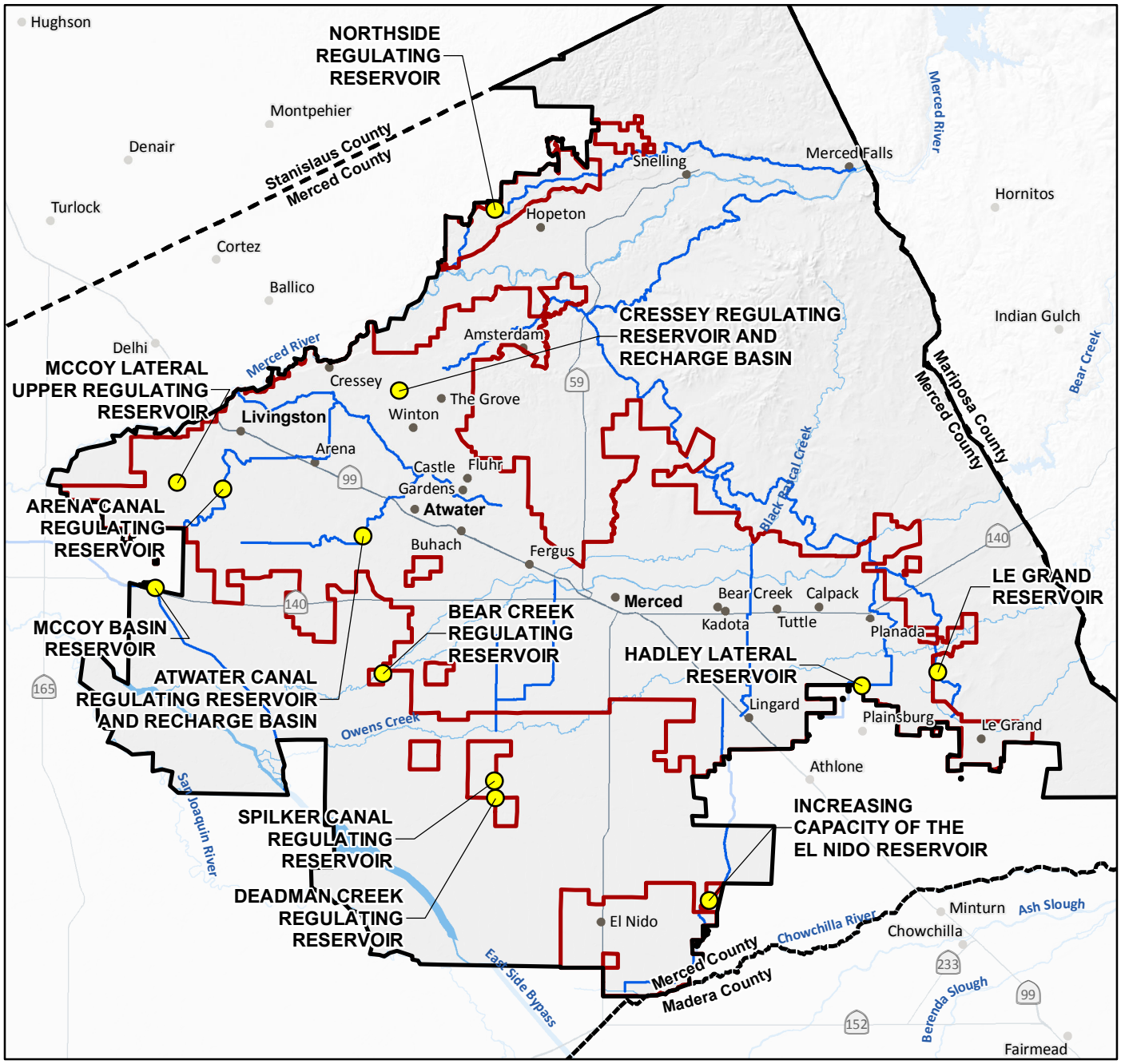
Table 2-7. Reservoirs and Recharge Basins

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Name | Proposed Improvements | Location | Proposed Schedule |
|---|---|---|---|
| Northside Regulating Reservoir | Regulating reservoir; new VFD pumps; manual flow control gate; concrete pipe; new automatic modulating valve; new Replogle flume; new flashboards at check structure | **Northside Canal System** | **2028** |
| Cressey Regulating Reservoir and Recharge Basin | Regulating reservoir; raising of canal banks; modifications to existing flap gate, flashboard check structure, sluice gates, and SCADA; new VFD pumps; LCW; Replogle flume | **Livingston Escaladian Canal System** | **2029** |
| Spilker Lateral Regulating Reservoir | Regulating reservoir; VFD pumps; new automatic water level and flow control structures; emergency LCW; pump; modifications to existing control scheme; SCADA | **El Capitan, Deane Canals, and West Bear Creek System** | **2029, 2030, 2031** |
| Arena Canal Regulating Reservoir and Recharge Basin | Regulating reservoir; recharge basin; new manual flow control gate; new LCWs; relocation of headgate; new pipeline; new VFD pumps; emergency LCW; modification of existing water level control structure; new subcritical contraction; raise canal banks and headwall | **Livingston Escaladian Canal System** | **2030, 2031, 2032** |
| McCoy Lateral Upper Regulating Reservoir | Regulating reservoir; new LCW; VFD reservoir outlet pumps; new pipeline; new automatic trash screens; automatic modulating valve | **Livingston Escaladian Canal System** | **2031, 2032** |

Proposed regulating reservoir projects would have storage capacities of up to approximately 120 acre-feet (AF) and would occupy up to approximately 65 acres. Existing canal or lateral flows would be diverted either from, or to, the proposed reservoirs to balance the demands of upstream and downstream irrigation delivery orders with the incoming canal or lateral flows. This balancing, or "buffering," of flows would allow for improved water delivery service at irrigation turnouts and improve overall water use efficiency by reducing unnecessary operational canal spills. The proposed reservoirs would not impound any natural surface water flows or other inflows.

Land needed to construct each reservoir in the vicinity of existing canal and lateral facilities would be excavated, and embankments along the reservoir boundaries would be constructed to form each reservoir. An overview of the reservoir project locations is presented on Figure 2-10. Conceptual site layouts of the individual reservoir and basin projects are included on Figures 2-11 through 2-23. Proposed reservoirs may be constructed to include an interior dike to form a second "cell" within the reservoir. In some cases, the second cell would operate as a recharge basin.




LEGEND

- MID Program Area
- MID Service Area
- Canal
- Natural Drainages
- Major River
- Reservoir and Recharge Basin Project Location

VICINITY MAP


**FIGURE 2-10 RESERVOIR AND RECHARGE BASIN PROJECT LOCATIONS**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

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0 2.5 5
Miles



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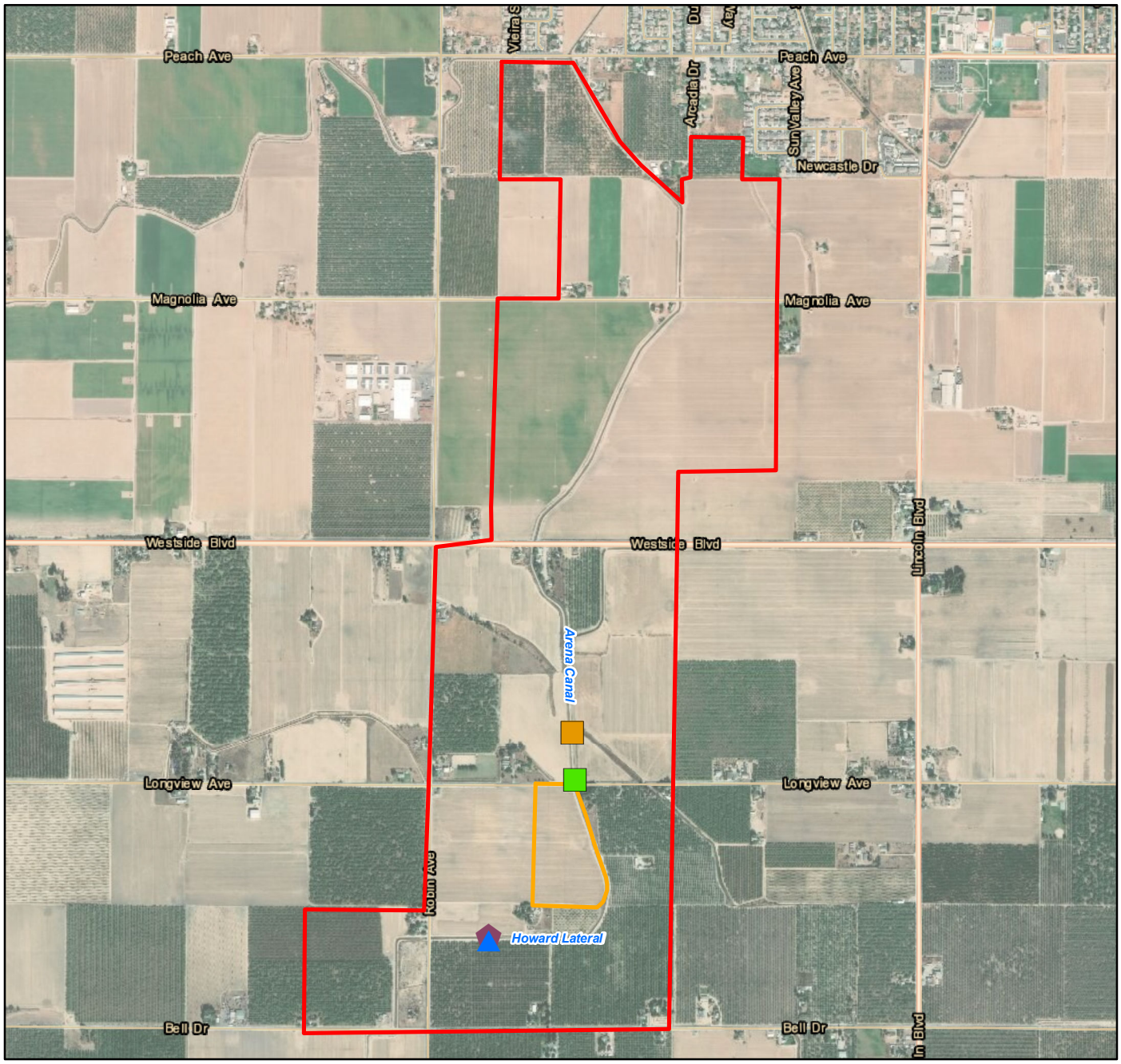



LEGEND

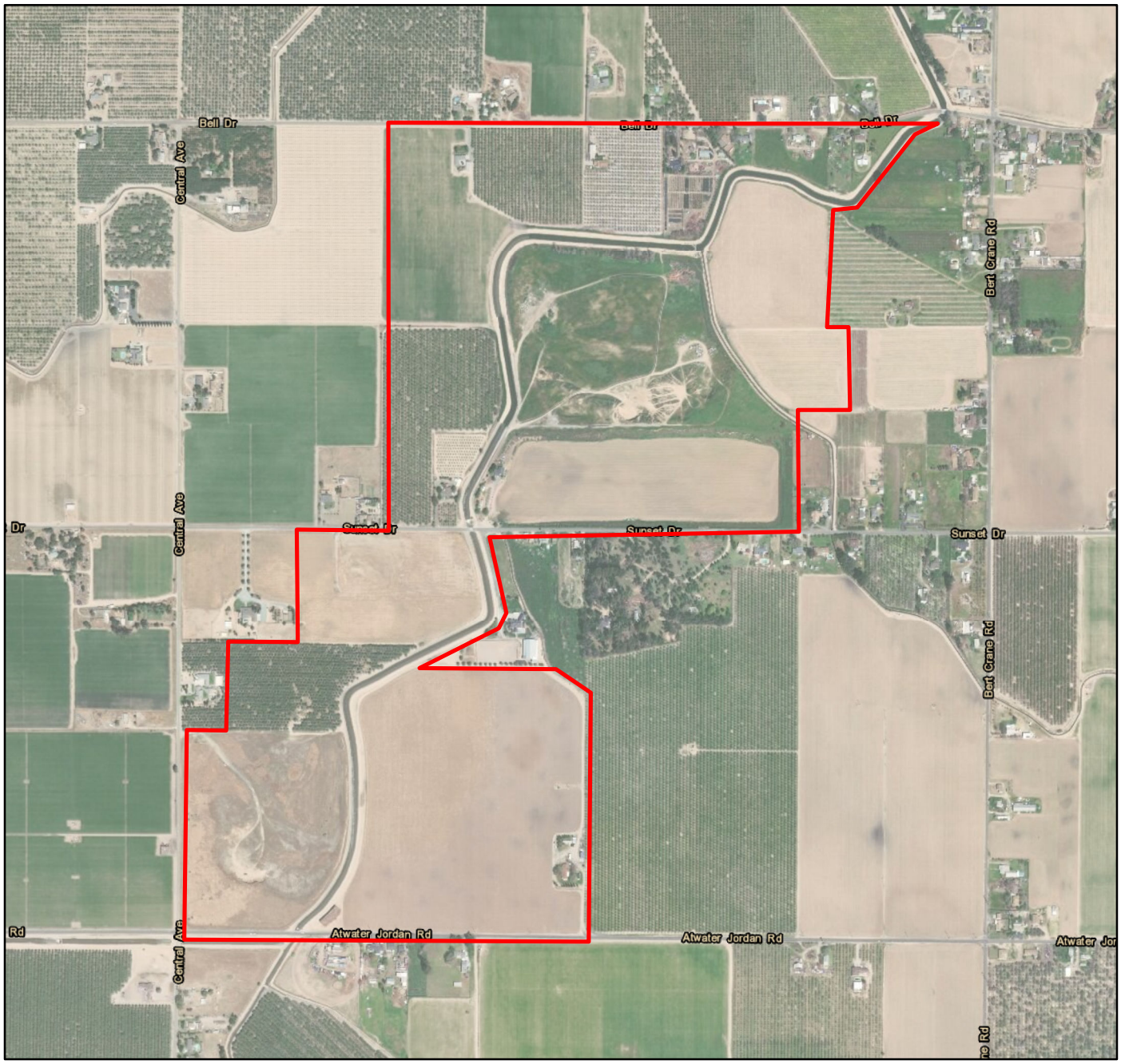
- Range of Potential Reservoir Sites
- Probable Reservoir Location
- Existing LCW
- Existing Spill
- Existing Rubicon Gate
- Existing Danadian Gate

VICINITY MAP


N

0 900 1,800
Feet

**FIGURE 2-11 ARENA CANAL REGULATING RESERVOIR**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA




LEGEND

Range of Potential Reservoir Sites

VICINITY MAP


**FIGURE 2-12 ATWATER CANAL REGULATING RESERVOIR AND RECHARGE BASIN**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

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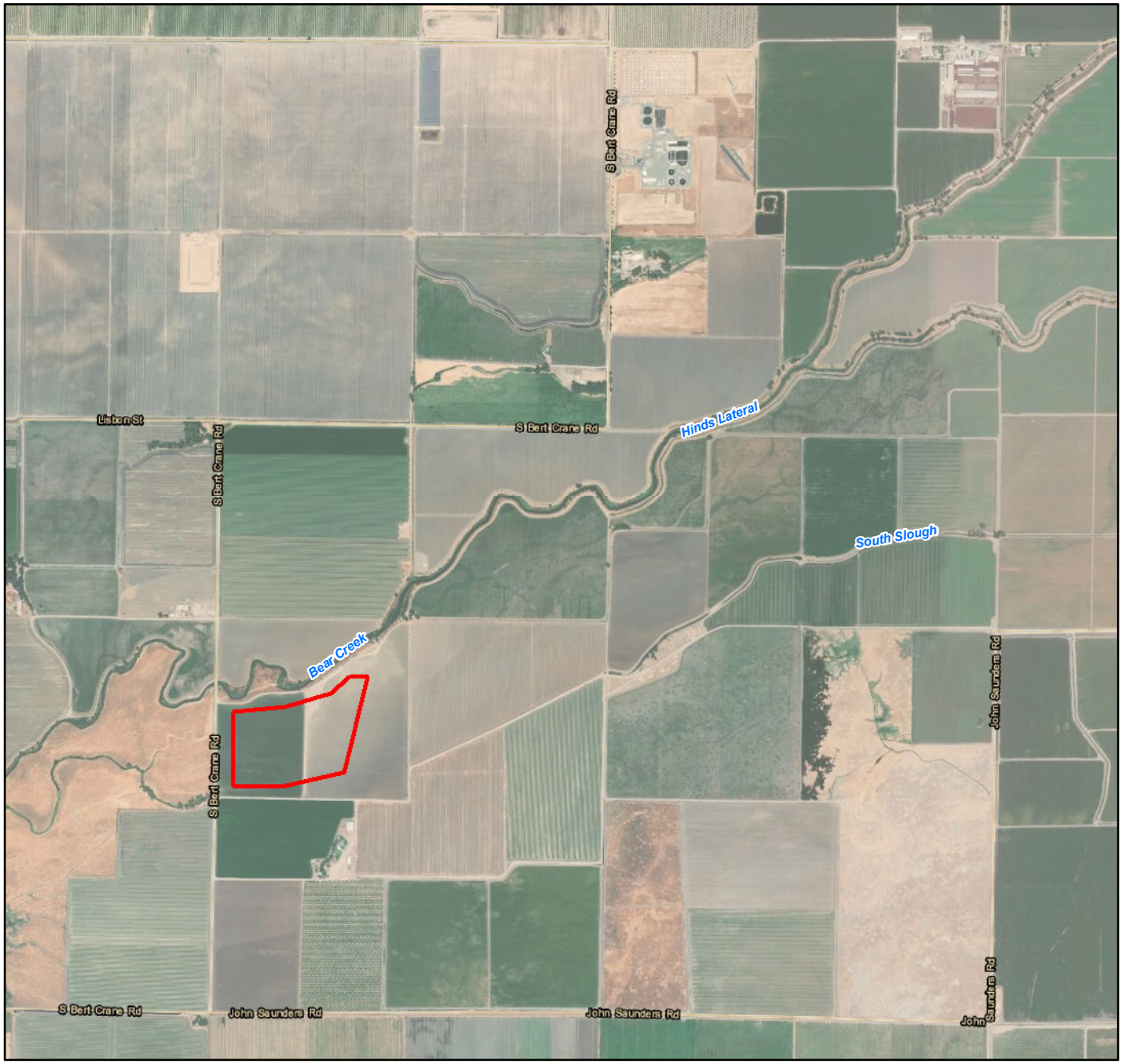
Feet




LEGEND

Proposed Reservoir Site

VICINITY MAP


**FIGURE 2-13 BEAR CREEK REGULATING RESERVOIR**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

N

0 1,000 2,000
Feet


LEGEND

- Range of Potential Reservoir Sites
- LCW Inlet in Recharge Basin and Manual On/Off Gate
- Reservoir Outlet Pumps

VICINITY MAP


**FIGURE 2-14 CRESSEY REGULATING RESERVOIR AND RECHARGE BASIN**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

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0 200 400
Feet



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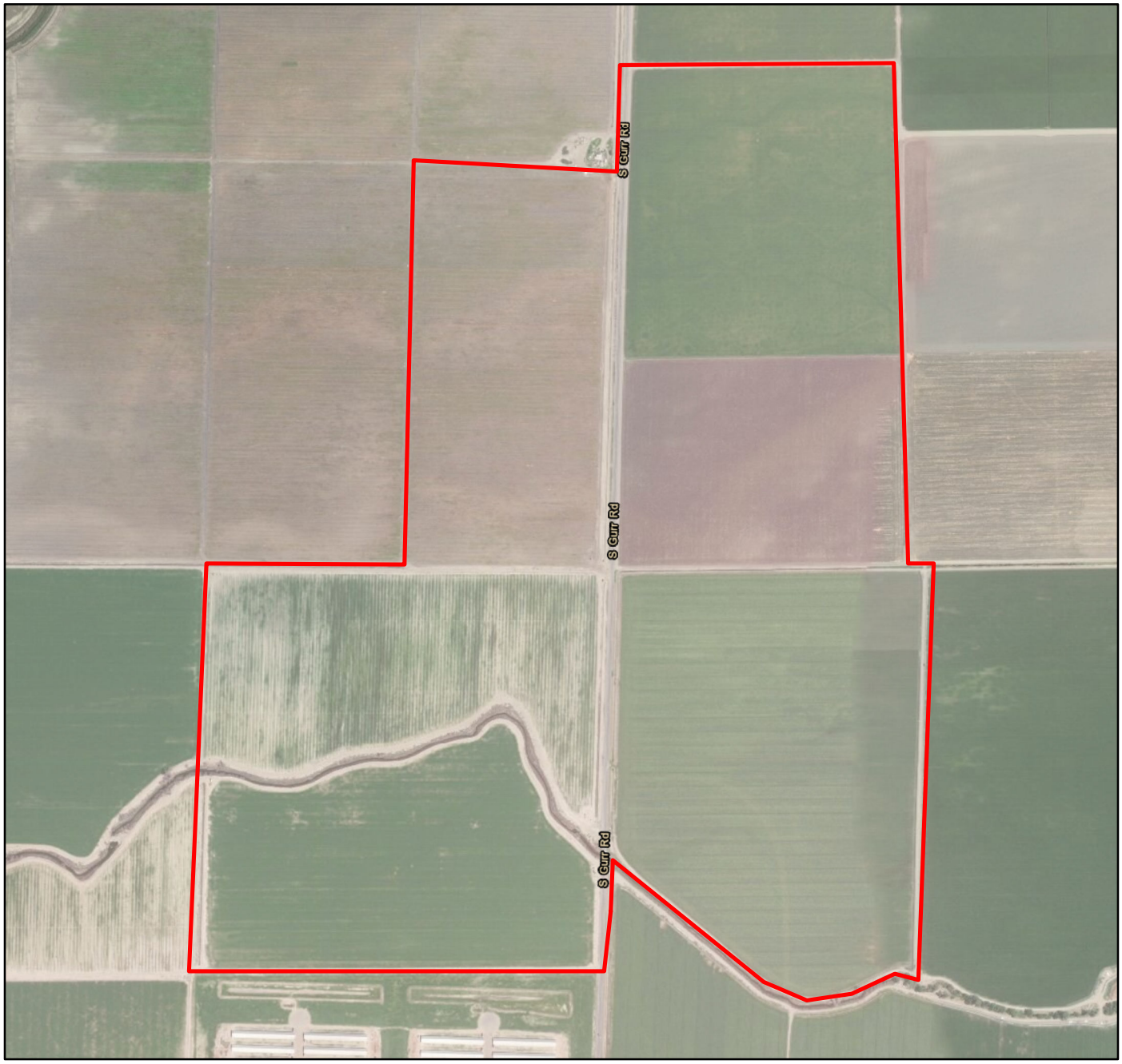


LEGEND

Range of Potential Reservoir Sites

VICINITY MAP


**FIGURE 2-15 DEADMAN CREEK REGULATING RESERVOIR**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

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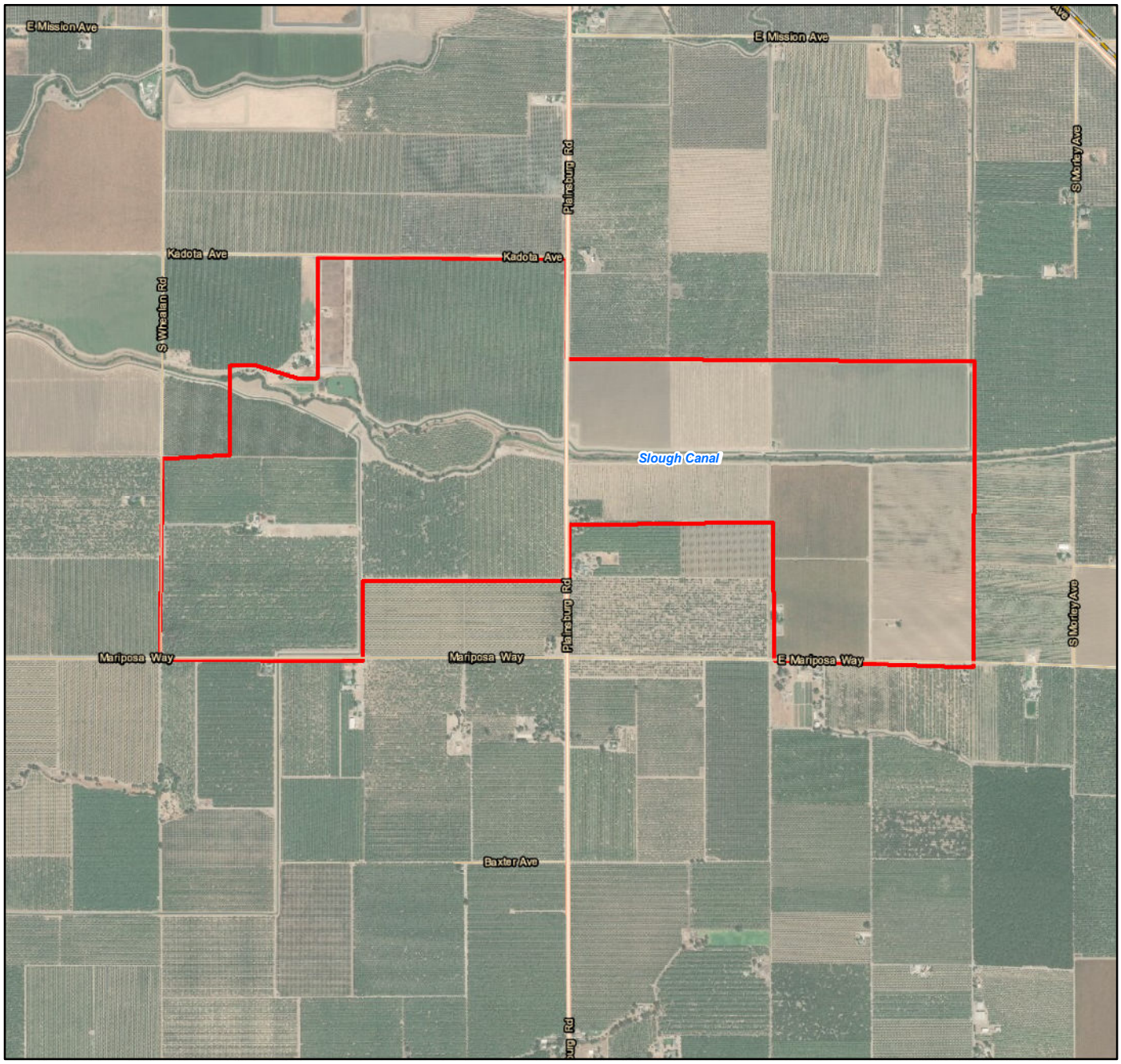
Feet




LEGEND

Range of Potential Reservoir Sites

VICINITY MAP


**FIGURE 2-16 HADLEY LATERAL RESERVOIR**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

N

0 1,000 2,000
Feet

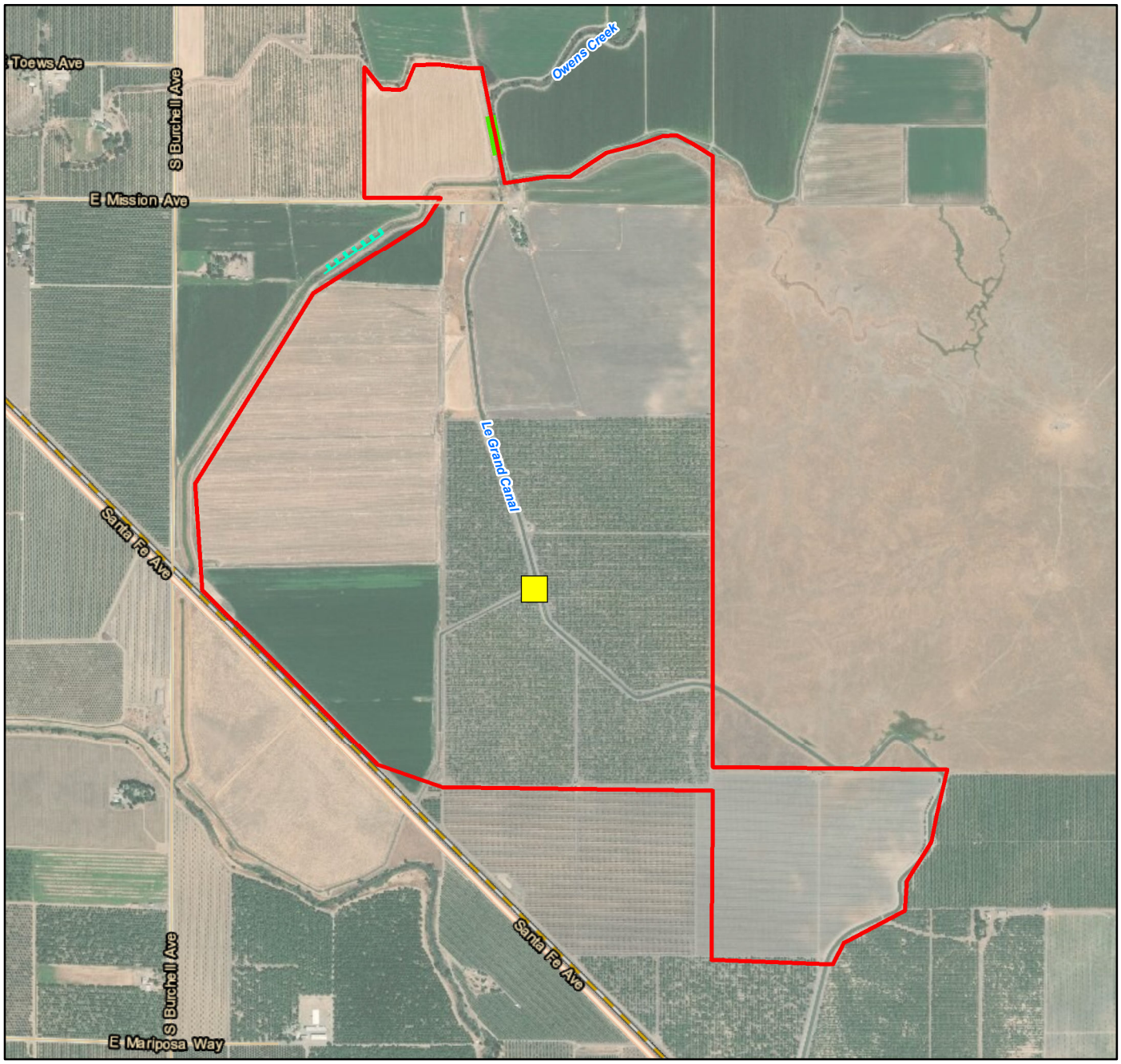

LEGEND

- Existing Reservoir Site
- Existing Convergence with Lower Cell
- Existing Gravity Inlet
- Existing Gravity Outlet
- Existing Langemann Gate

VICINITY MAP


**FIGURE 2-17 INCREASING CAPACITY OF EL NIDO RESERVOIR**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

N
0 500 1,000
Feet




LEGEND

- Range of Potential Reservoir Sites
- Owens Diversion Canal
- Siphon
- Existing Manual Flow Control

VICINITY MAP


**FIGURE 2-18 LE GRAND RESERVOIR**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

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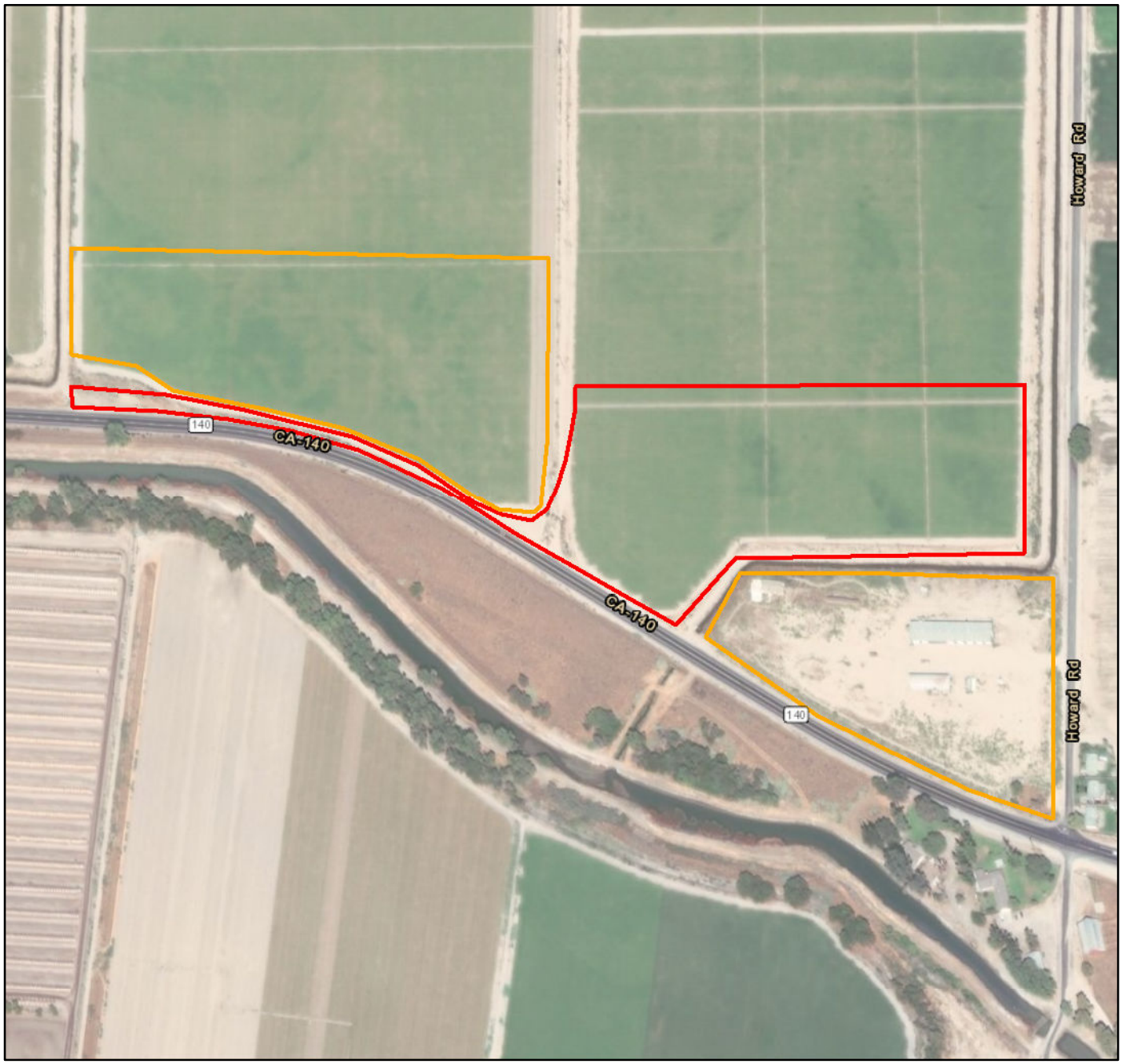
0 900 1,800
Feet




LEGEND

Potential Staging Area

Reservoir Location

VICINITY MAP


**FIGURE 2-19 MCCOY BASIN REGULATING RESERVOIR**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

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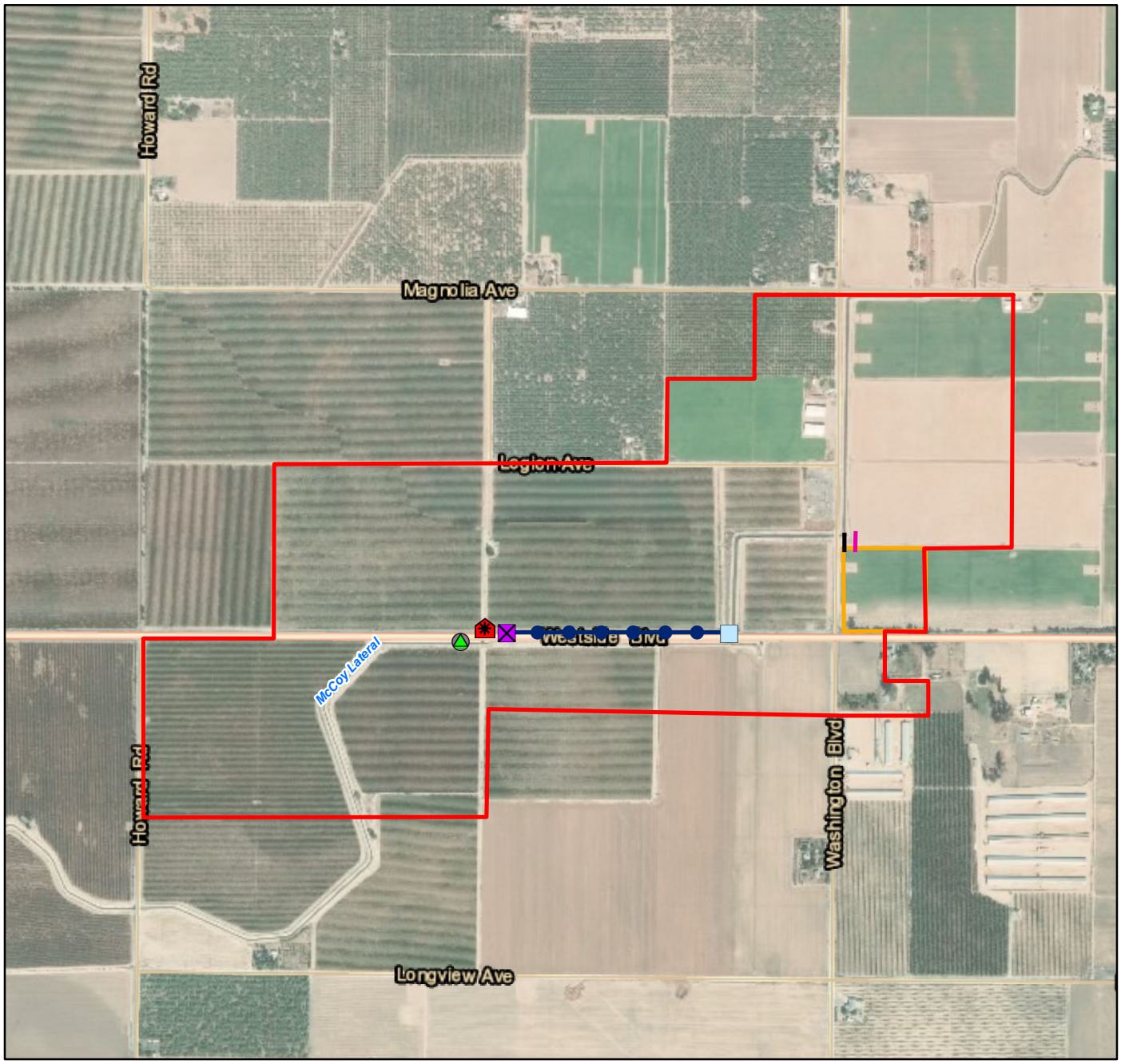
0 200 400
Feet



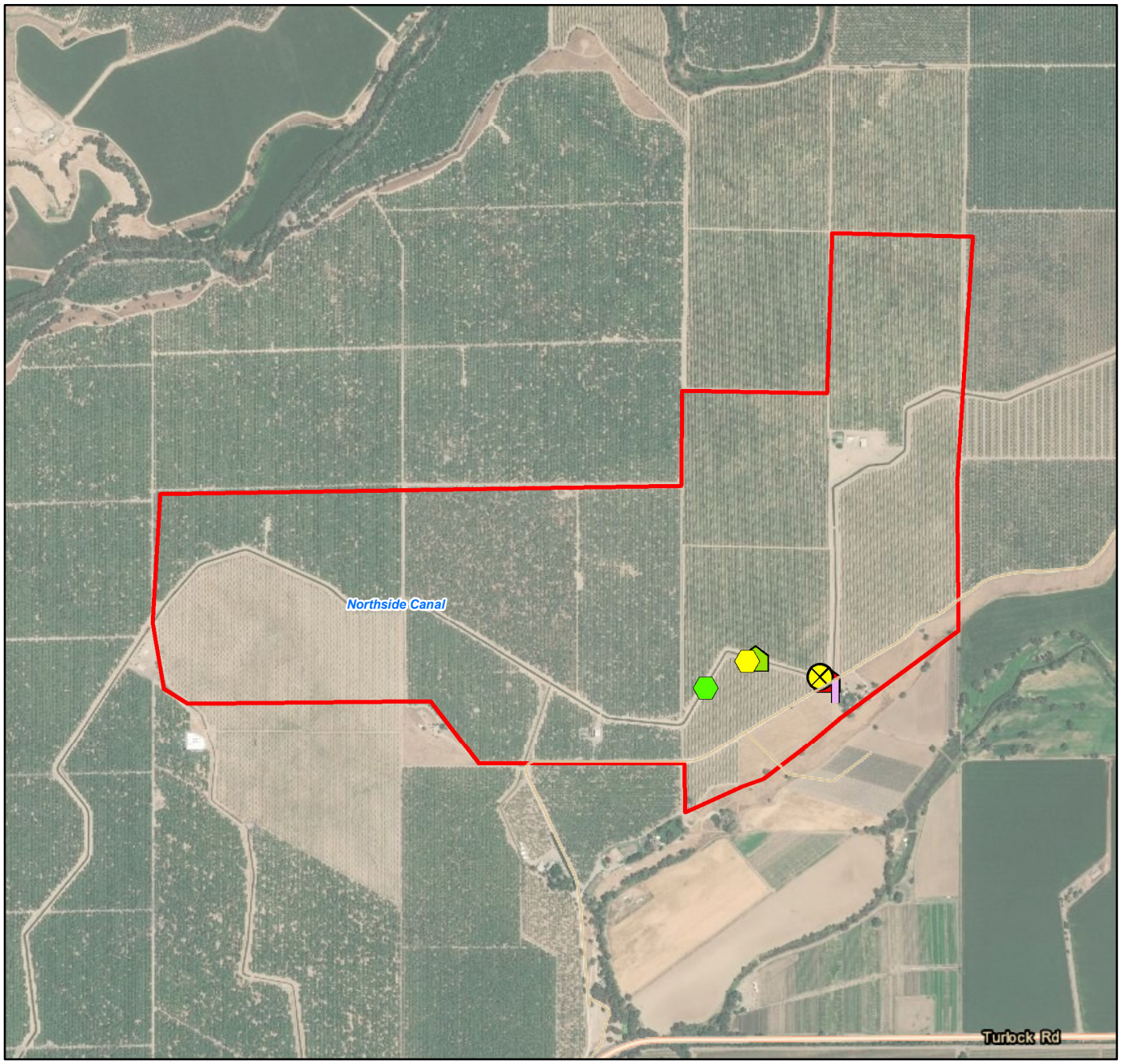

LEGEND

- Range of Potential Reservoir Sites
- Probable Reservoir Location
- New 48" Supplemental Pipeline
- New LCW Reservoir Inlet
- New Reservoir Outlet VFD Pumps
- Existing Short LCW
- Existing Spill Structure
- New Modulating Valve
- Flow Measurement Section

VICINITY MAP


0 900 1,800
Feet

**FIGURE 2-20 MCCOY LATERAL UPPER REGULATING RESERVOIR**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA




LEGEND

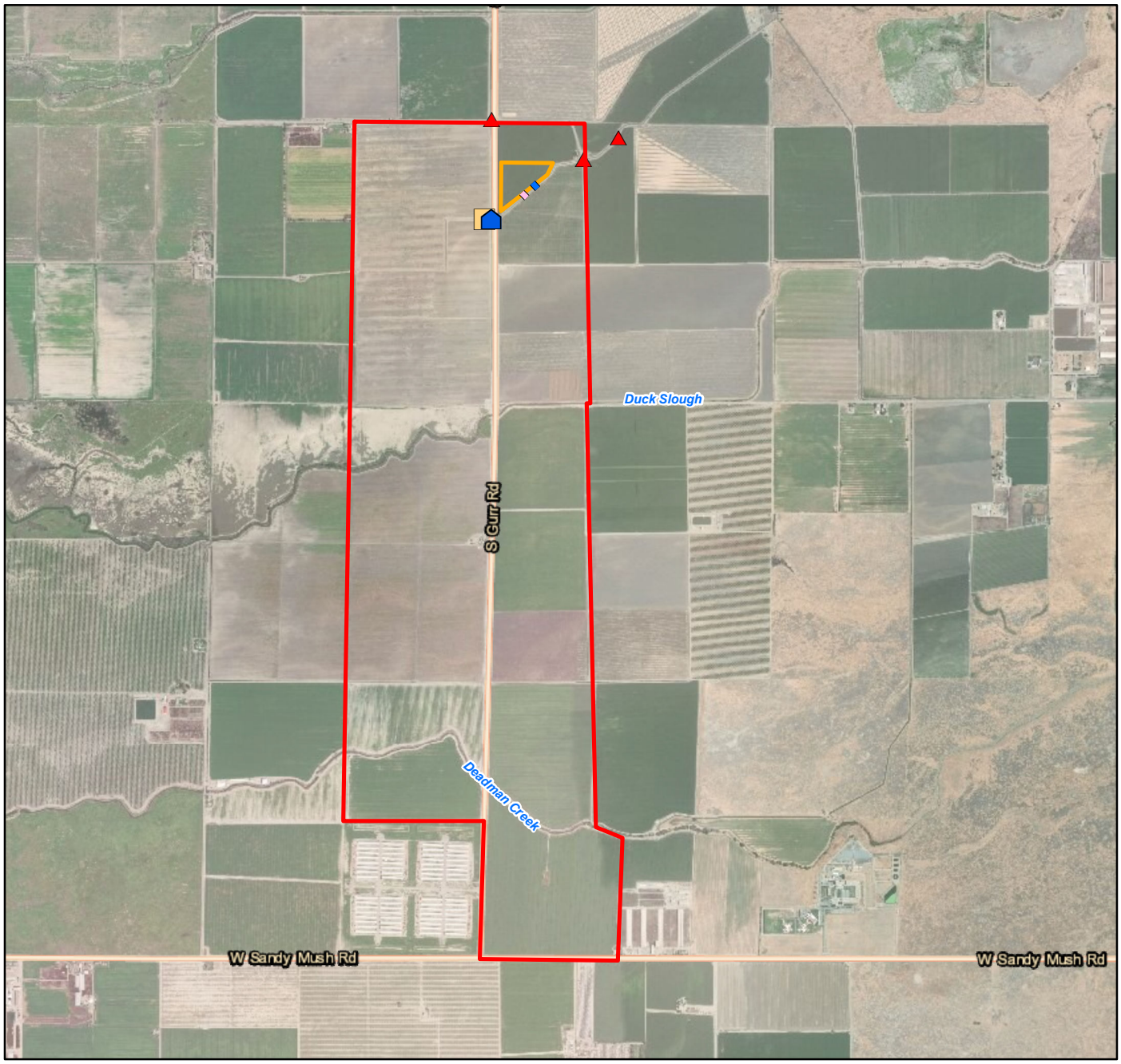
- Range of Potential Reservoir Sites
- Reservoir Inlet VFD Pump
- Abandoned Check Structure
- Existing Check Structure
- New Manual Flow Control
- Automatic Modulating Valve
- New Replogle Flume

VICINITY MAP


N

0 900 1,800
Feet

**FIGURE 2-21 NORTHSIDE REGULATING RESERVOIR**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA



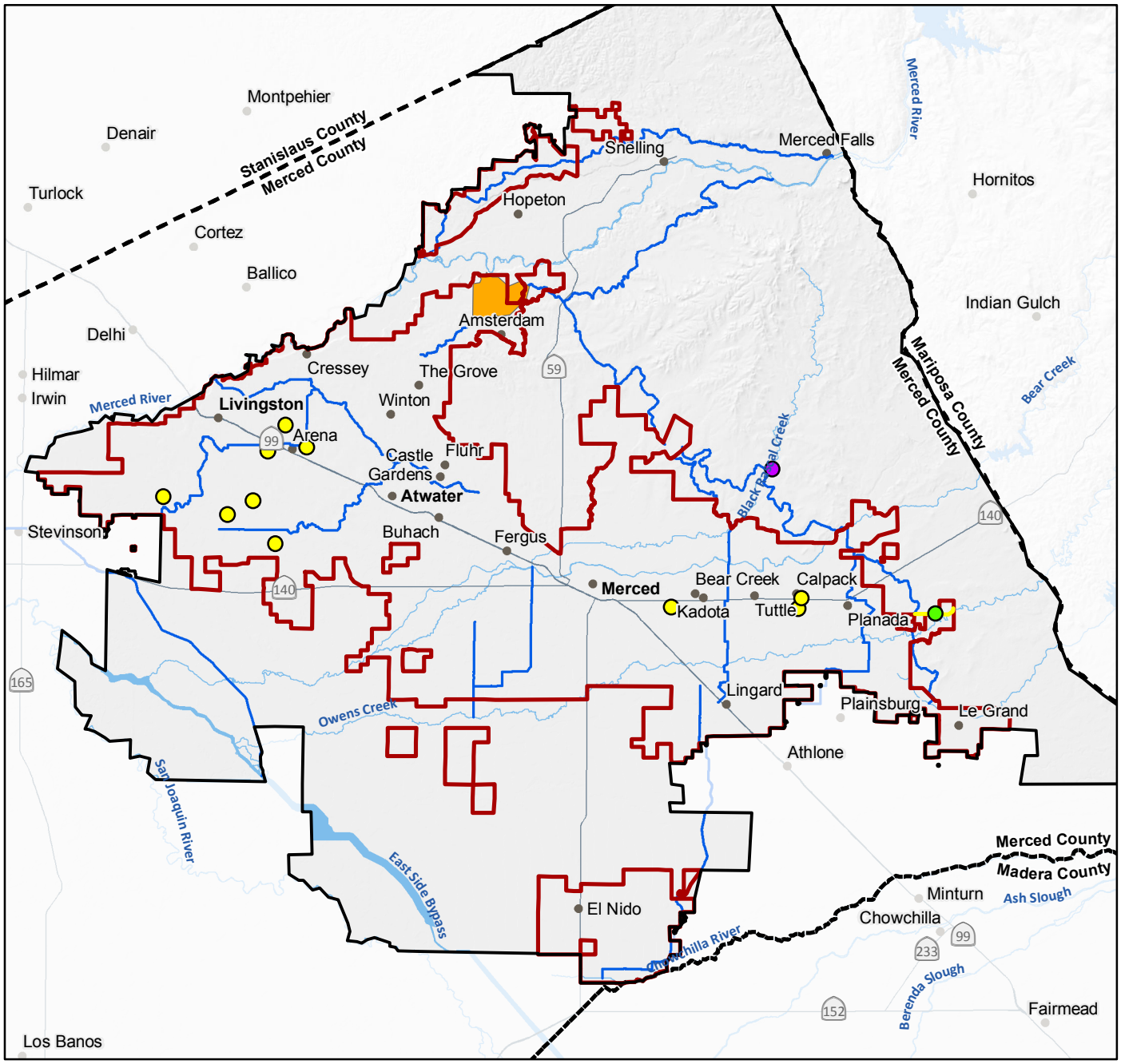

LEGEND

- Range of Potential Reservoir Sites
- Probable Reservoir Location
- New Inlet Pumps
- New Outlet Pumps
- New LCW
- New Spilker Lateral Pump
- New Flow Control Structure

VICINITY MAP


0 1,500 3,000
Feet

**FIGURE 2-22 SPILKER CANAL REGULATING RESERVOIR**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA




LEGEND

- MID Program Area
- MID Service Area
- County
- Canal
- Natural Drainages
- Major River
- Highlands Projects
- Owens Creek Diversion Channel Project
- Black Rascal Creek Diversion Channel Project
- Merced River Water Recovery Project

N

0 2.5 5
Miles

VICINITY MAP


**FIGURE 2-23 CONJUNCTIVE WATER USE MANAGEMENT PROJECT LOCATIONS**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

In most cases, reservoirs would be constructed of compacted earth (unlined) from the project site generated through necessary excavations and earth movement. As feasible, reservoirs would be designed to balance the site, so that no fill material would need to be imported. The maximum reservoir water surface elevation would be limited to 6 feet above original grade. Riprap, concrete, or geotextile lining may be installed on reservoir embankments to protect the embankments from erosion caused by reservoir drawdown, wind, and precipitation. Security fencing would be installed along the perimeter of the sites, as necessary. As required to optimize earthwork and provide a means of draining the proposed reservoir, a drainage channel may be constructed within the reservoir inverts. Pump intake structures and canal outlet structures would be constructed at the tie-in locations of the canal and lateral facilities.

Other associated improvements would include the following:

- Installation of new or replacement manual and automatic flow control structures
- Installation of new or replacement flow measurement structures
- Installation of new or replacement of headgates
- Installation of new sensors, stilling wells, pipeline, pumps, and trash screens
- Installation of new or modifications to existing water level control structures
- Raising of canal banks and headwalls
- Installation of solar panels
- Installation of “concrete/rubber bump”
- Installation of SCADA system equipment
- Sediment removal (primarily applies to the Increase Capacity of El Nido Reservoir Project)

In addition, future onsite stormwater runoff would likely be conveyed via new drainage swales, ditches, or culverts around the proposed reservoir toe of berm. Stormwater would likely be directed toward the area where stormwater currently flows. Conveyance of stormwater into canal and lateral facilities would be avoided, if possible. Stormwater runoff in other areas of the project sites would be unaffected by project implementation. SCADA would be incorporated into the reservoir designs to monitor water levels in the level pools, cell(s) of the reservoir, and upstream on canal and lateral facilities. Where applicable, SCADA would monitor the regulation cell outlet pump flows and speeds, as well as gate positions and flows.

**Anticipated Disturbance Areas and Site Access**

Construction activities (including staging and laydown areas) for the proposed reservoir and basin projects would typically be contained within an approximate 60-acre construction footprint or within and adjacent to the canal and existing facility footprints (approximately 2 of the 60 acres would be temporary). Access to each proposed reservoir would be via public roadways and District access roads. It is expected that construction would last approximately 18 months in total and could occur any time of the year; however, tie-in work would occur outside of the irrigation season, between November 1 and March 1 to avoid affecting water deliveries. Work activities would also be limited in winter months, as necessary, to times when access and work would not be constrained by weather. Consistent with the Merced County Code, work would be conducted primarily Monday through Friday, between 7:00 a.m. and 6:00 p.m.; and construction activities would only occur during the evening or weekends with approval of MID and in coordination with affected landowners. Activities requiring workers and truck traffic would include site excavation, backfill, and concrete pours, as well as vehicle trips for the delivery of concrete or hauling excavated material.

It is anticipated that each project would require approximately 150,000 CY of soil excavation. It is assumed that 60 percent of this material would be suitable for reuse, and an additional 200 CY of soil would be imported. Approximately 50,000 CY would be used in the construction of the berms surrounding the new project facilities, and up to 10,000 CY may also be used along existing MID canal banks within a 5-mile radius of each project site to support ongoing bank maintenance. The remaining,

up-to 40,000 CY of nonsuitable material excavated for each project would either be sold to fill buyers or be permanently stored on District-owned property adjacent to project sites and used for maintaining canals. Excess excavation materials are not anticipated to be diverted to landfills during facility construction. Although the reservoirs would typically be unlined, approximately 630 CY of concrete would be trucked in for reservoir-related infrastructure (such as, intake and discharge facilities, and outlet). Maximum excavation depths are anticipated to be approximately 10 feet deep at the inlet and outlet pumps, and between 2 and 4 feet across the reservoir. No additional areas for staging and laydown outside of the construction footprint would be needed. Demolition of existing facilities would include removal of the existing headgates from associated structures at the head of canal facilities for each proposed reservoir site as needed and would generate approximately 50 CY of material per proposed reservoir.

Table 2-8 summarizes anticipated construction activities (which would generally occur in sequence and only minimally overlap), personnel, and equipment required for each of the proposed reservoir projects.

Table 2-8. Reservoirs and Recharge Basin Projects Construction Work Days, Workforce, and Equipment[a]
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity | Work Days | Personnel Required | Equipment Required[b] |
|---|---|---|---|
| Site Clearing | 40 | 8 to 12 | 2 Bulldozers with brush attachments<br>1 Grader<br>1 Backhoe<br>1 Loader<br>3 Dump trucks<br>1 Water truck |
| Earthwork<br>(topsoil stripping and removal) | 20 | 5 to 14 | 2 Bulldozers<br>1 Loader<br>2 Dump trucks<br>1 Water truck |
| Earthwork<br>(reservoir construction) | 180 | 15 to 27 | 4 Scrapers<br>2 Bulldozers<br>1 Loader<br>1 Grader<br>2 Compactors<br>1 Water truck<br>3 Dump trucks |
| Structure/Equipment Installation | 180 | 10 to 20 | 6 Ready-mix trucks<br>1 Excavator<br>1 Backhoe<br>1 Dump truck<br>1 Concrete pump<br>1 Generator<br>1 Power screed<br>1 25-ton crane<br>1 Water truck |
| Dust Control | Duration of each | 1 | 1 Water truck |

[a] Table lists anticipated maximum requirements for each construction location within the various reservoir and basin projects. Some projects, smaller in scale, would require far less construction workers, work days, and equipment, than projects of greater scale and complexity.

[b] Equipment required periodically during the work days of each construction activity.

**Construction Traffic**

Construction traffic would access each site via existing roads. Typical daily averages of construction vehicles entering and exiting the site during most of the construction period would range between 8 and 10 vehicles. Average daily construction activities would require up to 10 workers onsite and 6 major pieces of equipment, with occasional increases to 27 workers and 8 to 10 pieces of major equipment.

Activities requiring maximum workers and truck traffic would be limited to concrete pours.

**Operations and Maintenance**

The proposed reservoirs and basins would be operated during the irrigation season to maintain a constant water surface elevation in the corresponding canals and laterals to achieve target flow rates (flow discrepancies up to 50 cubic feet per second [cfs] would be absorbed by the regulating reservoirs). Water would be conveyed into and out of the reservoirs via pumps or gravity flow to and from the canal and lateral facilities to support improved water management. Normal operations would include daily visits by MID operations staff to monitor conditions and make manual changes to local irrigation services near the reservoirs. Operations of reservoir outlet gates would be accomplished using remote SCADA monitoring and control.

Maintenance activities for the reservoirs would include winter-season shutdown and draining; periodic sediment removal, if needed; and vegetation control. Periodic inspection and maintenance would be performed on mechanical and electrical equipment as needed.

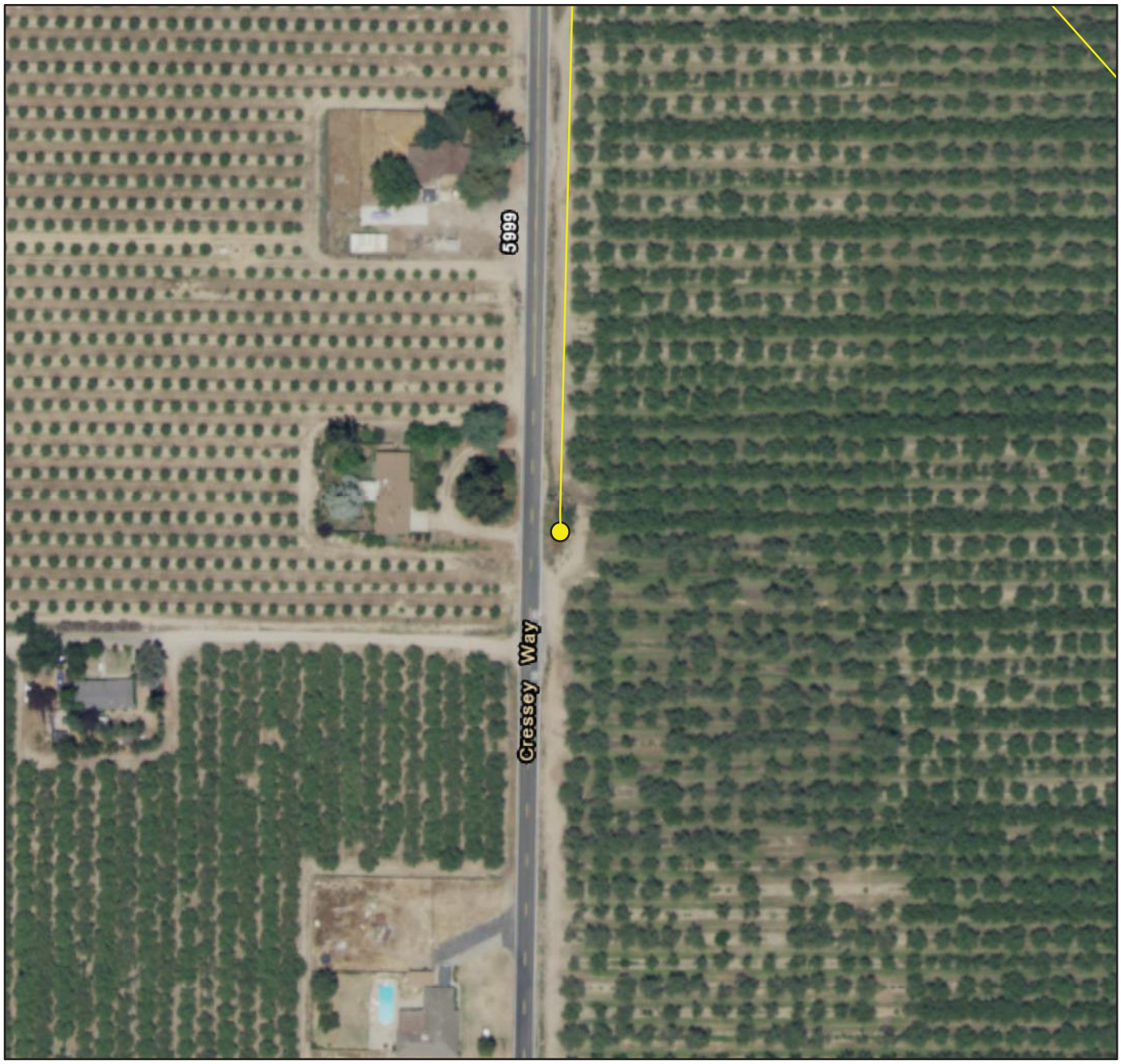
#### 2.1.2.4 Conjunctive Water Use Management Projects

As part of the Proposed Program, MID would implement 12 conjunctive water use management projects, which would involve the coordinated use of surface water and groundwater resources via existing wells, as well as proposed booster stations, pipelines, and recharge basins. During dry periods (below-normal rainfall) groundwater would be used in lieu of surface water to help meet water demands in areas of higher elevation and high surface water percolation. Conjunctive water use management projects would include (1) installation of new booster pumps and new conveyance pipelines to deliver surface water from nearby canals to areas that are generally unable to receive surface water by gravity flow (the highlands projects), (2) diversion of winter stormwater flows from creeks into the Le Grand Canal for the purpose of groundwater recharge where cones of depression have occurred from groundwater pumping, and (3) installation of a pump station to recover water not used by diverters for beneficial use (the Merced River Water Recovery Project). Expansion of existing recharge basins and installation of new recharge basins and groundwater monitoring is proposed to occur in coordination with the implementation/construction of new regulating reservoirs (discussed above and further described in Subsection 2.1.2.2, Canal and Lateral Operations and Measurement Projects).

Conjunctive water use management projects would be located primarily in the western portion of the Program Area (which includes the Livingston Canal and Escaladian Canal systems), where soils are coarser and available surface water is typically lost due to rapid percolation in the soil. The highlands and diversion channel projects are shown on Figure 2-24.

**Highlands Projects**

The proposed highlands projects include the installation of booster pump and pipeline upgrades to deliver surface water from nearby canals to acreage currently served by MID wells and private wells. The highlands projects would reduce the overall demand on groundwater through the provision of surface water (allowing existing groundwater users to reduce use of their existing wells) and reduce the need to deepen and replace existing groundwater wells in the area and surrounding properties.




LEGEND

- Highlands 11
- Lateral

VICINITY MAP


**FIGURE 2-24 TYPICAL HIGHLANDS PROJECT – HIGHLANDS 11**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

N

0 75 150
Feet

### *Proposed Implementation/Construction*

Each proposed project would include (1) installation of an electric booster pump and buried polyvinyl chloride (PVC) and/or reinforced concrete pipeline. Some projects may also include an intake screen and/or a VFD. The booster pumps would be installed in an approximately 6-foot by 6-foot covered concrete box. A service pole and associated panel backboard (minimum of 5 feet wide) would be installed, where necessary to connect to the existing power grid. Existing delivery structures may be modified if needed or a new structure installed if the delivery is in poor condition or there is not a structure at the site. The new pipelines would be connected to the grower's existing delivery system and would generally be 30 inches in diameter and range in length from 1,100 feet to 5,100 feet. Air vents would be installed along each pipeline approximately every 300 feet, and existing standpipes and boxes would be raised as necessary.

### *Anticipated Disturbance Areas and Site Access*

Total construction footprint, including staging and laydown areas, would be approximately 3 acres or less for each project site. A 40-foot-wide construction area or less would be required along the length of each pipeline. Pipeline lengths would vary as described above. Soil excavation for the pipeline trenches and other structures would be to a depth that would provide a minimum cover of 3 feet above the pipe and 1 foot on either side. Excavation would be limited to the width of the easement and would vary by project, up to approximately 100 CY, and would be balanced onsite. Demolition activities would generate approximately 20 CY of material. Construction traffic would access the sites by way of public roads and MID canal banks.

Construction could occur any time of the year but would avoid wet conditions. Projects would occur between 2029 and 2032. Activities requiring workers and truck traffic would include site excavation, backfill, and concrete pours. Table 2-9 includes anticipated construction activities, personnel, and equipment required for each of the proposed reservoir projects. Construction activities would last up to 6 months.

Table 2-9 includes construction work days, workforce, and equipment for these general activities.

Table 2-9. Highlands Projects Construction Work Days, Workforce, and Equipment[a]
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity | Work Days | Personnel Required | Equipment Required[b] |
|---|---|---|---|
| Site Clearing, Earthwork | 2 days | 5 | 1 Excavator<br>1 Backhoe<br>1 Dump truck<br>1 Concrete truck/pumping equipment |
| Construction | 23+ days (3+ days to complete test well work, 20+ days for permanent well installation) | 5 | 1 Backhoe (with hydraulic hammer)<br>1 Drill rig<br>1 Crane<br>1 Water truck<br>1 Dump truck<br>1 Concrete truck/pumping equipment |
| Dust Control | Duration of each | 1 | 1 Water truck |

[a] Table lists anticipated requirements for each construction location within the various highlands projects. Some projects, smaller in scale, would require far fewer construction workers and work days, and less equipment than projects of greater scale and complexity.

[b] Equipment required periodically during the work days of each construction activity.

**Stormflow Diversions**

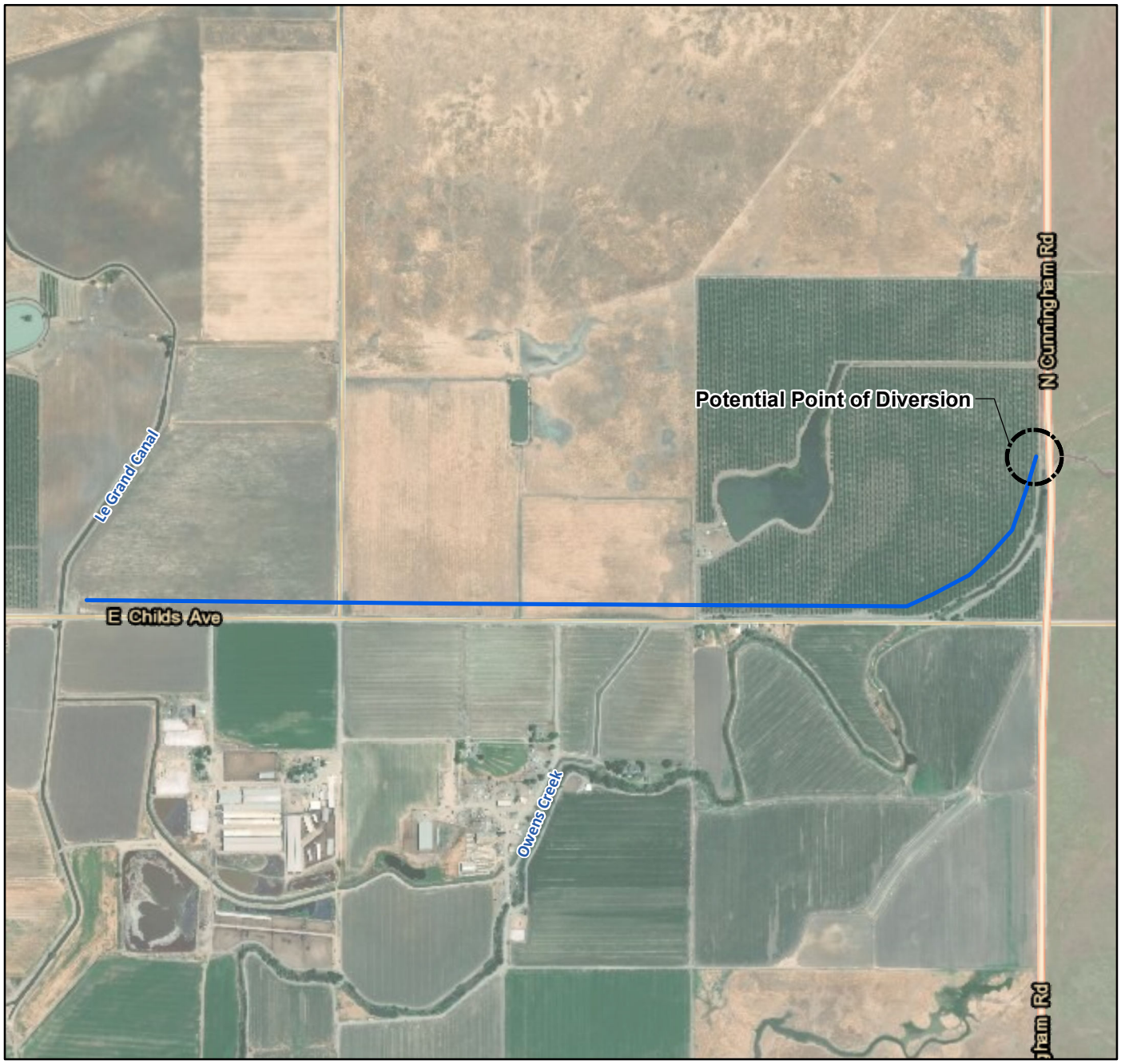
Two projects are proposed to divert winter stormwater flows from Black Rascal Creek and Owens Creek into the Le Grand Canal—the Owens Creek Diversion Channel and Black Rascal Creek Diversion Channel Projects. These and other creeks cross the existing canal alignment, which would require construction of new diversion channels that divert water through new control structures from upstream creeks and allow the stormwater to gravity-flow into the Le Grand Canal through these new diversion channels. Exact locations of the points of diversion have yet to be determined. Although MID holds water rights on Owens Creek and Black Rascal Creek, the specific points of diversion, once known, would need to be approved by the State Water Resources Control Board (SWRCB). The Owens Creek Diversion Channel and Black Rascal Creek Diversion Channel Projects are shown on Figures 2-25 and 2-26, respectively.

***Owens Creek Diversion Channel Project***

**Proposed Implementation/Construction**

The Owens Creek Diversion Channel Project would primarily entail construction of an approximate 8,000-foot-long by 15-foot-wide open channel across agricultural fields from Owens Creek to Le Grand Canal. The new channel alignment crosses several existing roadways, requiring siphons under roadways. Head structures would likely be installed at the inlet and outlet of the new channel. Temporary workspace of approximately 25 feet on either side of the new channel alignment would be required. Total construction footprint, including staging and laydown areas, would be approximately 10 acres. A permanent footprint of approximately 9 acres would result. Excavation of approximately 14,000 CY would be required. Demolition activities would generate approximately 50 CY of material. Material excavated would either be sold to fill buyers or be permanently stored on District-owned property adjacent to project sites. Excess excavation materials are not anticipated to be diverted to landfills during facility construction. Construction traffic would access the site by way of existing public roads, ranch roads, and MID canal banks. Activities requiring maximum workers and truck traffic would include site excavation, backfill, concrete pours, and the delivery of concrete. Table 2-10 includes the anticipated construction schedule, workforce, and equipment for these general activities.

Work on the Owens Creek Diversion Channel Project could occur any time of the year, with the tie-ins to the canals occurring in winter months, outside of the irrigation season between November 1 and March 1. Project construction is estimated to take approximately 18 months and is expected to commence after 2030.




LEGEND

Diversion Channel

VICINITY MAP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0 500 1,000

Feet

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors
Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics,

**FIGURE 2-25 OWENS CREEK DIVERSION CHANNEL PROJECT**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA


LEGEND

- Le Grand Canal at Black Rascal Creek Stormwater Project
- Potential Diversion Channel Alignment

VICINITY MAP


N

0 250 500
Feet

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**FIGURE 2-26 BLACK RASCAL CREEK DIVERSION CHANNEL PROJECT**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

Table 2-10. Owens Creek Diversion Channel Project Construction Work Days, Workforce, and Equipment
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity | Work Days | Personnel Required | Equipment Required[a] |
|---|---|---|---|
| Site Clearing | 15 | 12 to 16 | 3 Bulldozers with brush attachments<br>1 Grader<br>1 Backhoe<br>1 Loader<br>2 Dump trucks |
| Earthwork<br>(topsoil stripping and stockpiling) | 5 | 3 to 5 | 2 Bulldozers<br>1 Loader |
| Earthwork<br>(90% canal construction) | 80 | 15 to 26 | 8 Scrapers<br>2 Bulldozers<br>1 Loader<br>1 Grader<br>2 Compactors<br>1 Water truck |
| Earthwork<br>(10% canal construction) | 40 | 10 to 24 | 2 Excavator<br>2 Bulldozers<br>1 Loader<br>10 Dump trucks |
| Earthwork<br>(spreading stockpiled topsoil upon completion) | 8 | 4 to 6 | 2 Bulldozers<br>1 Loader |
| Structure/Equipment Installation | 10 | 4 to 6 | 2 Ready-mix trucks<br>1 Excavator<br>1 Backhoe<br>1 Dump truck<br>1 Concrete pump<br>1 Generator |
| Dust Control | Duration of each | 1 | 1 water truck |

[a] Equipment required periodically during the work days of each construction activity.

### *Black Rascal Creek Diversion Channel Project*

#### Proposed Implementation/Construction

The Black Rascal Creek Diversion Channel Project would primarily entail construction of an approximate 970-linear-foot, 30-foot-wide open channel across undeveloped land from Black Rascal Creek to Le Grand Canal. Head structures at the inlet and outlet of the new channel would likely be installed. Temporary workspace of approximately 35 feet on either side of the new channel alignment would be required. Total construction footprint, including staging and laydown areas, would be approximately 3 acres. A permanent footprint of approximately 1.5 acres would result. Construction traffic would access the site by way of existing public roads, ranch roads, and MID canal banks. Excavation of approximately 3,200 CY would be required. Excavated material would be stockpiled onsite. Suitable material would be segregated and used as a dirt source to repair canal banks when needed. Unsuitable material for canal maintenance would remain onsite permanently. Excess excavation materials are not anticipated to be diverted to landfills during facility construction. Demolition activities would generate approximately 50 CY of material. Activities requiring maximum workers and truck traffic would include site excavation, backfill, and concrete pours. Table 2-11 includes anticipated construction schedule, workforce, and equipment for these general activities.

Table 2-11. Black Rascal Creek Diversion Channel Project Construction Work Days, Workforce, and Equipment
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity | Work Days | Personnel Required | Equipment Required[a] |
|---|---|---|---|
| Site Clearing | 15 | 12 to 16 | 3 Bulldozers with brush attachments<br>1 Grader<br>1 Backhoe<br>1 Loader<br>2 Dump trucks |
| Earthwork<br>(topsoil stripping and stockpiling) | 5 | 3 to 5 | 2 Bulldozers<br>1 Loader |
| Earthwork<br>(90% canal construction) | 20 | 22 to 26 | 8 Scrapers<br>2 Bulldozers<br>1 Loader<br>1 Grader<br>2 Compactors<br>1 Water truck |
| Earthwork<br>(10% canal construction) | 10 | 19 to 24 | 2 Excavator<br>2 Bulldozers<br>1 Loader<br>10 Dump trucks |
| Earthwork<br>(spreading stockpiled topsoil upon completion) | 2 | 4 to 6 | 2 Bulldozers<br>1 Loader |
| Structure/Equipment Installation | 15 | 4 to 6 | 2 Ready-mix trucks<br>1 Excavator<br>1 Backhoe<br>1 Dump truck<br>1 Concrete pump<br>1 Generator |
| Dust Control | Duration of each | 1 | 1 Water truck |

[a] Equipment required periodically during the work days of each construction activity.

Work on the Black Rascal Creek Diversion Channel Project could occur any time of the year, with tie-ins occurring in winter months, outside of the irrigation season between November 1 and March 1. Project construction is estimated to take approximately 6 months and is expected to commence after 2030.

**Merced River Water Recovery Project**

**<u>Proposed Implementation/Construction</u>**

The Merced River Water Recovery Project involves placing a pump station in the Bettencourt/Shaffer/Griffith Cowell Area Diversion Ditch located at the Borland Lateral B Spill, and pumping water south through a force main to the Escaladian Canal and the MID service area. The project would be designed to recover approximately 30 cfs during the irrigation season and 10 cfs during the off-season.

Modifications to the existing Cowell Area Diversion Ditch would include installing an automated check structure, providing access to the pump station, and armoring the channel. The pump structure would be adjacent to the ditch and would incorporate an intake, pump wet well, and an automated screen. It is anticipated that the project would incorporate four 75- to-100-horsepower vertical turbine pumps to pump water to the Escaladian Canal. The pumps would be fully enclosed in a ventilated block pump house to protect them from the elements and vandalism. The pump house would be built to an

elevation such to prevent high flood waters from inundating the pumps. The four pumps would pump water approximately 9,300 linear feet south through a large-diameter pipeline to the Escaladian Canal. The pipeline would have vacuum/air release valves at high points and every 2,000 linear feet. An outlet structure would be built adjacent to the Escaladian Canal, and approximately 60 feet of liner would be installed to prevent the canal from eroding at the discharge.

SCADA would be incorporated in the project to tie in the Merced River, the new pump station, and the Escaladian Canal. It is anticipated that major power infrastructure would have to be brought in to supply the site with power.

Construction traffic would access the site by way of existing public roads, ranch roads, and MID canal banks. Excavation of approximately 14,736 CY would be required. Excavated material would be stockpiled onsite. Suitable material would be segregated and used as a dirt source to repair canal banks when needed. Excess excavation materials are not anticipated to be diverted to landfills during facility construction. Demolition activities would generate approximately 2 CY of material. Activities requiring maximum workers and truck traffic would include site excavation, backfill, and concrete pours. Table 2-12 includes anticipated construction schedule, workforce, and equipment for these general activities.

Total construction footprint, including staging and laydown areas, would be approximately 2 acres. The project would result in a permanent footprint of approximately 0.5 acre. Although dependent on the final location, work could likely occur any time of the year, with tie-ins occurring in winter months, outside of the irrigation season between November 1 and March 1. Project construction is estimated to take approximately 12 months and is expected to commence in 2022.

Table 2-12. Merced River Water Recovery Project Construction Work Days, Workforce, and Equipment
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Phase | Activity | Work Days | Personnel Required | Equipment Required[a] |
|---|---|---|---|---|
| Pump House | Site Clearing | 2 | 4 to 6 | 1 Bulldozer |
| | | | | 1 Grader |
| | | | | 1 Loader |
| | | | | 1 Dump truck |
| | Earthwork (spreading, leveling, and compacting subgrade) | 5 | 4 to 6 | 1 Bulldozer |
| | | | | 1 Grader |
| | | | | 1 Compactor |
| | | | | 1 Dump truck |
| | | | | 1 Loader |
| | Structure/Equipment Installation Concrete Work (Slab on Grade/ Walls) | 21 | 10 to 14 | 1 Backhoe |
| | | | | 1 Excavator |
| | | | | 2 Ready-mix trucks |
| | | | | 1 Concrete pump |
| | | | | 1 Dump truck |
| | | | | 1 Generator |
| Pipeline | Site Clearing | 10 | 8 to 10 | 1 Excavator |
| | | | | 2 Bulldozers |
| | | | | 1 Loader |
| | | | | 1 Dump truck |
| | Trenching/Backfill | 186 | 12 to 16 | 1 Bulldozer |
| | | | | 2 Excavators |

Table 2-12. Merced River Water Recovery Project Construction Work Days, Workforce, and Equipment
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Phase | Activity | Work Days | Personnel Required | Equipment Required[a] |
|---|---|---|---|---|
| | | | | 2 Dump trucks |
| | | | | 2 Loaders |
| Channel Armoring | Site Clearing | 5 | 6 to 8 | 1 Excavator |
| | | | | 1 Bulldozers |
| | | | | 1 Loader |
| | | | | 1 Dump truck |
| | Earthwork (Cutting Ditch) | 5 | 6 to 8 | 1 Excavator |
| | | | | 1 Bulldozers |
| | | | | 1 Loader |
| | | | | 1 Grader |
| | | | | 1 Dump truck |
| | Concrete Work (Armoring Channel) | 30 | 12 to 16 | 1 Excavator |
| | | | | 2 Ready-mix trucks |
| | | | | 1 Concrete pump |
| | | | | 1 Dump truck |
| | | | | 1 Generator |
| Check Structure | Site Clearing | 2 | 4 to 6 | 1 Bulldozer |
| | | | | 1 Loader |
| | | | | 1 Dump truck |
| | Earthwork | 2 | 4 to 6 | 1 Bulldozer |
| | | | | 1 Excavator |
| | | | | 1 Loader |
| | | | | 1 Dump truck |
| | Structure/Equipment Installation Concrete Work | 20 | 8 to 12 | 1 Loader |
| | | | | 1 Excavator |
| | | | | 2 Ready-mix trucks |
| | | | | 1 Concrete pump |
| | | | | 1 Dump truck |
| | | | | 1 Generator |
| Power | Site Clearing | 2 | 4 to 6 | 1 Excavator |
| | | | | 2 Bulldozers |
| | | | | 1 Loader |
| | | | | 1 Dump truck |
| | Trenching/Conduit Encasement/ Backfill (Earthwork/Concrete Work Only) | 41 | 12 to 16 | 1 Bulldozer |
| | | | | 2 Excavators |
| | | | | 2 Dump trucks |
| | | | | 2 Loaders |
| Outlet Structure | Site Clearing | 2 | 4 to 6 | 1 Bulldozer |
| | | | | 1 Loader |
| | | | | 1 Dump truck |

Table 2-12. Merced River Water Recovery Project Construction Work Days, Workforce, and Equipment
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Phase | Activity | Work Days | Personnel Required | Equipment Required[a] |
|---|---|---|---|---|
| | Earthwork | 4 | 4 to 6 | 1 Bulldozer |
| | | | | 1 Excavator |
| | | | | 1 Loader |
| | | | | 1 Dump truck |
| | Structure/Equipment Installation (Riprap) | 4 | 6 to 8 | 2 Excavator |
| | | | | 1 Loader |
| | | | | 2 Dump truck |
| Dust Control | | Duration of each | 1 | 1 Water truck |

[a] Equipment required periodically during the work days of each construction activity.

Note: The estimated work day values were generated for each project phase. The total time required to complete the whole project would be less than the sum of work days in this table. Different project phases can be in progress at the same time.

**Operations and Maintenance of Conjunctive Water Use Management Projects**

Long-term operations and maintenance activities would vary between the irrigation season and winter shutdown periods. During the irrigation season, each facility would be accessed using existing access roads one or more times per day for general inspections and routine maintenance or repairs. SCADA features and local automated controls would minimize the need for manual control by MID staff. During the winter shutdown, operations and maintenance activities would include scheduled maintenance and inspections of mechanical equipment as necessary. Pipelines, canals, structures, and siphons would require inspections and repairs once every 2 years, as necessary.

#### 2.1.2.5 Program Implementation Schedule

As discussed previously, overall program implementation is based on the draft schedule developed in the WRMP. Table 2-13 shows the timing and phasing of projects constructed over the next 30 years, to the extent they are currently known.

### 2.1.3 Class II to Class I Conversion

In 2004, MID and the former El Nido Irrigation District (ENID) were consolidated under an agreement that provided the landowners within the 10,500-acre ENID service area boundary with 50 percent of the water supply allocation of MID landowners (on a per-acre basis). These new MID customers were designated Class II users to distinguish them from Class I users (original MID customers). As a result of the consolidation, MID assumed all assets and liabilities of ENID, including its water rights.

In non-drought years since 2005, former ENID customers have typically been offered the same water supply allocation as Class I users. During the recent drought, MID experienced severe shortages in surface water supply. Because of the lack of water availability during the recent drought, Class II users were limited to 50 percent of the water made available to Class I customers.

During initial development of the WRMP, Class II water users expressed interest in converting to Class I water users for a fee. Under the Proposed Program, MID would provide an opportunity for water users in the El Nido area to convert from Class II to Class I for a fee. The MID service area would not be expanded as part of the option to convert from Class II to Class I. System improvements related to the Class II to I conversion would be minimal.

Table 2-13. Program Implementation Schedule

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Projects | Total Projects Proposed | Construction Schedule | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Main Canal Improvements at Tunnel No. 1 Option 1 | 1 | 2021–2022: 1 project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Canal Improvements at Tunnel No. 1 Option 2 | 1 | 2021–2022: 1 project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Canal Improvements at Tunnel No. 1 Option 3 | 1 | 2021–2022: 1 project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Canal Improvements at Tunnel No. 1 Option 4 | 1 | 2021–2022: 1 project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Canal Rebuilding/Relining | 81 | 2019–2032: 3 projects per year<br>2033–2040: 5 projects per year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Table Topping Dead-end Facilities | 230 | 2019–2033: 2 projects per year<br>2034–2050: 12 projects per year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Canal Automation | 31 | Five projects per year, total<br>6 years (1 year with six projects) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Flow Measurement | 150 | Five projects per year, total<br>30 years | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Siphon Modifications | 15 | Five projects per year, total<br>3 years | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Siphon Demolition | 35 | Five projects per year, total<br>7 years | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Intertie | 11 | One project per year, total<br>11 years | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reservoirs and Recharge Basins | 12 | 2019, 2020, 2022, 2023, 2026, 2028, 2030, 2031: One project each<br>2024, 2029: Two projects each | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Highlands | 9 | 2029, 2030: One project each<br>2031: Four projects<br>2032: Three projects | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Owens Creek Diversion Channel | 1 | 2030, 2031: One project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Black Rascal Diversion Channel | 1 | 2030: One project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Merced River Water Recovery | 1 | 2022: One project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Le Grand Canal near Black Rascal Automation | 1 | 2020 or 2021: One project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Northside Canal Flumes | 1 | 2022: One project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Note:

Gray-filled cells indicate which projects would occur during any given year.

## 2.1.4 Water Transfers

### 2.1.4.1 Existing Water Transfers

Over the last several decades, the Board of Directors (Board) has made the decision to make District surface water available for water transfers with a variety of entities for a variety of purposes including to support fishery habitat, environmental programs including the Vernalis Adaptive Management Program, and local as well as regional water users. Water has been made available through transfers for a variety of out-of-District purposes essentially every year since 1967, ranging from 734 AF in 2016 (a below-average water year preceded by 4 critical years) up to 193,715 AF in 1999 (an above-average water year preceded by 4 wet years). Transfers including for irrigation, drought, and refuge supply purposes both in- and out-of–basin, and to federal, State, and local interests have been conducted.

Over the past 25 years, water transfers have occurred almost every year and in all year types. The District is generally able to make the greatest amount of water available for transfer in years following wet water years types when reservoir carryover storage volumes are higher than average. Transfers have been implemented via either storage or direct diversions. Sources have included Lake McClure, the Merced River, from Lake Yosemite via Bear Creek and Crocker Dam, and from local creeks. Board decisions to approve transfers are generally guided by conditions at the time, including water rights, availability, timing, and the location of the transfer recipient.

### 2.1.4.2 Proposed Water Transfers

The District-proposed water transfer element (through term and 1-year temporary water transfers) of this WRMP would include transfers both within and outside the Merced Groundwater Subbasin. Transfers have historically been, and would continue to be, made to secure revenues to improve water management, conservation, efficiency, and customer service. As all potential transferees and points of diversion/rediversion and places of use are not yet specifically known outside the Merced Groundwater Subbasin, this PEIR evaluates out-of-basin transfers at a programmatic level, and water transfers within the Merced Groundwater Subbasin at a project level. Water transfers are proposed to be implemented via reservoir release of previously stored water and would likely be subject to typical refill agreements with California Department of Water Resources and Bureau of Reclamation as well as MID water right license and Federal Energy Regulatory Commission (FERC)-related requirements.

Stored water transfers are proposed in two categories/types: “term” transfers and “as-available” transfers. “Term transfers” would be agreements where MID would provide transfer water in almost all years. “As-available” transfers would generally occur at the annual discretion of the District considering, among other things, reservoir storage, projected runoff, and District demand. Accordingly, four potential subtypes of transfers are included as part of the Proposed Project water transfer element: in-basin term, in-basin as-available, out-of-basin term, and out-of-basin as-available. Total transfers would range from 10,000 to 80,000 AF across all water supply (March 31 storage in addition to April–October inflow) availability conditions. Transfer volumes would likely be lowest in very dry and very wet years due to water supply availability and in-basin delivery constraints and out-of-basin pumping system constraints. The volume of in-basin and out-of-basin transfers would be determined annually by MID, with an anticipated maximum amount of 50,000 AF transferred in-basin and up to 30,000 AF of out-of-basin in any year. Additional environmental review of out-of-basin transfers would be conducted as necessary depending on term transfer volume(s), timing, and transferee.

In general, it is proposed that when the available water supply is relatively limited (e.g., drier years), less water would likely be transferred to reduce potential impacts on MID’s water supply. Transfers would more likely occur in years when there is both water available to transfer and capacity available to divert and convey transfer water. In the wetter years, when the available water supply is highest, conveyance system constraints may limit the ability to transfer more water. Additionally, in wetter years, demand

for transfer water may be less than in less wet or drier years, other than some potential transferees looking for transfer water to support groundwater recharge. Water transfers are generally proposed to be implemented from April through September on a variety of different patterns depending in part on water supply and reservoir storage conditions, and the location and needs of the transferee.

## 2.2 Existing Conditions (Environmental Setting)

The CEQA baseline for assessing the significance of project impacts is Existing Conditions, which are documented for each of the environmental resource areas in the context of the environmental setting in Section 3, Environmental Setting, Impacts, and Mitigation. This baseline is identified to assess the significance of project impacts in relation to current conditions and the environment. The Existing Conditions baseline accounts for current conditions at the time of the release of the NOP (May 18, 2017), including applicable regulatory requirements and current operational FERC license requirements.

As described above, the District has executed water transfers with a variety of entities for a variety of purposes including to support fishery habitat, environmental programs, and local as well as regional water users. Accordingly, some degree of water transfer is anticipated to occur each year (depending on water year type and reservoir storage) but is not specified or included in the modeling conducted as part of the assumed existing condition.

The SWRCB and California Environmental Protection Agency *Draft Revised Substitute Environmental Document (SED) in Support of Potential Changes to the Water Quality Control Plan for the Bay-Sacramento San Joaquin Delta Estuary* (September 2016) evaluates project releases to follow an unimpaired flow prescription ranging from 30 to 50 percent unimpaired as directed by a localized technical workgroup designated by SWRCB. The SED was endorsed through a majority vote by SWRCB on December 12, 2018. The SED flows would result in significantly higher outflow than under existing conditions or the No Program Alternative. Exact management actions or the resultant effects (positive or negative) of the SED have not yet been finalized. In addition, numerous legal filings regarding the SED are anticipated to result in a significant delay of its implementation. Given the time and numerous logistical uncertainties of the SED action, the impact of implementing the SED is not known and, as such, is not included as part of the existing condition or the No Program Alternative discussed below.

## 2.3 No Program Alternative

CEQA also requires an analysis of an alternative under which the proposed project is not implemented. CEQA calls this scenario the “No Project Alternative.” For this PEIR, this alternative is termed the “No Program Alternative” to account for the Balanced Approach Alternative being an overarching program. The “No Program Alternative” evaluated in this PEIR is based on the “No Action Alternative” in the WRMP. The No Program Alternative allows decision makers to use the PEIR to compare the impacts of approving the Proposed Program with the <u>future</u> conditions of not approving the Proposed Program. CEQA Guidelines Section 15126.6, subdivision (e)(2), indicates that the No Project (Program) Alternative should include reasonably foreseeable changes in Existing Conditions and changes that would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.

Although the implementation of the system improvements included in the Proposed Program is anticipated to take 30 years, the future year associated with the No Program Alternative is 2040, because that was the year that was defined as the future condition during the WRMP development process for the purposes of evaluating alternatives (alternatives evaluated during the WRMP development process are discussed in Subsection 2.4, Alternatives Evaluated in the Water Resources Management Plan and Eliminated from Detailed Consideration in this Programmatic Environmental Impact Report).

The No Program Alternative represents a future in which the District would not address the issues or explore the options raised during the WRMP development process. Under the No Program Alternative, conversion to orchard crops and urban uses (around existing urban areas) would continue to occur, and water supply reliability would decrease. No significant system improvements would be undertaken, resulting in the loss of some customers; the Class I and Class II distinction between water users would remain; and the MID service area would not be expanded by annexation (annexation is not a part of the Proposed Program, but was considered as part of the WRMP development process). Demand for groundwater would be expected to increase, subject to availability given implementation of SGMA-related management actions. Furthermore, no additional water transfers would be assumed to occur, and water rates would be increased only so far as permitted by existing Proposition 218 authority, e.g., $100.67 per AF.

The No Program Alternative assumes the revised Merced River Hydroelectric Project operations specified in the FERC Final Environmental Impact Statement for the Merced River Project No. 2179-043, and Merced Falls Project No. 2467.020, will be implemented starting in 2022 (FERC, 2015).

Anticipated impacts from implementation of the Proposed Program when compared to the No Program Alternative are evaluated specifically for some environmental resource areas, including in Subsection 3.9, Hydrology and Water Quality, related in particular to proposed water transfers as well as Subsection 3.8, Groundwater Resources, given anticipated future benefits and impacts.

## 2.4 Alternatives Evaluated in the Water Resources Management Plan and Eliminated from Detailed Consideration in this Programmatic Environmental Impact Report

Five alternatives were developed and evaluated as part of the WRMP development process. The alternatives were evaluated considering projected water demand, projected surface water availability, and financial implications. The alternatives were screened and ranked according to feasibility, flexibility, and potential to further WRMP goals, both quantitatively and qualitatively. From this process, the Balanced Approach Alternative was identified as the Proposed Program. Other alternatives discussed below were not able to meet all District goals and objectives; thus, they were not deemed feasible and are, therefore, not evaluated in this PEIR. The alternatives evaluated in the WRMP and dismissed as infeasible are described below.

### 2.4.1 Elements of the Programmatic Alternatives

During the WRMP development process, alternatives (including the Balanced Approach Alternative) were defined and evaluated in the context of the following five program elements:

**System/Infrastructure Improvement Projects** – includes capital improvements and proposed water delivery system modernization improvements. System improvements would potentially benefit MID customers by offering improved customer service and greater reliability. In addition, they would benefit conjunctive groundwater management efforts. System improvements would require a significant financial investment.

**Class II to Class I Conversion** – includes offering the opportunity to Class II water users in the El Nido service area to convert to a Class I water user for a fee. The 2004 consolidation of MID and the former ENID resulted in users of two classes within the District: Class II water users in the El Nido area have 50 percent of the water supply allocation of Class I water users in the original portion of the District (on

a per-acre basis). This element would result in the removal of this distinction by offering a one-time conversion of Class II water users to Class I water users for a fee.

The benefits of converting Class II water users to Class I water users would include (1) removal of a class distinction between customers within the District; (2) Class II customers would, at times, receive an additional surface water supply; and (3) in-lieu groundwater recharge would occur in the El Nido area by reducing the reliance of these users on groundwater pumping. In addition, MID would receive a one-time payment for conversion and increased revenue from a larger customer base going forward. A potential negative effect could be reduced reliability to existing Class I users as a result of a larger overall customer base. This additional firm water supply commitment would reduce flexibility to consider other water management and financial opportunities.

**Annexation** – this element would include annexation of additional land into MID that would extend its service area boundary and expand its customer base. Annexation requires approval from the Merced County Local Agency Formation Commission. Typically, Merced County Local Agency Formation Commission prefers contiguous service areas, which would require that annexation happen in a way that expands outward in an orderly fashion. In addition, a SWRCB process to approve amendments to MID's water rights to service the new land may be needed. Alternatively, annexed land could be added as Class II water users, or a new Class III could be created with a different water entitlement.

Annexation offers landowners who are otherwise limited to private groundwater pumping or periodic water transfers by MID to their land outside of the current District boundary access to MID surface water as regular customers. Benefits of annexation would be (1) potential offset of agricultural lands lost to urbanization within the District, (2) in-lieu groundwater recharge for the Merced Groundwater Subbasin, and (3) MID would receive payment for annexed land and increased revenue from a larger customer base going forward. Potential negative effects could be (1) reduced reliability to existing users as a result of a larger overall customer base, and (2) additional firm water supply commitment that reduces flexibility to consider other water management and financial opportunities.

**Water Rates** – this element accounts for the option of considering varied water rates to in-District customers. The water rates under consideration may be within the existing authority of Proposition 218 or not, as specified by alternatives considered in the WRMP. The existing authority of Proposition 218 allows for in-District agricultural water rates up to $100.67 per AF. The current rate structure varies from $50 to $100.67 per AF, depending on water availability from more than 300,000 AF to less than 150,000 AF, respectively, and in increments of $10 per AF for every 50,000 AF in water availability. Water rates are set by the Board each year.

Potential benefits of varied water rates include (1) improved MID revenue, (2) more favorable in-District water rates to support the agricultural economic base of the region, and (3) in-lieu groundwater recharge to the benefit of the Merced Groundwater Subbasin. However, within the existing authority of Proposition 218, water rates alone do not provide for the long-term financial viability of the District.

**Water Transfers** – this element would account for the option whereby water is made available for potential out-of-District (either in-basin or out-of-basin) sale. Water transfers provide a short-term, supplemental water supply to out-of-District water users via water transfer agreements. Water prices and the terms and conditions of water transfers are negotiable and may be tied to water availability. Water transfers have generally been short-term agreements that do not commit the District beyond a single year at a time and are limited to certain water year types, as specified by alternatives considered in the WRMP. Water transfer prices have varied; thus, projected values vary from $150 to $700 per AF, depending on water year type, through 2021. From 2022 onward, prices are assumed to vary from $200 to $900 per AF. The lowest projected prices correspond to wetter years, and the highest prices typically correspond to drier years. The increased projected price for water transfers is largely attributed to SGMA implementation.

Anticipated benefits of water transfers include (1) affording MID additional revenue from outside water sales and the flexibility to craft agreements to protect MID interests, and (2) delivery of surface water to in-basin water users who otherwise rely on private groundwater pumping provides in-lieu recharge to the benefit of the Merced Groundwater Subbasin. A potentially negative impact could be the reduced water supply to existing users, depending on the agreement(s) from year to year.

## 2.4.2 Description of Programmatic Alternatives

A description of each alternative analyzed and eliminated as part of the WRMP development process is provided below along with a description of how each alternative relates to the WRMP goals and why alternatives were eliminated from further consideration. All five alternatives (including the Proposed Program) evaluated in the WRMP included the same projected land use and customer profile, no change to the standby fee structure, and implementation of the FERC Final Environmental Impact Statement in 2022.

### 2.4.2.1 No Action Alternative

The "No Program Alternative" evaluated in this PEIR is based on the "No Action Alternative" in the WRMP. Under the No Action Alternative, expansion of the customer base within the District would not occur, either by the Class II to Class I conversion or by annexations. System improvements would not be implemented. Without system/infrastructure improvements, continued focus on customer service and substantial changes to conjunctive management of groundwater resources (including private groundwater pumping) to support the agricultural economic base of the region would be unlikely, subject to the implementation of Sustainable Groundwater Management Act (SGMA)-related management actions. Water supply reliability would decrease relative to current conditions. The frequency of water shortage would increase from 20 to 37 percent of the time, and the water shortage (1 in 10 years shortage) would increase from 68,000 to 138,000 AF. Under the No Action Alternative, the District's total annual costs would exceed revenue-generating potential. It would, therefore, not provide for the financial stability of the District and would not be financially feasible.

### 2.4.2.2 Low Transfers Alternative

The Low Transfers Alternative included the following:

- System/infrastructure improvements necessary for implementation of the full CIP and system modernization would be made
- A one-time conversion of Class II to Class I water users would be offered
- The MID service area would not be expanded by annexation
- Water transfers would be limited to 10,000 AF and would only occur during wet and above-normal water years
- Water rates would be increased, if necessary

The system/infrastructure improvements and other elements included as part of this alternative would provide a continued focus on customer service and would promote sustainable management of groundwater resources. Water supply reliability under the Low Transfers Alternative would decrease very slightly relative to current conditions as the result of water transfers. Given the maximum water transfer amount would be 10,000 AF during any given year (and would remain limited to years when available storage and demand existed to make a transfer), this alternative would provide minimal water transfer income and would not support the financial stability of the District. The in-District agricultural water rate would need to be increased to at least $150 per AF for this alternative to be financially feasible. Therefore, the Low Transfers Alternative was eliminated from further consideration.

#### 2.4.2.3 Annexation and Dry Year Transfers Alternative

The Annexation and Dry Year Transfers Alternative included the following:

- System/infrastructure improvements necessary for implementation of the full CIP and system modernization
- One-time conversion of Class II to Class I water users would be offered
- Expanded service area by 10,000 acres through annexation
- Water transfers limited to 10,000 AF and allowed for only in dry and critical water years
- Water rates increased, if necessary

The system/infrastructure improvements and other elements included as part of this alternative would provide a continued focus on customer service and would promote sustainable management of groundwater resources. Under the Annexation and Dry Year Transfers Alternative, water supply reliability would decrease as a result of the expanded service area and water transfers. The frequency of water shortage would increase from 37 to 47 percent of the time, and the water shortage (1 in 10 years shortage) would increase from 138,000 to 213,000 AF. In this case, although there is decreased reliability, the annexation and water transfers would provide financial feasibility. This alternative would be financially feasible with average water rates ranging from $52 to $61 per AF. However, annexation of 10,000 acres into the MID service area represents reduced reliability to existing users as a result of a larger overall customer base, and additional firm water supply commitment reduces flexibility to consider other water management and financial opportunities. Considering an uncertain water future, it is in the best interest of the District to retain maximum flexibility to address potential future water shortages. This includes limiting new actions that increase water demand and reduce water supply availability and reliability for existing users. At the same time, to ensure the District's financial stability, water transfers will be necessary to generate revenue to pay for system improvements. Water transfers are preferred to annexations, because they are based on negotiated agreements that typically contain provisions related to water supply availability and can be established over a various periods of agreement. Therefore, this alternative was eliminated from further consideration.

#### 2.4.2.4 CIP Only Alternative

The CIP Only Alternative included the following:

- System/infrastructure improvements necessary for implementation of the full CIP and system modernization would be made
- The Class I and Class II conversion would not be offered
- The service area would not be expanded by annexation
- Water transfers would not occur
- Water rates would increase only to meet annual cash reserve levels

The system/infrastructure improvements and other elements included as part of this alternative would provide a continued focus on customer service and would promote sustainable management of groundwater resources. The CIP Only Alternative would result in increased water supply reliability. The frequency of water shortage would decrease from 37 to 31 percent of the time, and the water shortage (1 in 10 years shortage) would decrease from 138,000 to 100,000 AF. This increase in reliability is attributed to reduced demand within the District. At the same time, this alternative does not provide for the financial stability of the District. In in-District agricultural water rate would need to be increased to at least $250 per AF for this alternative to be financially feasible. Therefore, the CIP Only Alternative was eliminated from further consideration.

## 2.4.3 Meeting Water Resource Management Plan Goals

Each alternative was considered with an eye toward best achieving the WRMP goals. It is important to note that tradeoffs would be required; each alternative may further one or more WRMP goals while hindering others. Foremost among these tradeoffs are those between water supply reliability and financial viability.

### 2.4.3.1 Goal 1: Protect and Maximize MID Water Rights

This goal addresses a critical imperative for MID. The District holds a variety of pre-1914 and post-1914 water rights, which are critical to its long-term viability. For purposes of the WRMP, some of the options available to the District for optimizing its water rights into the future include the Class II to Class I buy-up, annexation, and water transfers. Exercising these options puts to use more water, up to the total available in any given year.

The Low Transfers Alternative and the Annexation and Dry Year Transfers Alternative somewhat meet this goal, but limit the water transfer volume and/or do not allow for water transfers in all water year types. The Balanced Approach Alternative best meets this goal by allowing for the one-time conversion of Class II to Class I water users to expand the customer base of the District and for water transfers in all water year types. Together these promote MID's full, reasonable, and beneficial water use.

### 2.4.3.2 Goal 2: Ensure that MID Remains Financially Sound

This goal addresses the other critical imperative for MID. The District must remain financially sound to continue to serve its customers over the planning horizon of this document. Several policy options provided the financial mechanisms by which the District was made financially viable over the 30-year planning horizon. Key among these were water rates, and whether the District could remain financially viable over time. From the evaluation of alternatives, only the Annexation and Dry Year Transfers Alternative and the Balanced Approach Alternative allow for favorable water rates while providing for the long-term financial viability of the District.

### 2.4.3.3 Goal 3: Provide a Reliable and Affordable Water Supply to MID Customers

MID customers want a water supply that is both reliable and affordable. To assess water supply reliability, the water shortage amount corresponding to each alternative was quantified. All alternatives except the CIP Only Alternative resulted in reduced reliability relative to the No Action Alternative (i.e., they result in increased water shortages). In most cases, this reduction was slight. Affordability was determined by the existing authority of Proposition 218. (The existing authority of Proposition 218 allows for rates up to $100.67 per AF.) The No Action Alternative, the Low Transfers Alternative, and the CIP Only Alternative were not financially feasible. On the other hand, the Annexation and Dry Year Transfers Alternative and the Balanced Approach Alternative have favorable water rates. Each also has reduced reliability relative to the No Action Alternative. However, the Balanced Approach Alternative resulted in much less of a water shortage than the Annexation and Dry Year Transfers Alternative (172,000 AF versus 213,000 AF, respectively).

### 2.4.3.4 Goal 4: Continued Focus on MID Customer Service

MID wishes to have a continued focus on customer service. All of the alternatives except the No Action Alternative provide for system improvements. The purpose of these system improvements is to enhance water supply reliability, efficiency, and customer service.

### 2.4.3.5 Goal 5: Promote Sustainable Management of Groundwater Resources

Among the key findings of the public outreach effort, the most important issue for stakeholders was groundwater. Those interviewed were concerned about groundwater availability and use. Merced County residents believe groundwater should be managed locally. Furthermore, the District has taken an active role in groundwater management activities. Since the early 1990s, MID has been actively

engaged in three major groundwater planning activities in the region. Those alternatives that maximize surface water use in the Merced Groundwater Subbasin best meet this goal. The Annexation and Dry Year Transfers Alternative best meets this goal because available water is distributed in-basin. However, the Balanced Approach and Low Transfer Alternatives also support this goal.

#### 2.4.3.6 Goal 6: Support the Agricultural Economic Base of the Region

Merced County's leading industry is agriculture, and many growers in eastern Merced County rely on MID water deliveries. The District wishes to continue to support the agricultural economic base of the region. The Balanced Approach Alternative best meets this goal by providing maximum flexibility from year to year to serve MID growers and other growers in the region.

The alternatives measured against WRMP goals are summarized in Table 2-14.

Table 2-14. Programmatic Alternatives Measured Against WRMP Goals
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| | Programmatic Alternative | | | | |
|---|---|---|---|---|---|
| **WRMP Goal** | **No Action** | **Low Transfers** | **Annexation and Dry Year Transfers** | **CIP Only** | **Balanced Approach** |
| **1. Protect and maximize MID's water rights** | – | ★★★ | ★★★ | ★★ | ★★★★ |
| **2. Ensure that MID remains financially sound** | – | ★★ | ★★★ | ★ | ★★★★ |
| **3. Provide a reliable (1st row) and affordable (2nd row) water supply to MID customers** | – | ★★★★<br>★★ | ★<br>★★★ | ★★★★<br>★ | ★★★<br>★★★★ |
| **4. Continued focus on MID customer service** | – | ★★★ | ★★★★ | ★★★ | ★★★★ |
| **5. Promote sustainable management of groundwater resources** | – | ★★★ | ★★★★ | ★★ | ★★★ |
| **6. Support the agricultural economic base of the region** | – | ★★ | ★★★ | ★ | ★★★★ |
| **Total Stars** | – | 19 | 21 | 14 | 26 |

Notes:
The two rows of stars for WRMP Goal 3 indicate reliability (top row) and affordability (bottom row).
★★★★ = Most completely addresses goal

## 2.5 Environmental Commitments

As described under Subsection 2.1.1, Site-specific Project/Action Environmental Evaluation Checklist, prior to the start of construction, all proposed projects evaluated at the programmatic level in this PEIR (as well as projects evaluated at a project level of detail but delayed due to funding or changes in District priorities) would be subject to the EEC process to make certain potential impacts are identified and properly mitigated in accordance with the MMRP in the Executive Summary. Use of the EEC would allow the District to accommodate potential changes in conditions given the proposed phasing of the Proposed Program. Although given the current and likely future agricultural nature of the majority of the District lands, substantial changes in conditions or projects identified in this PEIR would result in the District completing additional environmental review as necessary. In addition, the following

commitments and best management practices (BMPs) would be incorporated as part of the Proposed Program to avoid or minimize potential impacts:

1. Install temporary and permanent safety lighting to minimize glare and offsite light trespass:
   - If nighttime construction activities that require lighting were to be required, lighting would be limited to that needed for safety, and it would be aimed to minimize glare and light trespass. Lights would be turned off after completion of the work.
   - Permanent safety lighting installed at Proposed Program facilities would be fully shielded, area-specific lighting that is directed downward to minimize glare and offsite light trespass.
2. Comply with applicable San Joaquin Valley Air Pollution Control District Regulation VIII requirements for fugitive dust emissions. Emission control measures for construction and operations and maintenance activities included as part of the Proposed Program would include the following:
   - Apply water to unpaved surfaces and areas.
   - Use nontoxic chemical or organic dust suppressants on unpaved roads and traffic areas.
   - Limit or reduce vehicle speed on unpaved roads and traffic areas.
   - Maintain areas in a stabilized condition by restricting vehicle access.
   - Install wind barriers, if necessary.
   - During high winds, cease outdoor activities that disturb the soil.
   - Keep bulk materials sufficiently saturated when handling.
   - When storing bulk materials, apply water to the surface or cover the storage pile with a tarp.
   - Do not overload haul trucks. Overloaded trucks are likely to spill bulk materials.
   - Cover haul trucks with a tarp or other suitable cover. Or, wet the top of the load enough to limit visible dust emissions.
   - Clean the interior of cargo compartments on emptied haul trucks prior to leaving a site.
   - Prevent track-out by installing a track-out control device.
   - Clean up track-out at least once a day. If along a busy road or highway, clean up track-out immediately.
   - Monitor dust-generating activities and implement appropriate measures for maximum dust control.
3. Minimize unnecessary construction vehicle trips and idling time to reduce greenhouse gas (GHG) emissions.
4. As feasible, construction equipment and truck traffic would be located or routed away from local neighborhoods or sensitive receptor areas.
5. The following environmental commitments would be incorporated as part of the Proposed Program to assist in avoiding or minimizing potential impacts to biological resources:
   - **Initial Siting Evaluation/Site-specific Resource Evaluation** – MID and a qualified biologist (as necessary) will use a standardized approach/checklist (see Appendix A to this PEIR) to evaluate the potential for biological and other impacts and screen out/modify proposed facility locations to the extent possible.
   - **Conduct Appropriate Surveys** – A qualified biologist will determine the extent of potential impacts on biological resources and assist in identifying additional mitigation (and additional

environmental documentation as necessary) for future projects determined to require measures not included in this PEIR.

- **Avoid/Minimize/Mitigate Impacts on Sensitive Habitat and Special-status Species** – All proposed facilities and associated construction areas will be situated to avoid sensitive species and associated habitats to the extent possible. Avoidance distances by habitat type are listed in Table 3.4-5 in the Biological Resources section of this PEIR.

6. Design and construct Proposed Program facilities, such as the impoundment facilities associated with the proposed regulating reservoirs, to withstand the effects of anticipated earthquake loading for the Program Area, based on the site-specific detailed geotechnical analysis of each project site.

7. The construction contractor(s) would prepare and implement a stormwater pollution prevention plan (SWPPP) consistent with the guidance provided in the most recent edition of the California Stormwater Quality Association (CASQA) Stormwater Best Management Practice Handbook (CASQA, 2019) or similar resource. The SWPPP would emphasize proper hazardous materials storage and handling procedures; would outline spill containment, cleanup, and reporting procedures; and would limit refueling and other hazardous activities to designated areas. Signs prohibiting refueling would be posted in sensitive areas. Equipment would be inspected prior to use each day to ensure that hydraulic hoses are tight and in good condition.

   Additionally, the contractor would employ BMPs, consistent with the guidance in *Construction Site Best Management Practice Field Manual and Troubleshooting Guide* (Caltrans, 2003), to reduce runoff from the project sites or disposal areas to nearby surface water features. These may include, but are not limited to, temporary soil stabilization (such as proper grading and covering of soil stockpiles) and temporary sediment control (such as silt fences, fiber rolls, or sandbag barriers), and permanent soil stabilization (such as installing sediment barriers, vegetative buffer strips, and reseeding disturbed areas).

   Other appropriate BMPs, such as use of concrete washout basins and proper waste management and securely locating and maintaining portable toilets, would be used to prevent discharge of possible contaminants and chemicals associated with construction or operations activities. The measures outlined in the SWPPP and BMPs would be incorporated into routine maintenance activities, as applicable, to prevent the release of water pollutants during Program operation.

8. Use, transport, and dispose of hazardous materials, such as fuels, lubricants, and solvents, in accordance with California Department of Toxic Substances Control, U.S. Environmental Protection Agency, and U.S. Occupational Safety and Health Administration requirements.

9. Comply with Merced County's noise ordinance, Merced County Code 10.60.030(B), to reduce temporary construction noise impacts, and implement the following BMPs:

   – Construction activity would be restricted to the hours between 7:00 a.m. and 6:00 p.m. on weekdays, unless otherwise approved by Merced County.

   – Stationary noise-generating equipment would be located as far as possible from nearby noise-sensitive receptors.

   – Construction equipment powered by gasoline or diesel engines would have sound control devices at least as effective as those provided by the original equipment manufacturer. No equipment would be allowed to have unmuffled exhaust.

   – Noise-generating mobile equipment and machinery would be turned off when not in use.

10. Construction activities are proposed throughout the Program Area and could require the temporary relocation of utility provider facilities such as electric or telephone transmission and distribution lines or gas, water, or wastewater transmission and distribution pipes. Projects would be designed

and constructed to avoid utility provider facilities wherever possible. If avoidance is not possible, MID would coordinate with service providers to relocate facilities without interrupting service to customers.

11. Short-term full or partial road closures may be required to allow for certain construction activities and to maintain public safety as part of implementation of the Proposed Program. MID would develop a traffic control plan, as appropriate, with Merced County to address emergency responder access and management of local traffic including managing construction traffic routing and Program road use. The plan would include traffic controls, such as the use of flaggers and signage, and other traffic safety measures to maintain proper traffic flow during temporary construction activities, as necessary.
12. MID would inform residents of construction activities and potential delays, and coordinate with California Department of Transportation and Merced County to minimize construction impacts to the extent necessary. MID would obtain all required encroachment and transportation permits.
13. MID would work with the Merced Regional Airport in advance of construction of the Dead-end Lateral Modifications at Booster 14 Lateral B and Dead-end Lateral Maintenance at an Existing Open Channel projects to identify how to avoid or minimize potential runway disruption during construction activities, which are anticipated to occur over 1 week. MID would also work with the Merced Regional Airport to avoid or minimize disruption during Program operation, as necessary.

SECTION 3

# Environmental Setting, Impacts, and Mitigation

Merced Irrigation District (MID or District) prepared this Programmatic Environmental Impact Report (PEIR) in accordance with California Environmental Quality Act (CEQA) regulations and requirements, which are discussed in Section 1, Introduction, and Section 2, Program Description and Alternatives. Subsection 2.5 identifies Environmental Commitments and best management practices that would be incorporated as part of the Proposed Program to avoid or minimize potential impacts.

Subsections 3.1 through 3.12 are organized by environmental resource area. Each section discusses the applicable regulatory setting, environmental setting, and environmental impacts specific to a given resource/issue area associated with implementation of the Proposed Program in comparison to Existing Conditions and the No Program Alternative. Assumptions considered, methodologies used, and references that were consulted during the preparation of the analyses are identified by resource/issue area subsection. Mitigation measures are proposed as applicable for those impacts considered to be potentially significant.

Subsections 3.1 through 3.12 are organized into the following environmental resource areas:

- Subsection 3.1: Aesthetics and Visual Resources
- Subsection 3.2: Agricultural Resources and Land Use
- Subsection 3.3: Air Quality
- Subsection 3.4: Biological Resources
- Subsection 3.5: Cultural, Paleontological, and Tribal Cultural Resources
- Subsection 3.6: Geology and Soils
- Subsection 3.7: Greenhouse Gases
- Subsection 3.8: Groundwater
- Subsection 3.9: Hydrology and Water Quality
- Subsection 3.10: Noise
- Subsection 3.11: Public Services and Utilities
- Subsection 3.12: Traffic and Transportation

Appendixes C through H have been prepared for Subsections 3.3, 3.4, 3.5, 3.8, 3.9, and 3.12, respectively, and are included at the end of this PEIR. Cumulative impacts are discussed in Section 4, Other CEQA Considerations.

## General Assessment Methodology

### Study Area

The Program Area includes the MID service area and areas outside of the MID service area where capital improvements are proposed and in-basin water transfers could occur. The Study Area for each environmental resource area varies as applicable and is defined and described in the introduction to each subsection in Section 3. For example, because the potential effects related to public services and utilities would occur within Merced County (County), the Study Area for Subsection 3.11, Public Services and Utilities, is defined as public services and utilities within the County, while the Study Area for Subsection 3.9, Hydrology and Water Quality, is the San Joaquin River Basin.

## Project Categories

As described in Section 2, Program Description and Alternatives, the Proposed Program includes capital improvement projects that have been grouped into categories on the basis of common features and functions. For example, although several different reservoir projects are proposed throughout the District, they are all located near canals and would require earthwork and connections similar to new or existing infrastructure. The similarity of projects under the various categories also results in common potential effects. Therefore, impact analyses evaluate potential impacts by project category. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

## Existing Conditions and No Program Alternative

The CEQA baseline for assessing the significance of project impacts is Existing Conditions, which are documented for each of the environmental resource areas in the context of the environmental setting in each subsection of Section 3, Environmental Setting, Impacts, and Mitigation. This baseline is identified to assess the significance of project impacts in relation to current conditions and the environment. The Existing Conditions baseline accounts for current conditions at the time of the release of the Notice of Preparation (May 18, 2017), including applicable regulatory requirements.

CEQA also requires an analysis of an alternative under which the proposed project is not implemented. For this PEIR, this alternative is termed the “No Program Alternative” to account for the Balanced Approach Alternative being an overarching program. The “No Program Alternative” evaluated in this PEIR is based on the “No Action Alternative” in the Water Resources Management Plan. The No Program Alternative allows decision makers to use this PEIR to compare the impacts of approving the Proposed Program with the future conditions of not approving the Proposed Program. CEQA Guidelines Section 15126.6(e)(2), indicates that the No Project (Program) Alternative should include reasonably foreseeable changes in Existing Conditions and changes that would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services. See Subsection 2.3, No Program Alternative, for a detailed description of this scenario.

In the context of some environmental resource areas, the No Program Alternative would not differ substantially from Existing Conditions. For example, regarding aesthetics, the No Program Alternative is functionally the same as Existing Conditions because although the loss of farmland due to urbanization adjacent to the cities of Merced, Atwater, and Livingston is anticipated, the overall visual character of the Program Area is not expected to change substantially with the No Program Alternative as compared to Existing Conditions. Regarding other resource areas such as groundwater, No Program Alternative conditions are anticipated to experience greater groundwater pumping subject to availability and implementation of Sustainable Groundwater Management Act-related management actions. The relationship between the Existing Conditions and No Program Alternative scenarios is specified in each subsection of Section 3, Environmental Setting, Impacts, and Mitigation, under Impact Assessment Assumptions and Methodology. For environmental resource areas where the No Program Alternative was determined to be functionally the same as Existing Conditions, potential impacts are evaluated when compared to Existing Conditions and are identified as such.

# Types of Impacts

Mechanisms that could cause impacts are discussed for each resource. General categories of impact mechanisms are construction and future operations and maintenance. Program-related impacts are categorized as follows, and as appropriate, to describe the intensity or duration of an impact:

- **A temporary or short-term impact** would generally occur only during construction of the proposed capital improvements. Construction impacts would occur during the defined construction period, which would vary by project, and include all activities required to construct each project. The construction disturbance area would include each facility footprint plus the land area around that footprint that would be used for materials laydown, soil stockpiling, equipment storage, construction vehicle parking, equipment/vehicle maintenance, spoil disposal, construction debris, materials delivery, access roads, actual construction activity disturbance, and any other activity conducted during the construction period that would cease after the proposed capital improvements are built.
- **A long-term or permanent impact** would continue to occur after the completion of construction, including the permanent alteration of land to accommodate a given proposed project. Additionally, operations and maintenance impacts include any activities that must occur to operate and maintain each facility. These activities and their associated impacts are long-term or permanent. Operations and maintenance activities for each project category are described in Subsection 2.1.2, Capital Improvements. Generally, operations activities include those related to the movement of water (e.g., the intake or release of water through the facilities), and maintenance activities include vegetation management, minor repairs, and routine inspections.

# 3.1 Aesthetics and Visual Resources

This section describes the regulatory and environmental setting related to aesthetics, including visual resources, in the Program Area and evaluates potential impacts that could result from implementation of the Proposed Program. For the purposes of this section, the Study Area includes lands within the Program Area where projects under the Proposed Program are proposed.

## 3.1.1 Regulatory Setting

This section describes guidelines and regulations for evaluating potential aesthetic and visual resources impacts and identifying mitigation. The aesthetics and visual resources standards within the Study Area are regulated by the local policies and regulations of Merced County (County), City of Merced, City of Atwater, and City of Livingston.

### 3.1.1.1 Federal and State

There are no federal or State regulations applicable to aesthetics and visual resources.

### 3.1.1.2 Local

The following outlines Merced County, City of Merced, and City of Atwater policies related to aesthetic and visual resources that are relevant to the Proposed Program. The General Plan for the City of Livingston does not include policies related to aesthetic and visual resources (City of Livingston, 1999).

**Merced County**

The *2030 Merced County General Plan* provides the following policies regarding aesthetic and visual resources that are relevant to this Proposed Program (Merced County, 2013a):

> **Policy NR-4.1: Scenic Resource Preservation**. *Promote the preservation of agricultural land, ranch land, and other open space areas as a means of protecting the County's scenic resources.*
>
> **Policy NR-4.5: Light Pollution Reduction**. *The County shall develop and implement a lighting ordinance to require good lighting practices, such as the use of specific light fixtures that reduce light pollution, minimize light impacts, and preserve views of the night sky. The ordinance shall contain standards to avoid light trespass, particularly from developed uses, to sensitive wildlife corridors and refuges.*

The *2030 Merced County General Plan Background Report* designates scenic landscape resources, public viewpoints, and scenic corridors in the County (Merced County, 2013b). Those relevant to the Proposed Program are listed below:

> **p. 8–133: *Rural Agricultural Landscapes.*** *Though intensively developed, modified, and manipulated for agricultural purposes, the County's rural area (comprising 95 percent of all County land) has a high scenic value. The predominant characteristic of Merced County's rural areas is agricultural, and includes pasture, row crops, and orchards with limited accessory buildings scattered throughout. In certain areas of the County, dairies with their large facilities and surrounding croplands form a prominent portion of the viewscape. Viewers are offered expansive views over row crops and pastures, while orchards and vineyards create a focused line of sight. Most roadways through non-urbanized Merced County provide some extent of rural agricultural landscape views.*
>
> **p. 8–133: *River Corridors*.** *The Merced River, San Joaquin River, and Bear Creek corridors, including their tributaries and creeks, provide scenic waterways and areas of riparian forest in the County. Views of river corridors can be seen from State Highways,*

*along bikeways and trails, and by recreationists along the Merced River. Major public viewpoints of these resources adjacent to the Merced River include from west to east, River Road, Livingston Cressey Road, Turlock Road, SR-59, and Merced Falls Road. Because of its wide floodplain, visual access to the San Joaquin River corridor is limited to highway crossings of SR 152, SR 165, and SR 140.*

**p. 8–134: *Scenic Panoramas.*** *Views of the Coastal ranges and the Sierra Nevada foothills from the wide valley floor constitute the major scenic vistas in the County. These ranges are most often viewed from roadways in the County. The foothills of the Sierra Nevada Mountains border Merced County on the east, and are composed of gently rolling hills leading to the sharper terrain of the Sierra in the background. The dominant colors of the mountains and hills vary with the season, with golden brown hues through most of the year and green due to the winter rains. Seasonal contrasts of swollen rivers and lush hillsides are complimented by snow-capped distant mountains. Because of poor air quality within the County, views of these scenic panoramas are often limited, with views of the Sierra Nevada being limited to several days each year after major winter storms.*

**City of Merced**

The *Merced Vision 2030 General Plan* provides the following policy regarding aesthetic and visual resources that are relevant to the Proposed Program (City of Merced, 2012):

**Policy OS-1.3.** *Promote the Protection and Enhancement of Designated Scenic Routes.*

Implementing Actions:

**1.3.a** *Identify, and where appropriate, designate additional scenic routes within the City's SUDP/Sphere of Influence.*

Use the following criteria to identify scenic routes:

a) The scenic area through which the corridor passes should possess important scenic, historic, or aesthetic value.

b) As appropriate, the scenic corridor should contain a variety of vegetation or landscape types.

c) Routes of historic significance which connect places of interest should be considered even though the route is of marginal scenic value.

d) Routes which incorporate significant views or vistas should be considered.

**1.3.b** *Preserve the designated Scenic Corridors.*

The Scenic Corridors are as follows:

a) North and South Bear Creek Drive within the City limits.
b) N Street from 16th Street to the Merced County Courthouse.
c) 21st Street from the Merced County Courthouse to Glen Avenue.
d) M Street from Black Rascal Creek to Bellevue Road.
e) West 28th Street from M Street to G Street.
f) Lake Road from Yosemite Avenue to Lake Yosemite.
g) R Street (extended) from Black Rascal Creek to Bellevue Road.
h) Olive Avenue East of McKee Road.
i) M Street from 18th Street to Bear Creek.
j) Campus Parkway.
k) Bellevue Road from Lake Road to G Street.

**1.3.c** *Utilize established guidelines for the review of projects proposed within a designated Scenic Corridor.*

The following guidelines apply to the review of applications for development in vicinity of a designated Scenic Corridor:

a) Utility lines should be placed underground whenever feasible.

b) Signing should be carefully controlled to insure that it does not detract from the scenic beauty of the corridor. Specific guidelines for signing along these corridors should be established.

c) Limit the intrusion of future land uses which may detract from the scenic quality of the corridor.

d) Unsightly mechanical and utility structures shall be screened from view by use of planting, grading, and fencing.

e) Heights and setbacks of buildings should be regulated to avoid obstructing important scenic views.

f) Every effort should be made to preserve and properly maintain existing stands of trees and other plant materials of outstanding value.

g) Structures on private and public properties visible from the corridor should be maintained in good condition (free of trash, weeds, etc.).

h) Architectural and landscape design should result in an attractive appearance and a harmonious relationship with the surrounding environment.

**1.3.d** *Explore the feasibility of creating some scenic corridors in South Merced through the use of special standards.*

Continue to implement the Gateway Road policy of the South Merced Community Plan, which states: "Require design treatments along Childs Avenue (between SR 99 and SR 59), Mission Avenue (between SR 99 and SR 59), Tyler Road, and SR 59 that will enhance the aesthetic qualities of the roadways," notably:

- encourage and/or provide programs to businesses on SR 59 that will enable building facade and site landscaping improvements;
- install a landscaped median in Tyler Road; and,
- utilize the established design guidelines (Policy OS-1.3.c of the *Merced Vision 2030 General Plan*) for projects proposed alongside these roads.

**City of Atwater**

The *2020 City of Atwater General Plan* provides the following policies regarding aesthetic and visual resources that are relevant to this Proposed Program (City of Atwater, 2000):

**Policy CO-10.1.** *Utilize landscaping and other features to enhance and beautify major streets and gateways into and through the City.*

**Policy CO-10.2.** *Avoid excessive signage and other features which could detract from the scenic quality of prominent circulation routes.*

## 3.1.2 Environmental Setting

Situated in eastern Merced County, the majority of the Program Area is characterized by flat lands with open views of land used for agriculture and agriculture-related infrastructure (e.g., canals, weirs, dams,

and reservoirs). Eastern portions of the Program Area are near the base of the Sierra Nevada foothills. Views in these areas include undeveloped rolling hills, some agricultural lands, water features, and distant views of mountain ranges. Other portions of the Program Area that are closer to local communities in the region feature views of residential, commercial, and industrial uses.

For this analysis, a "sensitive" viewer is defined as one whose visual experience of the landscape might be adversely affected by construction or operation of the Proposed Program, either by physical features or activities. As a general rule, sensitive viewers in the Program Area are a largely mobile audience, as there are few stationary viewers (including residences) for whom projects associated with the Proposed Program would be visible. Specifically, for much of the Study Area, project locations are not located near public roads where the project sites would be visible to the public.

The Program Area is not visible from any local- or State-designated vista point, scenic route, or scenic highway (Caltrans, 2017).

## 3.1.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential impacts on aesthetic and visual resources. The thresholds used to evaluate potential aesthetic and visual resources impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

### 3.1.3.1 Thresholds of Significance

The thresholds used to evaluate the potential impacts are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines and listed below. Except as provided in Public Resources Code Section 21099, impacts on aesthetics and visual resources are considered significant if the Proposed Program would result in any of the following:

- Have a substantial adverse effect on a scenic vista.
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway.
- Substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, the project would conflict with applicable zoning and other regulations governing scenic quality.
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

As the Proposed Program would not include activities within or adjacent to a State scenic highway and associated resources (e.g. trees, rock outcroppings, and historic buildings), potential impacts related to the corresponding threshold in the list above are not evaluated in the following analysis.

### 3.1.3.2 Impact Assessment Assumptions and Methodology

Aesthetic impact assessment generally refers to the evaluation of potential effects on visual resources and the associated perception of contrast with an area's scenic character, resources, vistas, and sources of light and glare. In general, the degree of an aesthetic/visual impact is related to the perceived degree of contrast with existing views and visual character in relation with proposed project features, context, and view conditions (such as, distance, presence of existing features, and background).

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area, as applicable. The No Program Alternative is functionally the same as Existing Conditions as related to aesthetics

because while the loss of farmland due to urbanization adjacent to the cities of Merced, Atwater, and Livingston is anticipated, the overall visual character of the Program Area is not expected to change substantially as a result of anticipated urbanization and will still be primarily rural and agricultural in 2040, the year associated with the No Program Alternative. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

The following assumptions were made regarding the Proposed Program-related construction, operations, and maintenance impacts related to aesthetic and visual resources:

- It is assumed that in the absence of the Proposed Program, Merced Irrigation District (MID) would continue to operate and maintain its existing facilities and, thus, existing aesthetic and visual resources conditions associated with agricultural use operations, including occasional views of construction activities and associated equipment, would be ongoing.
- As discussed in Subsection 3.2, Agricultural Resources and Land Use, land use within and immediately adjacent to the Program Area would continue to be primarily agricultural. However, as reported in the Water Resources Management Plan, the population of urban areas within the MID service area, such Merced, Atwater, and Livingston, as well as portions of several unincorporated communities, are expected to grow significantly by 2040 (CH2M HILL, 2019). Additional urban development, primarily in terms of rural residential development, would increase the number of potential viewers within the Program Area. However, views would remain agricultural, including daily operations and occasional MID maintenance activities, as necessary.
- The following environmental commitments would be incorporated as part of the Proposed Program to avoid or minimize potential impacts:
  - Temporary and permanent safety lighting would be installed to minimize glare and offsite light trespass:
    - If nighttime construction activities that require lighting were to be required, lighting would be limited to that needed for safety, and it would be aimed to minimize glare and light trespass. Lights would be turned off after completion of the work.
    - Permanent safety lighting installed at Program facilities would be fully shielded, area-specific lighting that is directed downward to minimize glare and offsite light trespass.

The evaluation of potential impacts on aesthetic and visual resources was completed by comparing existing visual resources, as described under Subsection 3.1.2, Environmental Setting (considered the Existing Conditions/No Program Alternative for this analysis), with anticipated Program construction, operations, and maintenance activities.

#### 3.1.3.3 Impacts Associated with the Proposed Program

**Impact AES-1: Have a substantial adverse effect on a scenic vista.**

The Proposed Program would not be implemented in or within view of any State- or County-designated scenic vista point, scenic corridor, or public viewpoint. However, the Proposed Program would be implemented on rural and agricultural land that is considered a scenic resource by Merced County (Subsection 3.1.1.2). According to its General Plan, Merced County also considers views of the Sierra Nevada foothills to be scenic landscapes or views (Merced County, 2013a).

Impacts on aesthetic and visual resources during Program construction would include the removal of vegetation, construction dust raised by earthmoving, and the presence of construction equipment and vehicles. Some residences directly adjacent to the work sites within the Program Area would also be affected by short-term views of construction activities. Proposed Program implementation would result in varying degrees of vegetation removal, earthwork, quantity of construction equipment and vehicles, and number of and distance to sensitive viewers. However, visual impacts would be temporary, the majority of projects would usually last up to approximately 3 months, and affected views would be limited to short-term views of construction vehicles and equipment common to general maintenance activities by the occasional motorist or residence. Larger projects such as the regulating reservoirs would take longer to construct (up to approximately 18 months); however, the locations of these projects would generally be farther away from populated areas with sensitive viewers. ***Construction impacts would be less than significant because of the limited duration of construction, typical construction equipment used during ongoing maintenance activities, and limited number of viewers in the Program Area.***

The proposed facilities and improvements associated with the Proposed Program would be operated to support surrounding agricultural uses. Water conveyance canals and facilities are common features in the Program Area. Thus, the Proposed Program would not substantially alter the existing agricultural landscape and would not have a substantially adverse effect on views within and toward the Program Area.

Proposed facilities to be constructed as part of the Proposed Program would not block views toward the east, because the proposed facilities or improvements to existing facilities would be primarily subgrade or at grade and, thus, would not be of sufficient height to substantially block views of the landscape. Therefore, the Proposed Program would not interfere with views of the Sierra Nevada foothills.

Merced County also considers views of major river corridors and their tributaries to be scenic resources, particularly from designated public viewpoints (Subsection 3.1.1.2). Although there are no designated public viewpoints of a major river in the vicinity of project sites associated with the Proposed Program, portions of some local creeks (e.g., Owens Creek and Miles Creek) are visible within the Program Area. Creek views would not be adversely affected by the long-term Program operation because the proposed facilities and improvements would be located at or below grade and/or within existing canal footprints and, therefore, would not permanently block creek views. Accordingly, the Proposed Program would not substantially interfere with major public viewpoints or any publicly available views of creeks. ***Program operation would result in a less than significant impact on scenic vistas.***

**Impact AES-2: Substantially degrade the existing visual character or quality of public views of the site and its surroundings.**

The discussion above regarding construction impacts for Impact AES-1 applies to Impact AES-2. Construction activities would be temporary and would not substantially degrade the existing visual character or quality of the Program Area.

In general, the majority of the proposed facilities and improvements associated with implementation of the Proposed Program would be constructed at or below grade, or within existing canal or other existing facility footprints and, thus, would not be visible or result in changes in the visual character or quality of the Program Area. However, some projects would result in visual changes such as the conversion of an agricultural field to a regulating reservoir, or vegetation removal along portions of canals and service laterals in preparation of canal relining efforts, pipeline installation, or new channel construction. ***These improvements would affect the existing visual character or quality of the Program Area; however, given the limited number of viewers, temporary nature of impacts, and current and continued agricultural character of the area, permanent or temporary adverse aesthetic or visual resource impacts from the Proposed Program are considered less than significant.***

**Impact AES-3: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.**

As discussed in Subsection 2.5, Environmental Commitments, Program construction would generally occur during an 8-hour window between 7:00 a.m. and 6:00 p.m. on weekdays, unless otherwise approved by MID. Construction would typically occur during daylight hours and would not require night lighting. However, if nighttime construction activities that require lighting were to be required, lighting would be limited to that needed for safety, and it would be aimed to minimize glare and light trespass. Lights would be turned off after completion of the work. ***No substantial new source of light would occur during construction, and impacts would be less than significant.***

Permanent safety lighting may be included for some of the Program facilities such as the outlet structures for regulating reservoirs. As also discussed in Subsection 2.5, Environmental Commitments, the safety lighting would be fully shielded, area-specific lighting that is directed downward to minimize glare and offsite light trespass. Implementation of the proposed regulating reservoirs could result in a new source of glare, where sunlight could reflect off the water surface. However, the reservoirs would be located in existing agricultural areas, with few potential viewers, and not in the immediate vicinity of any airports; and thus, the potential to affect day or nighttime views would be minimal. ***No substantial new source of light or glare would occur during Program operation, and impacts would be less than significant.***

### 3.1.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant impacts on aesthetics and visual resources; therefore, mitigation is not required or recommended.

# 3.2 Agricultural Resources and Land Use

This section describes the regulatory and environmental setting related to agricultural resources and land use in the Program Area, and evaluates potential impacts that could result from implementation of the Proposed Program. For the purposes of this section, the Study Area comprises lands within the Program Area where projects are proposed.

## 3.2.1 Regulatory Setting

This section describes guidelines and regulations for evaluating potential agricultural resources and land use impacts and mitigation. There are no federal regulations applicable to agricultural resources and land use in the Program Area. Agricultural resources and land use within the Program Area are regulated by the State, and local policies and regulations are implemented by Merced County (County), City of Merced, City of Atwater, and City of Livingston.

### 3.2.1.1 State

The California Land Conservation Act of 1965 (Williamson Act) is the primary State regulation affecting agricultural use in the Program Area. Preservation of farmland in California is encouraged by the Williamson Act (Government Code Section 51250 et seq.), which enables local governments to form contracts with private landowners to restrict specific parcels of land to agricultural or related open space use. A landowner may sign a contract with the county where the land is located, voluntarily restricting land to agricultural and open space uses.

Some open space, defined by Government Code Section 51201, is generally eligible to be included as a compatible (not primary) use:

- Wildlife habitat areas, designated by an agency or political subdivision of the federal or State government in consultation with California Department of Fish and Wildlife
- Some managed wetland areas, tidal submerged areas, and salt evaporation ponds
- Land in its natural or agricultural state that is open to the public and supports recreational use
- Land in scenic highway corridors
- Land enrolled in the federal Conservation Reserve Program or Conservation Reserve Enhancement Program

In return, landowners receive substantially reduced property tax assessments. The tax assessments are based on generated income (such as, farming and open space uses) rather than the potential market value of the property. Through 2009, local governments received a partial subvention (that is, subsidy) of foregone property tax revenues from the State under the Open Space Subvention Act of 1972 (Government Code Section 16140, et seq.).

### 3.2.1.2 Local

The District contains thousands of acres of lands in Williamson Act contract as summarized in Subsection 3.2.2.3. MID acquisition of lands required to support and/or improve system water conveyance and management currently in Williamson Act contract is subject to a notification and approval process that includes the MID Board, Merced County Board of Supervisors, and the California Department of Conservation. When such lands are required to support necessary system improvement needs, MID generally initiates the acquisition process, which may include developing and passing a District Board resolution identifying the need for particular lands to support required infrastructure improvements. If condemnation is required, a resolution is subsequently included as part of a notice of possible acquisition provided to the Merced County Board of Supervisors and the Department of

Conservation. Such lands are generally acquired through either purchase or eminent domain, as appropriate in a particular context.

The following summarizes local-level County and city regulations and requirements relevant to the implementation of the Proposed Program.

**2030 Merced County General Plan**

The General Plan provides countywide goals that are the basis for evaluating development proposals and other land use-related activities within the County. The General Plan includes policies and implementation measures that support those goals. Some of the relevant goals and policies that reflect Merced County's approach to managing land use, agricultural land, and timberland that are related to the Proposed Program are discussed below (Merced County, 2013a).

***Countywide Growth and Development***

**Goal LU-1: Create a countywide land use pattern that enhances the integrity of both urban and rural areas by focusing urban growth towards existing or suitably located new communities.**

- **Policy LU-1.1: Countywide Development** – Direct urban development to areas within adopted urban boundaries of cities, Urban Communities, and Highway Interchange Centers in order to preserve productive agriculture, limit urban sprawl, and protect natural resources.
- **Policy LU-1.2: Rural Centers** – Limit the amount of new growth within existing Rural Centers by allowing only agriculture-supporting residential and commercial uses.

***Agricultural and Foothill Pasture***

**Goal LU-2: Preserve, promote, and expand the agricultural industry in Merced County.**

- **Policy LU-2.1: Agricultural Designation** – Apply the Agricultural land use designation as the primary designation in the County to support productive agricultural lands and promote the agricultural industry.
- **Policy LU-2.2: Foothill Pasture Designation** – Apply the Foothill Pasture land use designation on agricultural and open space lands located on the eastern and western edges of the County which are recognized for their value as grazing, cropland, and open space.
- **Policy LU-2.3: Land Use Activity Limitations** – Limit allowed land use within Agricultural and Foothill Pasture areas to agricultural crop production, farm support operations, and grazing and open space uses.
- **Policy LU-2.4: Secondary Uses in Agricultural Areas** – Except as otherwise provided by law, limit ancillary uses in Agricultural and Foothill Pasture areas to include secondary single-family residences, farm worker housing, agricultural tourism related uses, and agricultural support services, provided that such uses do not interfere with historic agricultural practices, result in adverse health risks, or conflict with sensitive habitats or other biological resources.
- **Policy LU-2.5: Agricultural Support Facilities** – Allow consideration of locating characteristically-specific commercial and industrial uses in rural areas in limited cases based on the unique nature of the use and for health and safety reasons, which require location on large parcels or in sparsely populated areas. In addition, consider the following criteria during the Conditional Use Permit review process:
    a. The use requires location in a rural area because of one or more of the following characteristics: unusual site area requirements, natural resource production purposes, the use is directly agricultural related, or because of specific operational characteristics which pose a health or safety problem to urban populations.

b. The use is located near or readily accessible to a probable work force.

c. The use is consistent with the intent and policies of the Agricultural, Natural Resources, and Health and Safety Elements.

d. The use will not significantly impact adjacent agricultural, recreational, natural, cultural, wildlife, or other identified Natural Resources Element.

e. The use is protected from hazards identified in the Health and Safety Element.

f. The use is not located on productive agricultural land when nonproductive agricultural land is available in the vicinity of the proposed project.

g. The use is limited in size, time of operation, or length of permit authority where necessary to ensure compatibility with adjacent land uses. The use shall not have a detrimental effect on surface or groundwater resources.

h. The use shall provide adequate infrastructure and improvements to reduce impacts on County services.

i. The use shall have access to adequate transportation facilities without creating abnormally high traffic volumes and shall provide road improvements to mitigate impacts generated by the project.

**Merced County Code, Title 18 – Zoning**

The purpose of Title 18 is to "(a) help implement the goals, objectives and policies of the county general plan; (b) assure compatibility between land uses; and (c) encourage development that protects and promotes the public health, safety and general welfare of the unincorporated areas of the county" (Merced County, 2018).

**2020 City of Atwater General Plan**

The General Plan provides a framework and specific goals to guide the development of the city of Atwater and its associated sphere of influence. The General Plan includes policies and implementation measures that support those goals. Some of the relevant goals and policies that reflect the city's approach to managing land use and agricultural land, and are related to the Proposed Program are discussed below (City of Atwater, 2000).

**GOAL CO-4.** Ensure the continued viability of agriculture in the area surrounding the City's proposed Sphere of Influence.

- **Policy CO-4.1.** Comply with all agricultural preservation policies and implementation programs developed jointly by the City and Merced County.

**1999 Livingston General Plan**

The General Plan provides a framework to guide physical, social, and economic development within the city's planning area. The General Plan includes objectives, policies, and standards to support this framework. Some of the relevant goals and policies that reflect the City of Livingston's approach to managing land use and agricultural land, and are related to the Proposed Program are discussed below (City of Livingston, 1999).

***Land Use Element***

**Objective A.** A well-balanced mix of residential, commercial, industrial, and open space/public/land uses which create and maintain a high quality environment and fiscally sound community.

**Policy 11.** In order to ensure orderly and logical urban growth, to maintain the integrity of surrounding agricultural activities, and provide for urban growth in areas with proper services, the Reserve

classifications are designated on the General Plan map. Activities within this designation are limited to those uses permitted by the exclusive agricultural zone districts of Merced County.

***Open Space, Conservation, and Recreation Element***

**Objective A.** Preserve prime farmland, farmland of statewide importance, and important agricultural operations within the Livingston sphere of influence until logical and orderly urban growth is appropriate.

**Objective B.** Planning boundaries are established around the City's perimeter to maintain the physical separation between the City and nearby agricultural operations and to maintain the scenic beauty surrounding the City.

**Objective C**. Edges such as roadways, railroad rights-of-way, irrigation ditches, shall be used as growth phasing boundaries to ensure that agricultural operations are not eliminated prematurely.

## 3.2.2 Environmental Setting

### 3.2.2.1 County and City Land Uses

The Proposed Program would include proposed facility improvements and actions throughout the Program Area in Merced County. In July 2016, Merced County had an estimated population of 268,672 (U.S. Census Bureau, 2016a). Between 2000 and 2010, the County population increased approximately 22 percent (U.S. Census Bureau, 2016b). The population is expected to continue growing, with a projected growth of 417,200 persons by 2030, which is a nearly a 100 percent increase from its 2000 population (Merced County, 2013b). The Program Area also includes the cities of Merced, Atwater, and Livingston, where approximately half of the County's population resides along the State Route 99 corridor.

The city of Merced is the largest urban area in Merced County and is located almost completely within the eastern portion of the Merced Irrigation District (MID or District) service area boundary, with the remainder of the city located within the Program Area. The city has a population of approximately 83,000 (approximately 30 percent of the County's population) (U.S. Census Bureau, 2017a).

The city of Atwater is the second largest city within the County and is completely contained within the MID service area boundary. Atwater's population is approximately 29,000 (approximately 10 percent of the County's population) (U.S. Census Bureau, 2017b).

The city of Livingston, with a population of approximately 14,000 (approximately 5 percent of the County's population), occurs within the western region of the MID service area (U.S. Census Bureau, 2017c).

Each city operates its own groundwater wells to supply water to urban users (CH2M HILL, 2019). MID provides irrigation water for rural residential lands included in the urban areas. Rural residential lands considered "ranchettes" generally include an irrigated field or small orchard, which are not grown for commercial production, as part of the home site. The future expansion of urban areas will likely affect future land uses and water demands within the District and surrounding area.

The remainder of the population in the County is located in unincorporated developments outside of the MID service area such as Franklin/Beachwood, Le Grand, Planada, Winton, and the University of California, Merced campus. Franklin/Beachwood is located in the eastern portion of the MID service area, just west of Merced. Le Grand and Planada are also within the eastern portion of the MID service area, east of Merced. Winton is in the western portion of the MID service area and is just north of Atwater. University of California, Merced is just outside and north of the MID service area boundary, to the north of Merced.

Similar to urban areas, expected population increases in these unincorporated areas would likely affect future land uses and water demands within the District and surrounding area. Development of these

unincorporated areas is guided by the *2030 Merced County General Plan*. Future growth in the unincorporated communities would likely expand primarily into agricultural land due to limited availability of native land adjacent to the current developments (CH2M HILL, 2019).

The majority of the MID Program Area is governed by Merced County. The predominant General Plan designation for lands in the MID service area is Agricultural, which "provides for cultivated agricultural practices which rely on good soil quality, adequate water availability, and minimal slopes." Likewise, these lands are zoned as General Agriculture (A-1) (Figures 3.2-1 and 3.2-2). Lands zoned as A-1 have high-quality soils, available water, and relatively flat topography that allows for intensive farming operations and agricultural, commercial, or industrial uses near urban areas or sparsely populated, low-traffic areas (Merced County Code, 1997).

The majority of the lands in the Program Area have a General Plan designation of Foothill Pasture, which "provides for non-cultivated agricultural practices which typically require larger areas of land due to poor soil quality, limited water availability, and steeper slopes," with the remainder in Agriculture. These lands are zoned Exclusive Agriculture (EA) and A-1, respectively. Table 3.2-1 provides a breakdown of the County zoning designations that occur within each of the Proposed Program components.

Table 3.2-1. Zoning Designations Affected by Project Component Type
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Components | County Zoning |
|---|---|
| Main Canal Improvements at Tunnel No. 1 Project – All Options | A-2 |
| Canal Rebuilding/Lining and Table Topping Dead-end Facilities | A-1 |
| | A-2 |
| | M-2 |
| | R-1 |
| | R-2 |
| | A-R |
| | AM |
| | C-1 |
| | HWY-99 |
| | R-1-5000 |
| | M-1 |
| | C-2 |
| Canal Automation and Flow Measurement Improvements | A-1 |
| | A-2 |
| | R-1 |
| | R-2 |
| | A-R |
| | AM |
| Siphon Modifications | A-1 |
| | A-2 |
| | R-2 |
| Interties | A-1 |
| | A-2 |
| | M-1 |
| Pipelining, Rerouting, and New Channel Construction on Customer Property | Locations not yet determined |
| Reservoirs and Recharge Basins | A-1 |
| | A-2 |

Table 3.2-1. Zoning Designations Affected by Project Component Type
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Components | County Zoning |
|---|---|
| Highlands Projects | R-2 |
| Stormflow Diversions | A-1 |
| | A-2 |
| Merced River Water Recovery Project | A-1 |

Notes:
Merced County Zoning Designations

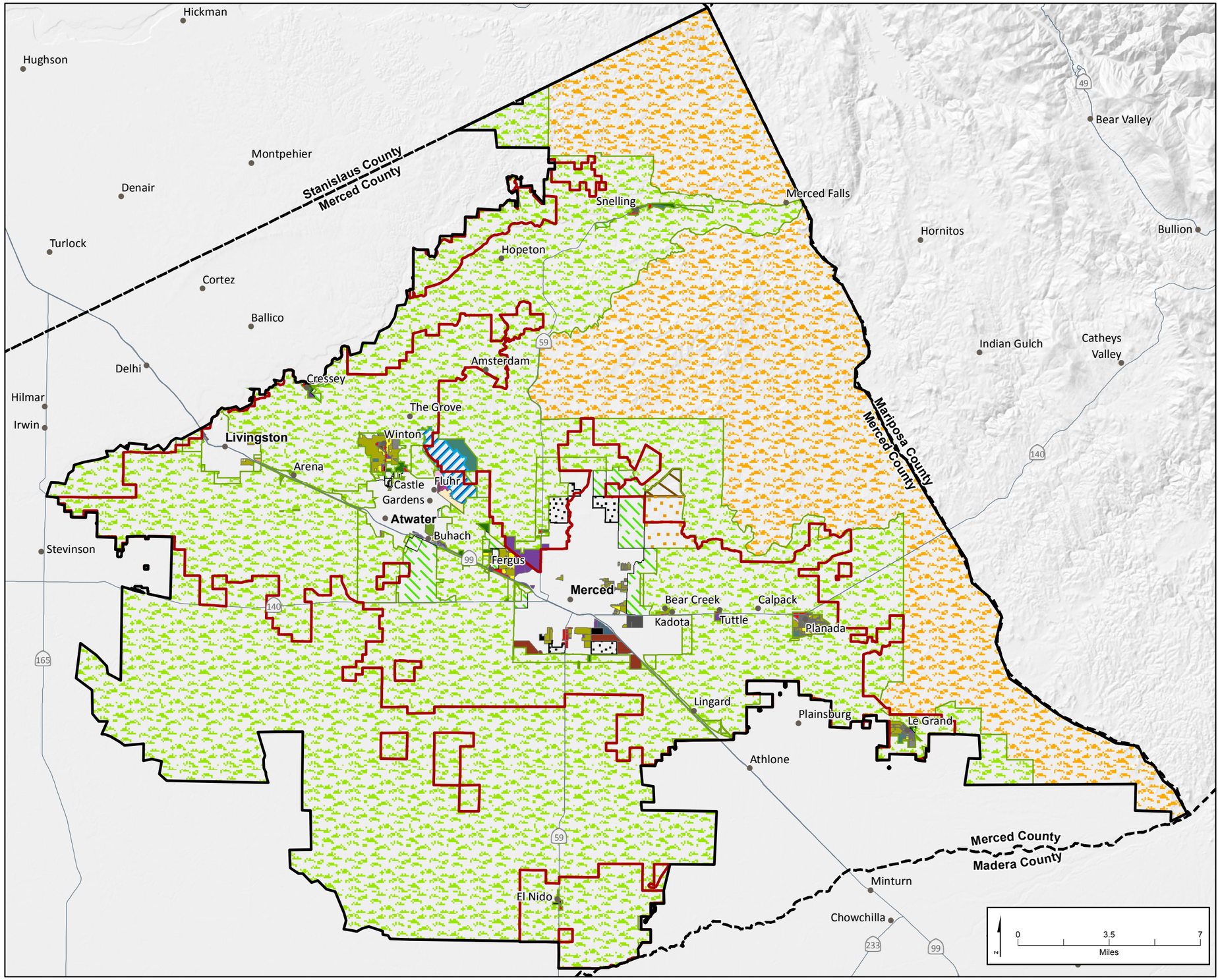
| | |
|---|---|
| A-1 = General Agricultural | A-R = Agricultural Residential |
| A-2 = Exclusive Agriculture | AM = Aviation/Manufacturing |
| M-1 = Light Manufacturing | R-1-5000 = Single-Family Residential with Higher Density |
| M-2 = General Manufacturing | C-1 = Neighborhood Commercial |
| R-1 = Single-Family Residential | C-2 = General Commercial |
| R-2 = Two-Family Residential | HWY 99 = Highway |

### 3.2.2.2 Farmland Designations and Agricultural Uses in Merced County

**Merced County Important Farmland**

The California Department of Conservation, Office of Land Conservation, maintains a statewide inventory of farmlands. These lands are mapped by the Department of Conservation, Division of Land Resource Protection as part of the Farmland Mapping and Monitoring Program (FMMP). Lands are classified using a system that combines technical soil ratings and current land use into the following categories (DOC, 2015):

- Prime Farmland – must have been irrigated within the last 4 years and the soil must meet physical and chemical criteria determined by the Natural Resources Conservation Service
- Farmland of Statewide Importance – must have been irrigated within the last 4 years and must be of similar quality; however, these lands may possess minor shortcomings, including increased slope or decreased ability to store moisture in the soil
- Unique Farmland – must have been cropped within the last 4 years, and is typically irrigated, although some nonirrigated orchards or vineyards may qualify for the designation
- Farmland of Local Importance – generally of a quality that would otherwise qualify for Prime Farmland or Farmland of Statewide Importance if not for a lack of irrigation
- Grazing Land – existing vegetation of suitable quality for livestock grazing
- Urban and Built-up Land
- Other Land and Water
- In 2014, more than 90 percent of the approximately 1.27 million acres inventoried in Merced County under the FMMP were designated for agricultural purposes (DOC, 2015) (Figure 3.2-3). Approximately half of the agricultural lands are designated as Important Farmland, the majority of which is Prime Farmland. Urban lands, such as incorporated cities, account for approximately 3 percent of the lands in the County (Table 3.2-2). Between 2014 and 2016, Merced County experienced a net conversion of 4,915 acres of agricultural land to urban and built-up and other land; however, as shown in Table 3.2-2, the majority of the land use conversions in the County were from one agricultural designation to another.
- Projects associated with the Proposed Program would be constructed on or adjacent to lands currently designated as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance under the FMMP (DOC, 2015).



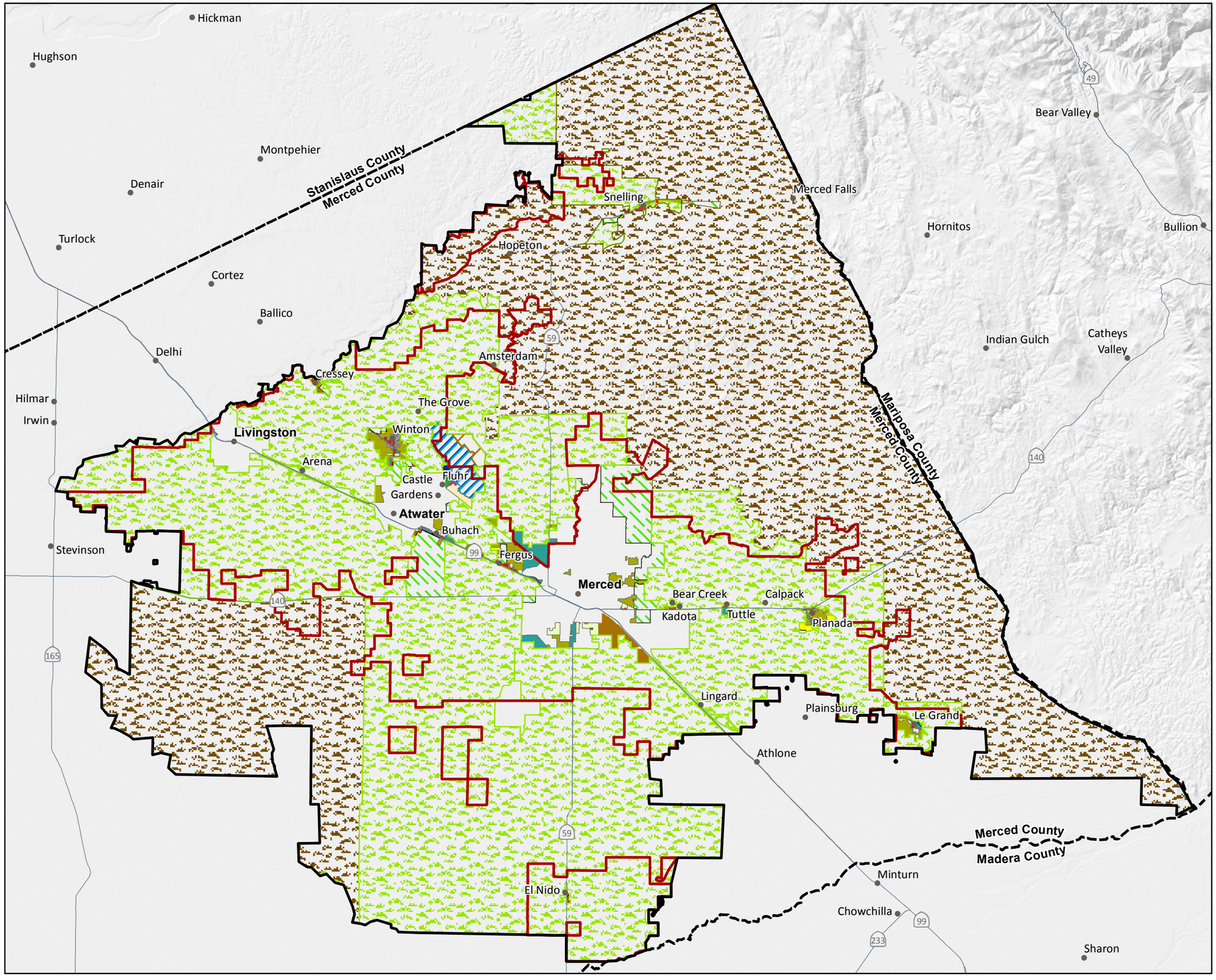


LEGEND

- MID Program Area
- MID Service Area
- County
- AGRICULTURAL
- AGRICULTURAL RESIDENTIAL
- AVIATION/MANUFACTURING
- BUISNESS PARK
- COMMERCIAL
- COMMERCIAL GENERAL
- COMMERCIAL NEIGHBORHOOD
- COMMERCIAL RESERVE
- COMMERCIAL TRANSITION
- FOOTHILL PASTURE
- HEAVY COMMERCIAL
- HIGH-DENSITY RESIDENTIAL
- INDUSTRIAL
- INDUSTRIAL RESERVE
- INSTITUTIONAL
- LOW-DENSITY RESIDENTIAL
- MEDIUM-DENSITY RESIDENTIAL
- MIXED USE
- MULTIPLE-USE URBAN DEVELOPMENT
- NEIGHBORHOOD COMMERCIAL
- OPEN SPACE
- PARK/OPEN SPACE/ RECREATIONAL
- PUBLIC/GOVERNMENT
- QUASI PUBLIC
- RECREATIONAL
- REGIONAL COMMUNITY COMMERCIAL
- RESIDENTIAL RESERVE
- RURAL RESIDENTIAL
- UNIVERSITY
- URBAN EXPANSION AREA
- VERY LOW-DENSITY RESIDENTIAL
- VISITOR COMMERCIAL

Source: General Plan, Merced County, downloaded August 2017

**FIGURE 3.2-1 GENERAL PLAN LAND USE DESIGNATIONS**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA





LEGEND

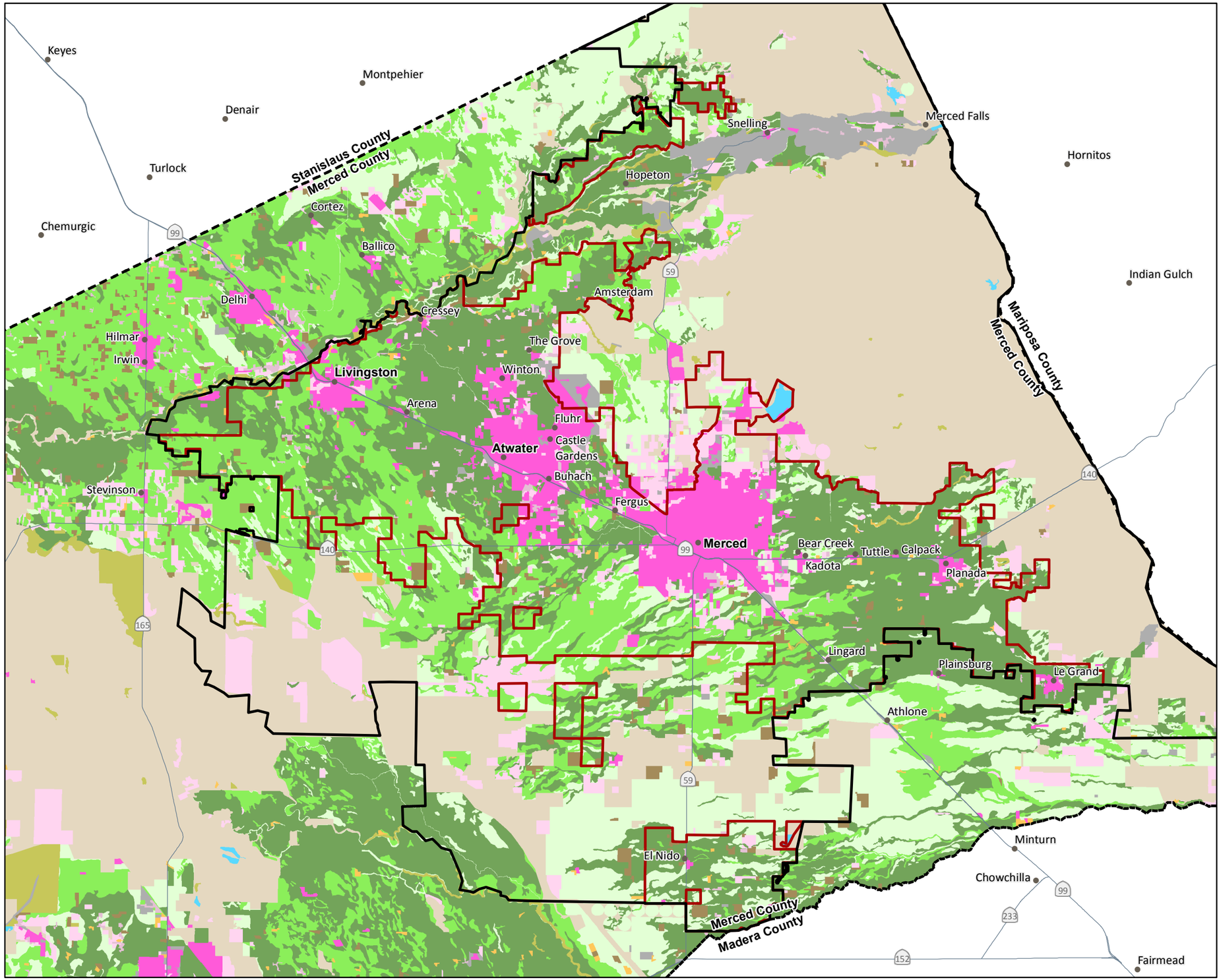
- MID Program Area
- MID Service Area
- County
- AGRICULTURAL RESIDENTIAL
- AVIATION/MANUFACTURING
- BUSINESS PARK
- COMMERCIAL TRANSITION
- COMMERCIAL
- EXCLUSIVE AGRICULTURAL
- GENERAL AGRICULTURAL
- GENERAL COMMERCIAL
- GENERAL MANUFACTURING
- HIGHWAY
- INSTITUTIONAL
- LIGHT MANUFACTURING
- MULTI-FAMILY RESIDENTIAL
- NEIGHBORHOOD COMMERCIAL
- OPEN SPACE
- PLANNED DEVELOPMENT
- SINGLE-FAMILY RESIDENTIAL WITH HIGHER DENSITY
- SINGLE-FAMILY RESIDENTIAL
- SPECIAL PLANNING ZONE
- TWO-FAMILY RESIDENTIAL
- VISITOR COMMERCIAL

N

0 3.5 7
Miles

Source: Zoning, Merced County, downloaded August 2017

**FIGURE 3.2-2 ZONING DESIGNATIONS**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA





LEGEND

- MID Program Area
- MID Service Area
- County

**Important Farmland**

- Prime Farmland
- Farmland of Statewide Importance
- Farmland of Local Importance
- Unique Farmland
- Grazing Land
- Confined Animal Agriculture
- Nonagricultural or Natural Vegetation
- Semi-Agricultural and Rural Commercial Land
- Vacant or Disturbed Land
- Rural Residential Land
- Urban and Built-Up Land
- Water

N

0 3.5 7
Miles

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom

Source: FMMP, ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/2014

**FIGURE 3.2-3 IMPORTANT FARMLAND**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA



ch2m

### Merced County Agricultural Uses

- Merced County is regarded as one of the most agriculturally productive counties in the United States, with a gross revenue of approximately $3.6 billion in 2015 (MCDA, 2016). Table 3.2-3 shows the leading agricultural commodities for 2015 in Merced County; animals and animal products including dairy, meat, and eggs account for a substantial amount of agricultural revenue. Other important agricultural commodities within the County include almonds, sweet potatoes, tomatoes, and silage (MCDA, 2016).

Table 3.2-2. Merced County Summary and Change by Land Use Category 2014–2016
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| | Total Acreage Inventoried | | 2014–2016 Acreage Changes | | |
|---|---|---|---|---|---|
| **Land Use Category** | **2014** | **2016** | **Acres Lost** | **Acres Gained** | **Net Change (acres)** |
| Prime Farmland | 271,914 | 269,243 | 4,463 | 1,792 | -2,671 |
| Farmland of Statewide Importance | 154,502 | 154,209 | 2,212 | 1,919 | -293 |
| Unique Farmland | 112,300 | 115,235 | 1,702 | 4,637 | 2,935 |
| Farmland of Local Importance | 62,224 | 61,671 | 5,528 | 4,975 | -553 |
| **Important Farmland Subtotal** | **600,940** | **600,358** | **13,905** | **13,323** | **-582** |
| Grazing Land | 556,965 | 552,632 | 5,196 | 863 | -4,333 |
| **Agricultural Land Subtotal** | **1,157,905** | **1,152,990** | **19,101** | **14,186** | **-4,915** |
| Urban and Built-up Land | 39,183 | 40,340 | 985 | 2,142 | 1,157 |
| Other Land[a] | 51,871 | 55,771 | 1,807 | 5,707 | 3,900 |
| Water Area | 16,673 | 16,531 | 154 | 12 | -142 |
| **Total Area Inventoried** | **1,265,632** | **1,265,632** | **22,047** | **22,047** | **0** |

Source: DOC, 2016.

[a] Land not included in any other mapping category. Common examples include low-density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry, or aquaculture facilities; strip mines; borrow pits; and water bodies smaller than 40 acres. Vacant and non-agricultural land surrounded on all sides by urban development and greater than 40 acres are mapped as Other Land.

Table 3.2-3. Merced County Leading Farm Commodities 2015
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Rank | Crop | Value ($) | Rank | Crop | Value ($) |
|---|---|---|---|---|---|
| 1 | Milk (includes market & manufacturing) | 895,180,000 | 9 | Hay (alfalfa) | 100,459,000 |
| 2 | Almonds (kernel basis) | 552,042,000 | 10 | Turkeys | 68,147,000 |
| 3 | Chickens (includes fryers & other chickens) | 364,085,000 | 11 | All nursery products | 58,026,000 |
| 4 | Cattle and calves | 357,426,000 | 12 | Cotton (includes acala & pima cotton) | 54,292,000 |
| 5 | Sweet potatoes | 194,317,000 | 13 | Grapes (wine) | 53,425,000 |
| 6 | Tomatoes (includes market & processing) | 161,100,000 | 14 | Silage (other) | 52,143,000 |
| 7 | Silage (corn) | 141,221,000 | 15 | Miscellaneous vegetables | 40,695,000 |
| 8 | Eggs, chicken (market) | 123,242,000 | **Top 15 Total** | | **3,215,800,000** |

Source: MCDA, 2016.

### Merced Irrigation District Service Area Agricultural Uses

At approximately 165,361[3] acres, the MID service area accounts for approximately 13 percent of the total land area in the County. Because of MID's ability to deliver high-quality water to growers within the Program Area, most of the Program Area is currently irrigated for crop production (approximately 70 percent). The primary cropping systems categories were developed for groups of crops across MID with similar water uses and management practices to characterize farming practices and land use trends. The seven primary cropping categories are as follows:

- Orchards
- Pasture and alfalfa
- Field crops
- Truck crops
- Grains
- Rice
- Vineyards

The majority of the Program Area is in orchards, primarily almonds (CH2M HILL, 2019). Table 3.2-4 shows the distribution of types of land uses within the MID service area.

Table 3.2-4. Land Use by Type for 2013 within Merced Irrigation District Service Area
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Land Use Type | 2013 Distribution Acreage (% of total) |
|---|---|
| Urban | 20,483 (13%) |
| Native and Riparian | 3,301 (2%) |
| Orchards | 52,660 (34%) |
| Vineyards | 2,070 (1%) |
| Truck Crops | 11,474 (7%) |
| Rice | 1,723 (1%) |
| Other (lands in transition) | 5,784 (4%) |
| Water | 607 (0%) |
| Field Crops | 23,655 (15%) |
| Grains | 8,315 (5%) |
| Pasture and Alfalfa | 22,939 (15%) |
| **Total** | **153,012 (100%)** |
| **Total Permanent Crops[a]** | **54,730 (35%)** |
| **Total Nonpermanent Crops[b]** | **73,890 (47%)** |
| **Total Irrigated Crops[c]** | **128,620 (82%)** |
| **Total All Other Uses[d]** | **24,391 (15%)** |

Source: CH2M HILL, 2019.
[a] Orchards and vineyards
[b] Truck crops, rice, other, field crops, grains, and pasture and alfalfa
[c] All permanent and nonpermanent crops
[d] Urban, native and riparian, and water

[3] 153,012 acres comprises parcels with the remaining acreage in rights-of-way, roads, canals, and rail.

***Urban***

Urban lands include residential, commercial, and industrial land uses within the three incorporated cities (Merced, Atwater, and Livingston).

***Native and Riparian***

Land classified as native or riparian is limited within MID. Between 2002 and 2013, native land declined approximately 3,300 acres due to land conversions for agriculture.

***Orchards***

Because of continuing favorable market conditions and the high quality and reliability of MID surface water compared with other water supply sources in the area, orchard acreage (specifically almonds) is increasing rapidly within the MID service area (CH2M HILL, 2019). Other orchard crops including walnuts and pistachios are increasing within the MID service area as well; however, these occur in higher proportions within the western portion.

***Vineyard***

Vineyard acreage has remained relatively steady in the last decade within the MID service area (CH2M HILL, 2019). Between 2002 and 2013 there was a net decrease of fewer than 200 acres.

***Truck Crops[4]***

Between 2002 and 2013 there was a net decrease in truck crops of about 2,300 acres in the MID service area, accounting for a 17 percent decrease in the District (CH2M HILL, 2019).

***Rice***

Rice comprises a small amount of acreage within the MID service area (between 1 and 2 percent); however, rice has decreased significantly over the last decade as the land has converted to nonpermanent crops such as field crops, truck crops, and grains (CH2M HILL, 2019).

***Other (Lands in Transition)***

The amount of agricultural land that is in transition and not planted in a particular year varies from year to year and is largely influenced by market factors and water availability (CH2M HILL, 2019).

***Field Crops***

Field crop acreage has increased in MID; however, since 1995, there have been large fluctuations in the field crop acreage because of crop rotations and economic conditions (CH2M HILL, 2019). Approximately 1,000 acres of the recent increase in field crops came from conversion of native land.

***Grains***

Grains in MID are subject to the largest fluctuations of any land use category. Between 2002 and 2013, grain acreage in MID decreased an estimated 63 percent; however, preceding this, there was an even larger increase in grain acreage (approximately 300 percent) between 1995 and 2002 (CH2M HILL, 2019). Changes in grain production acreage are primarily related to fluctuations in other nonpermanent crops such as field and truck crops and alfalfa that are grown in rotation with grains.

***Pasture and Alfalfa***

In the past decade, the acreage of pasture and alfalfa within the District has increased (CH2M HILL, 2019). Between 1995 and 2002, pasture had a reduction of approximately 4,000 acres; however,

[4] Truck crops include crops such as tomatoes, peppers, potatoes, melon, squash, onion, strawberry, and other small vegetables.

between 2002 and 2013, pasture increased approximately 3,000 acres, for a net reduction from 1995 to 2013 of approximately 1,000 acres.

***Irrigated, Permanent, and Nonpermanent Crops***

Overall, irrigated acreage inside MID increased by 1,000 acres, and urban acreage increased by 5,000 acres between 2002 and 2013 (CH2M HILL, 2019), resulting in a reduction of native and riparian acreage by approximately 6,000 acres. The distribution of permanent and nonpermanent crops also changed with an approximate 8,000-acre increase in permanent crops and 6,000-acre decrease in nonpermanent crops overall.

### Land Use Type Categorization in Merced Irrigation District, Outside of Service Area, within the Program Area

In 2013, approximately 63 percent of the land outside of the MID service area boundary, but within the Program Area, was native land (CH2M HILL, 2019). The next highest land use class was pasture and alfalfa with 15 percent of the total acreage, followed by orchards that make up 7 percent of the acreage. Native land has decreased over the last decade (approximately 11,000 acres) primarily because of conversions to agricultural uses, such as pasture and alfalfa and orchards. Overall, between 2002 and 2013, irrigated crops within the Program Area increased by approximately 9,000 acres. Table 3.2-5 provides a breakdown of land use types in the MID Program Area.

Table 3.2-5. Land Use by Type for 2013 Merced Irrigation District Outside of Service Area, within Program Area
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Land Use Type | 2013 Distribution Acreage (% of total) |
|---|---|
| Urban | 3,083 (1%) |
| Native and Riparian | 190,473 (63%) |
| Orchards | 20,134 (7%) |
| Vineyards | 5,739 (2%) |
| Truck Crops | 3,079 (1%) |
| Rice | 0 (0%) |
| Other (lands in transition) | 2,536 (1%) |
| Water[a] | 1,331 (0%) |
| Field Crops | 17,854 (6%) |
| Grains | 12,749 (4%) |
| Pasture and Alfalfa | 45,115 (15%) |
| **Total** | **302,093 (100%)** |
| **Total Permanent Crops[b]** | **25,873 (9%)** |
| **Total Nonpermanent Crops[c]** | **81,333 (27%)** |
| **Total Irrigated Crops[d]** | **107,206 (36%)** |
| **Total All Other Uses[e]** | **194,887 (64%)** |

Source: CH2M HILL, 2019.

[a] Large relative change is driven by small initial acreage

[b] Orchards and vineyards

[c] Truck crops, rice, other, field crops, grains, and pasture and alfalfa

[d] All permanent and nonpermanent crops

[e] Urban, native and riparian, and water

#### 3.2.2.3 Williamson Act Contract Status

Some improvements associated with the Proposed Program would be constructed on lands currently under Williamson Act contracts. Acquisition of such lands to support District facility needs is discussed in Subsection 3.2.1.2. Figure 3.2-4 shows lands currently enrolled in Williamson Act contracts throughout the County and within the MID service area boundary (DOC, 2013).

### 3.2.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential impacts on agriculture and land use. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

#### 3.2.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the California Environmental Quality Act Guidelines and are listed below. Impacts on agricultural resources and land use are considered significant if the Proposed Program would result in any of the following:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
- Conflict with existing zoning for agricultural use or a Williamson Act contract.
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)).
- Result in the loss of forest land or conversion of forest land to non-forest use.
- Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.
- Physically divide an established community.
- Cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

As there is no forest land or timberland in the Program Area, impacts related to the thresholds listed above regarding forest land and timberland are not evaluated in the following analysis.

#### 3.2.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area as applicable. In the long term, with or without implementation of the Proposed Program, it is expected that MID would serve fewer users by year 2040 because of urbanization adjacent to the cities of Merced, Atwater, and Livingston within the Program Area and the associated loss of farmland (CH2M HILL, 2019). It is assumed that in the absence of the Proposed Program, land use within and immediately adjacent to the Program Area would continue to be primarily agricultural. Forecast land use changes analyzed in the Water Resources Management Plan (CH2M HILL, 2019) indicate that by the year 2040, the following is expected to occur:

- Future urbanization would take place adjacent to current urban lands primarily inside the MID service area and would result in a conversion of approximately 8.5 percent of farmlands/agriculture to urban uses inside the MID service area and less than 1 percent to urban uses outside the MID service area, but within the Program Area by 2040.

- Because of urbanization, total irrigated acreage inside MID would decline by approximately 7 percent.
- The majority of the land outside of the MID service area consists of native land (land that has not been developed or irrigated to produce a crop) and would decrease in response to pressure to convert to agricultural land, including orchards and nonpermanent crops.

As discussed in Section 2, Program Description and Alternatives, five programmatic alternatives were developed and evaluated as part of the Water Resources Management Plan development process, including the No Program Alternative, which considered future 2040 land use, water demand, and District revenue without the Proposed Program. That analysis found that under the No Program Alternative, the District's total annual costs would exceed the revenue-generating potential and that without system/infrastructure improvements, continued focus on customer service, sustainable management of groundwater resources, and decreased use of private groundwater pumping to support the agricultural economic base of the region would be unlikely. The Proposed Program was developed to respond to anticipated land use changes in a way that supports the local agricultural economy and improves water management and customer service. Because future urbanization and conversion of land use would primarily be limited to areas adjacent to existing urban centers, and because facilities and actions included as part of the Proposed Program would not be located in such areas, anticipated changes in agricultural land use assumed as part of the No Program Alternative would not affect or be affected by projected urbanization. As such, the impact analysis below focuses on potential impacts associated with the Proposed Program when compared to Existing Conditions.

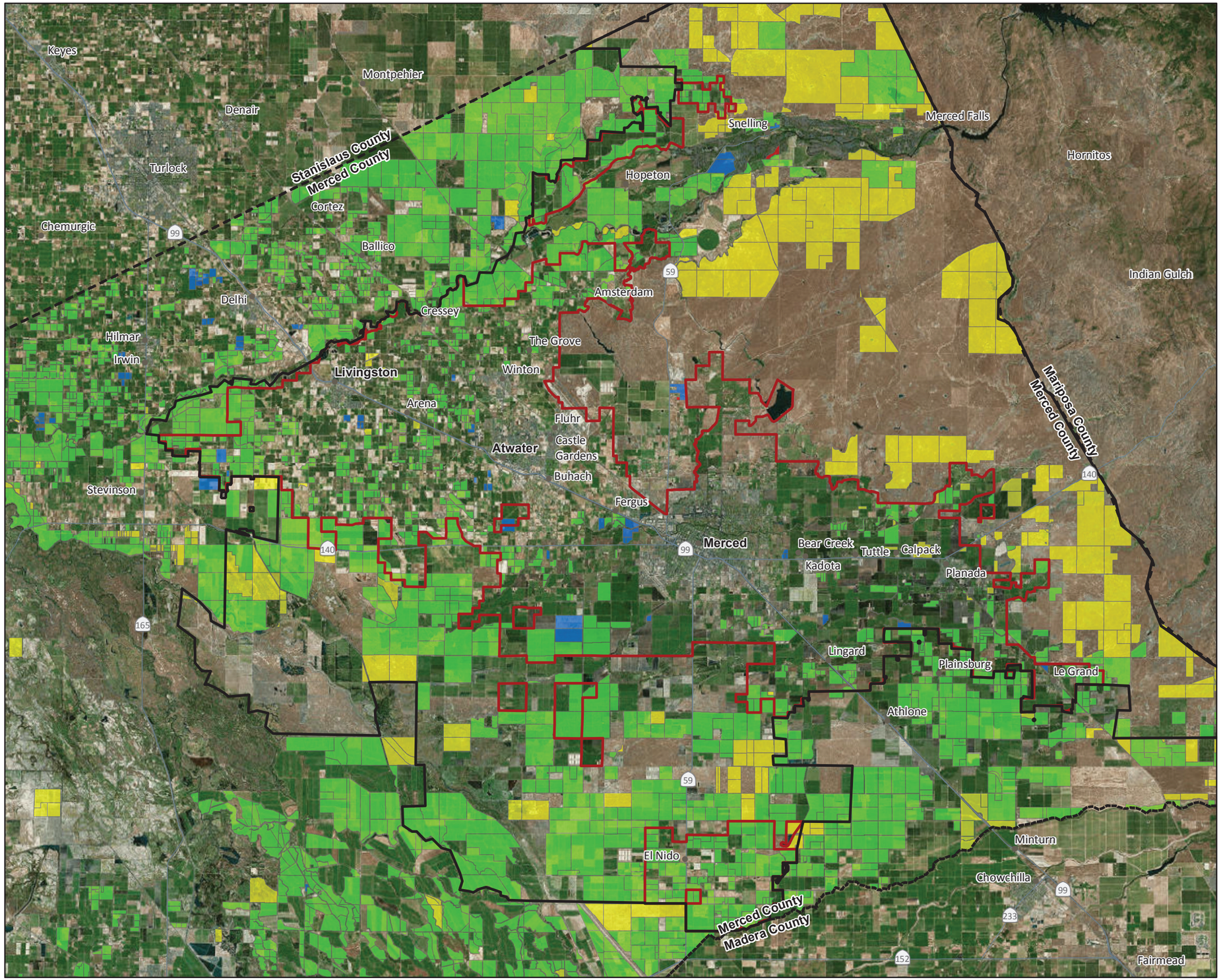
The Proposed Program includes projects that have been grouped into project categories based on common features of proposed improvements, as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

Impacts on land use were assessed using a combination of data review, published reports, and professional experience. Short-term impacts due to construction activities were assessed to the extent practicable; however, the analysis primarily focuses on long-term impacts from Program operation.

#### 3.2.3.3 Impacts Associated with the Proposed Program

**Impact AG/LU-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.**

Construction of the Proposed Program may result in the short-term conversion of Important Farmland. Farmlands adjacent to individual proposed projects may be temporarily taken out of production to accommodate construction activities such as vehicle access and material and equipment staging. Depending on the specific project, construction would range in duration from a month for table topping dead-end facilities up to 18 months for the proposed regulating reservoirs and 24 months under Option 2 for the Main Canal Improvements at Tunnel No. 1 Project. Temporary impacts would be limited to the extent necessary to accommodate the construction activity. Access routes and staging areas would be selected to limit impacts on adjacent agricultural properties, and proposed tie-ins would occur outside of the irrigation season to avoid impacts on agricultural water deliveries. Additionally, agricultural uses would be restored once construction activities are complete and would not result in the permanent conversion of farmlands. ***Therefore, impacts during construction would be less than significant.***





LEGEND

- MID Program Area
- MID Service Area
- County

**Williamson Act**

- Non-Prime (NP)
- Non-Prime/Non-Renewal (NP-NR)
- Prime Farmland (P)
- Prime Farmland/Non-Renewal (P-NR)

N

0 3.5 7
Miles

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS

Source: Williamson Act, Merced County, 2010

**FIGURE 3.2-4 WILLIAMSON ACT CONTRACTS**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

The Proposed Program would result in the permanent loss of some agricultural land, particularly as a result of proposed diversion channel and reservoir improvements. The Owens Creek Diversion Channel Project would be constructed along parcels of Important Farmland and would have a new permanent footprint of 9 acres. Each of the proposed reservoirs would convert approximately 60 acres of land in agricultural production. As described in Section 2, Program Description and Alternatives, the precise location of each reservoir is unknown at this time, and a range of potential locations has been identified as shown on Figures 2-11 through 2-23. Acres of Important Farmland within each of the areas that represent the range of potential locations for each reservoir are provided in Table 3.2-6. Additionally, the proposed intertie projects could result in small areas of agricultural land conversion of 0.2 acre or less.

Table 3.2-6. Important Farmland in Range of Areas Where Proposed Reservoirs Would Be Located[a]
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Name | Prime Farmland (acres) | Unique Farmland (acres) | Farmland of Statewide Importance (acres) |
|---|---|---|---|
| Arena Canal Regulating Reservoir and Recharge Basin | 337.3 | 2.9 | 285.6 |
| Atwater Canal Regulating Reservoir and Recharge Basin | 209.3 | 0.0 | 0.0 |
| Bear Creek Regulating Reservoir | 11.9 | 0.0 | 29.8 |
| Cressey Regulating Reservoir and Recharge Basin | 0.0 | 0.0 | 0.0 |
| Deadman Creek Regulating Reservoir | 194.5 | 65.2 | 243.1 |
| Hadley Lateral Reservoir | 771.8 | 57.2 | 0.0 |
| Increase Capacity of El Nido Reservoir | 0.0 | 0.0 | 0.0 |
| Le Grand Reservoir | 381.3 | 160.3 | 0.0 |
| McCoy Basin Reservoir (reservoir site + staging area) | 0.0 | 0.0 | 14.0 |
| McCoy Lateral Upper Regulating Reservoir | 239.5 | 0.0 | 105.7 |
| Northside Regulating Reservoir | 417.5 | 15.5 | 30.4 |
| Spilker Lateral Regulating Reservoir | 588.9 | 281.9 | 678.2 |

[a] Acreage above is for total study area within which each reservoir would ultimately be located - each reservoir would be approximately 60 acres

The Main Canal Improvements at Tunnel No. 1 project Options 1, 2, and 3 would result in a new permanent footprint of 60, 55, and 25 acres, respectively (Option 4 would not result in a new permanent footprint); and the Black Rascal Creek Diversion Channel Project would result in a new 1.5-acre permanent footprint. However, those new permanent footprints would not be located on existing agricultural lands. Other proposed capital improvements would only result in temporary impacts during construction.

Because the footprints associated with the Owens Creek Diversion Channel Project and the proposed reservoirs would be limited (reservoir disturbance area would be no greater than approximately 60 acres), individual projects would be situated such that the majority of the conversions would occur to

lands that are not considered Prime, Unique, or of Statewide Importance. ***Because the Proposed Program would not significantly change agriculture as the primary use of the land in the Program Area and would improve water supply delivery to agricultural land uses, thereby discouraging conversion of agricultural lands to other uses, impacts would be less than significant.***

**Impact AG/LU-2: Conflict with existing zoning for agricultural use or a Williamson Act contract.**

The majority of the Program Area is zoned by the County as General Agricultural and Exclusive Agriculture. Given that the Proposed Program is designed to support agriculture, the Proposed Program would not conflict with the zoning designations for agricultural use.

The discussion under Impact AG/LU-1 regarding impacts during construction applies to this threshold as well. ***Impacts during construction would be less than significant.***

Acres of Williamson Act contract lands within each of the range of potential reservoir sites are provided in Table 3.2-7. Reservoir locations would be chosen to avoid or minimize conversions of lands under Williamson Act contracts when feasible. As identified in Subsection 3.2.1.2, acquisition of lands including portions of or entire parcels in Williamson Act contracts required to support District facility needs is subject to a public notification process involving the Merced County Board of Supervisors and the Department of Conservation. ***Because the Proposed Program would not significantly change agriculture as the primary use of the land in the Program Area, would improve water supply delivery to agricultural land uses, and acquisition of lands in Williamson Act contract would be subject to an established public notification process, impacts would be less than significant.***

Table 3.2-7. Williamson Act Contract Lands in Potential Reservoir Locations[a]
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Name | Williamson Act Contracts (acres) |
|---|---|
| Arena Canal Regulating Reservoir and Recharge Basin | 33.3 |
| Atwater Canal Regulating Reservoir and Recharge Basin | 58.7 |
| Bear Creek Regulating Reservoir | 41.7 |
| Cressey Regulating Reservoir and Recharge Basin | 16.7 |
| Deadman Creek Regulating Reservoir | 211.1 |
| Hadley Lateral Reservoir | 281.8 |
| Increase Capacity of El Nido Reservoir | 0.8 |
| Le Grand Reservoir | 25.0 |
| McCoy Basin Reservoir (reservoir site + staging area) | 0.0 |
| McCoy Lateral Upper Regulating Reservoir | 156.3 |
| Northside Regulating Reservoir | 103.2 |
| Spilker Lateral Regulating Reservoir | 1,018.9 |

[a] Acreage above is for total study area within which each reservoir would ultimately be located; each reservoir would be approximately 60 acres.

**Impact AG/LU-3: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.**

Construction of the Proposed Program would involve ground disturbances such as grading and excavation associated with a range of supply and conveyance system improvements. Several types of heavy equipment would be used throughout construction of the Proposed Program. Temporary impacts on neighboring agricultural fields could occur during construction. However, MID would coordinate construction activities with landowners to minimize impacts on agricultural production, including scheduling construction as feasible to avoid impacts on agricultural operations and associated production, and financially compensating landowners for any loss of production. ***Therefore, construction impacts would be less than significant.***

Operations and maintenance activities would occur during operation of the Proposed Program. operations and maintenance activities would be consistent with those that the District completes currently and would not represent a change in the existing environment that could result in the conversion of farmland to non-agricultural use. ***Impacts during operation would be less than significant.***

**Impact AG/LU-4: Physically divide an established community.**

The Program Area is located in and around established communities; however, the Proposed Program entails improvements to existing water supply and conveyance facilities and, thus, would not result in projects or actions that would divide an established community. ***Implementation of the Proposed Program would improve water supply reliability and support the local agricultural economy; therefore, the Proposed Program would result in no impact.***

**Impact AG/LU-5: Cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.**

The goals, objectives, and policies in the General Plan emphasize the preservation of agricultural land uses. Although the Proposed Program would result in the permanent loss of some agricultural lands as a result of new canal, diversion, and reservoir construction, it would not conflict with local land use policies regarding agricultural uses, because the Proposed Program would improve MID's flexibility to serve farmland, thereby helping to preserve existing agricultural uses.

As shown in Table 3.2-1, some of the project sites would be located on land zoned as M-2 (General Manufacturing), AM (Aviation/Manufacturing), C-1 (Neighborhood Commercial), HWY 99 (Highway), C-2 (General Commercial), and M-1 (Light Manufacturing). Although agricultural facilities would generally not be considered compatible with these zoning designations or with the existing or intended use of the land, these facilities would generally include new belowground pipelines and improvements at existing facilities. Belowground facilities and improvements to existing facilities would not preclude any aboveground uses related to manufacturing and residential housing at the sites, and existing or planned uses for these parcels would still be viable. MID would coordinate proposed improvements with the relevant local entity to ensure zoning requirements are properly addressed. ***Therefore, the Proposed Program would result in a less than significant impact.***

### 3.2.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant impacts on agricultural resources and land use; therefore, mitigation is not required or recommended.

# 3.3 Air Quality

This section describes the regulatory and environmental setting related to air quality and evaluates potential air quality impacts associated with implementation of the Proposed Program. For the purposes of this section, the Study Area is the Program Area.

## 3.3.1 Regulatory Setting

This section describes guidelines and regulations for evaluating potential impacts and mitigation related to air quality. Air quality in California is regulated at the federal and State levels by U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (ARB), respectively. At the local level, regional air pollution control districts oversee the attainment of air quality standards within air basins throughout California. The regional districts have permitting authority over stationary sources of air pollutants within their district boundaries and provide the primary review of environmental documents prepared for projects with air quality issues. The Proposed Program is in the San Joaquin Valley Air Basin (SJVAB) under the jurisdiction of San Joaquin Valley Air Pollution Control District (SJVAPCD).

### 3.3.1.1 Federal

**Clean Air Act and National Ambient Air Quality Standards**

Federal air quality policies are regulated through the federal Clean Air Act (CAA). The U.S. Congress adopted the CAA in 1970 and passed amendments to the CAA in 1977 and 1990. Pursuant to the CAA, EPA has established nationwide air quality standards to protect public health and welfare, with an adequate margin of safety. The National Ambient Air Quality Standards (NAAQS), developed in 40 *Code of Federal Regulations* 50, are the maximum allowable atmospheric concentrations for seven criteria pollutants: ozone, nitrogen dioxide ($NO_2$), carbon monoxide (CO), particulate matter less than 10 micrometers in aerodynamic diameter ($PM_{10}$), particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$), sulfur dioxide ($SO_2$), and lead. The NAAQS contain (1) primary standards that protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly, and (2) secondary standards that protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Table 3.3-1 summarizes the NAAQS, as well as the California Ambient Air Quality Standards (CAAQS), which are discussed in Subsection 3.3.1.2.

**Table 3.3-1.** National and California Ambient Air Quality Standards
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| | | | NAAQS[a] | |
|---|---|---|---|---|
| **Pollutant** | **Averaging Time** | **CAAQS[b]** | **Primary[c]** | **Secondary[d]** |
| Ozone | 8 hours | 0.070 ppm | 0.070 ppm | 0.070 ppm |
| | 1 hour | 0.09 ppm | – | – |
| $PM_{10}$ | Annual arithmetic mean | 20 µg/m$^3$ | – | – |
| | 24 hours | 50 µg/m$^3$ | 150 µg/m$^3$ | 150 µg/m$^3$ |
| $PM_{2.5}$ | Annual arithmetic mean | 12 µg/m$^3$ | 12 µg/m$^3$ | 15 µg/m$^3$ |
| | 24 hours | – | 35 µg/m$^3$ | 35 µg/m$^3$ |
| CO | 8 hours | 9.0 ppm | 9 ppm | – |
| | 1 hour | 20 ppm | 35 ppm | – |
| $NO_2$ | Annual arithmetic mean | 0.03 ppm | 0.053 ppm | 0.053 ppm |
| | 1 hour | 0.18 ppm | 0.100 ppm | – |
| $SO_2$ | 24 hours | 0.04 ppm | – | – |
| | 3 hours | – | – | 0.5 ppm |
| | 1 hour | 0.25 ppm | 0.075 ppm[e] | – |

**Table 3.3-1.** National and California Ambient Air Quality Standards
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Pollutant | Averaging Time | CAAQS[b] | NAAQS[a] | |
|---|---|---|---|---|
| | | | Primary[c] | Secondary[d] |
| Lead[f] | Calendar quarter | – | 1.5 µg/m³ (certain areas) | 1.5 µg/m³ |
| | Rolling 3-month average | – | 0.15 µg/m³ | – |
| | 30-day average | 1.5 µg/m³ | – | – |
| Visibility-reducing particles | 8 hours | [g] | – | – |
| Sulfates | 24 hours | 25 µg/m³ | – | – |
| Hydrogen sulfide | 1 hour | 0.03 ppm | – | – |
| Vinyl chloride[f] | 24 hours | 0.01 ppm | – | – |

Source: ARB, 2016a

[a] NAAQS other than ozone, PM, and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration 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/m³ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, is equal to or less than the standard.

[b] CAAQS for ozone, CO (except Lake Tahoe), $SO_2$ (1-hour and 24-hour), $NO_2$, and suspended particulate matter ($PM_{10}$, $PM_{2.5}$, and visibility-reducing particles) are not to be exceeded. All others are not to be equaled or exceeded.

[c] NAAQS Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[d] NAAQS Secondary Standards: The levels of air quality necessary to protect the public welfare from known or anticipated adverse effects of a pollutant.

[e] Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 parts per billion.

[f] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined. ARB made this determination following the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[g] In 1989, ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Notes:

µg/m³ = micrograms per cubic meter
ppm = parts per million (by volume)

EPA classifies areas as being in attainment or nonattainment with the NAAQS for each criteria pollutant. A region that meets the NAAQS for a pollutant is designated as being in attainment for that pollutant. A region that does not meet the NAAQS for a pollutant is designated as being in nonattainment for that pollutant. An area that was previously designated as a nonattainment area but has recently met the standard and has been reclassified by EPA as attainment with a maintenance plan is designated as a maintenance area.

The 1977 CAA amendments require each state to develop and maintain a State Implementation Plan (SIP) for each nonattainment criteria pollutant. SIPs help avoid and minimize emissions of nonattainment criteria pollutants and their precursor pollutants and achieve compliance with the NAAQS. In 1990, the CAA was amended to strengthen regulation of both stationary and mobile emission sources.

***General Conformity***

Under the conformity provisions of the CAA, no federal agency can approve a project or undertake a federal action unless the project or action demonstrates conformity with the applicable SIP. These conformity provisions help ensure that federal agencies contribute to the efforts of attaining the NAAQS. EPA's conformity rules implement CAA Section 176(c) and include transportation conformity rules that apply to transportation plans and projects and general conformity rules that apply to other federal actions.

A project is exempt from EPA's general conformity rule (assumed to conform) if the total net project-related emissions are less than the general conformity de minimis thresholds.

A project that produces emissions that exceed conformity thresholds is required to perform additional general conformity analysis, and a formal conformity determination is required prior to federal approval of the proposed action.

Individual actions included as part of the Proposed Program that require federal involvement (e.g., actions that require a federal Clean Water Act Section 404 permit from U.S. Army Corps of Engineers) would be subject to a general conformity rule review, as appropriate.

***Toxic Air Contaminant and Odorous Emissions***

In addition to the criteria pollutants, EPA regulates emissions of hazardous air pollutants, or toxic air contaminants (TACs). TACs include airborne inorganic and organic compounds that can have both short-term (acute) and long-term (carcinogenic, chronic, and mutagenic) impacts on human health. Odorous compounds can be detected by the human olfactory system, such as hydrogen sulfide and other sulfurous compounds.

Controlling air toxic emissions became a national priority with the passage of the CAA amendments in 1990, when Congress mandated that EPA regulate 188 air toxics. Prior to the 1990 CAA amendments, national emission standards were established for benzene, vinyl chloride, radionuclides, mercury, asbestos, beryllium, inorganic arsenic, radon 222, and coke oven emissions. The 1990 CAA amendments require EPA to set standards for categories and subcategories of sources that emit hazardous air pollutants, rather than for the pollutants themselves. EPA began issuing the new standards in November 1994. National emission standards set before 1991 remain applicable.

Odorous emissions are typically regulated by local air districts under nuisance prohibitory rules. Because odor generally affects people differently, development of odor emissions standards has proven impractical. Therefore, regulators have relied on the nuisance standard to assist in enforcing control of odorous emissions. Determination of the presence of a nuisance emission is based on the number of odor complaints received by the air district during an odor episode.

#### 3.3.1.2 State

**California Clean Air Act and Air Quality Standards**

ARB oversees California air quality policies and regulations. CAAQS were first established in 1969 pursuant to the Mulford-Carrell Act. CAAQS are generally more stringent than the NAAQS and include the NAAQS pollutants and four additional pollutants: sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particulates. Relevant CAAQS are listed in Table 3.3-1.

The California CAA, approved in 1988, requires each local air district, where ambient concentrations violate the CAAQS, to prepare an air quality management plan to achieve compliance with the CAAQS as a part of the SIP. ARB has ultimate responsibility for the SIP for nonattainment pollutants but relies on each local air district to adopt mandatory statewide programs and provide additional strategies for sources under their jurisdiction. The SIPs are a compilation of new and previously submitted plans, programs (e.g., monitoring, modeling, and permitting), district rules, state regulations, and federal controls. Local air

districts and other agencies prepare SIP elements and submit them to ARB for approval. ARB forwards SIP revisions to EPA for approval and publication in the *Federal Register*.

***Air Toxics***

California regulates TACs through its Air Toxics Program, which is mandated in Chapter 3.5 of the Health and Safety Code – Toxic Air Contaminants, and Part 6 – Air Toxics Hot Spots Information and Assessment (California Health and Safety Code, Sections 39660 et seq. and 44300 et seq., respectively).

The California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, completed a comprehensive health assessment of diesel exhaust in 1998. The assessment formed the basis for an ARB decision to formally identify particulate matter in diesel exhaust as a TAC that may pose a threat to human health.

ARB adopted the *Diesel Risk Reduction Plan* (ARB, 2016b) and a series of airborne toxic control measures for mobile and stationary sources to reduce overall diesel exhaust emissions in California. The recommended measures address on-road vehicles, off-road equipment and vehicles, and stationary and portable engines.

ARB also adopted two airborne toxic control measures for controlling naturally occurring asbestos (NOA): (1) the Asbestos Airborne Toxic Control Measure for Surfacing Applications and (2) the Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations. ARB and local air districts have authority to enforce the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations for asbestos.

#### 3.3.1.3 Local

As stated earlier in this section, the Proposed Program is under the jurisdiction of SJVAPCD. The SJVAPCD is responsible for (1) implementing air quality regulations, including developing plans and control measures for stationary sources of air pollution to meet the NAAQS and CAAQS; (2) implementing permit programs for the construction, modification, and operation of sources of air pollution; and (3) enforcing air pollution statutes and regulations governing stationary sources. SJVAPCD has specific air quality-related planning documents, rules, and regulations. Local planning documents and regulations that may be applicable to the Proposed Program as administered by SJVAPCD with ARB oversight are summarized below.

**Fugitive Dust Control Measures**

SJVAPCD Regulation VIII requires property owners, contractors, developers, equipment operators, farmers, and public agencies to control fugitive dust emissions from specified sources.

**Indirect Source Review**

In December 2005, SJVAPCD adopted the Indirect Source Review (ISR) (Rule 9510) to meet emission reduction commitments in the $PM_{10}$ and ozone attainment plans. The ISR applies to development projects where construction exhaust emissions equal or exceed 2.0 tons per year of oxides of nitrogen ($NO_x$) or 2.0 tons of $PM_{10}$. Unless exempt, projects are subject to the ISR and must submit an Air Impact Assessment Application to SJVAPCD, with commitments to reduce construction exhaust $NO_x$ and $PM_{10}$ emissions by 20 and 45 percent, respectively. If a project does not achieve the onsite reductions required by the ISR, the project must pay offsite mitigation fees.

**SJVAPCD California Environmental Quality Act Guidelines**

The *Guidance for Assessing and Mitigating Air Quality Impacts* (GAMAQI) (SJVAPCD, 2015a) assists lead agencies and project applicants in evaluating the potential air quality impacts of projects in the SJVAB. The GAMAQI recommends procedures for evaluating potential air quality impacts for the California Environmental Quality Act (CEQA) environmental review process and for evaluating short-term (construction) and long-term (operations) air emissions. The current version of the GAMAQI (adopted

March 2015) provides recommended air quality emission thresholds for CEQA purposes and was used in the preparation of this Programmatic Environmental Impact Report.

## 3.3.2 Environmental Setting

### 3.3.2.1 Project Setting – San Joaquin Valley Air Basin

The primary pollutants of concern within the San Joaquin Valley are ozone and $PM_{10}$ because concentrations of these pollutants have exceeded ambient air quality standards. The combination of heat and sunlight transform volatile organic compounds and $NO_x$ from vehicle exhaust, industrial processes, and other operations into ground-level ozone. Additionally, small particles of manmade compounds, such as soot, ash, and dust, become suspended in air to create particulate matter. The topography of the basin exacerbates the problem by limiting dispersion and dissipation of the regional pollutants.

### 3.3.2.2 Topographic and Climate

Air quality is affected by the rate and location of pollutant emissions and by meteorological conditions that influence movement and dispersal of pollutants in the atmosphere. Atmospheric conditions (e.g., wind speed, wind direction, and air temperature gradients) and local topography provide the link between air pollutant emissions and local air quality concentrations.

The Proposed Program is in the SJVAB, in the southern half of the Central Valley, in an area approximately 250 miles long and 35 miles wide and shaped like a narrow bowl. The SJVAB is bordered by the Sierra Nevada Mountains to the east (8,000 to more than 14,000 feet in elevation), the Coast Ranges to the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains to the south (6,000 to 7,981 feet in elevation). There is a slight downward elevation gradient from Bakersfield in the southeast end (elevation 408 feet) to sea level at the northwest end where the Central Valley opens to San Francisco Bay at Carquinez Straits (SJVAPCD, 2015b).

The SJVAB is in a Mediterranean climate zone. The SJVAB is typically arid in the summer; cool temperatures and tule fog (a dense ground fog) are prevalent in the winter and fall. Average high temperatures in the summer are in the mid 90 degrees Fahrenheit (°F) range; average low temperatures in winter are in the high 40°F range. January is typically the wettest month of the year, with an average of approximately 2 inches of rain. Wind direction is typically from the northwest with speeds around 30 miles per hour. The subtropical high-pressure cell is strongest during spring, summer, and fall and produces subsiding air that can result in temperature inversions in the Central Valley. Wintertime high-pressure events often last many weeks, with surface temperatures in the 30°F range. During these events, fog can be present, and inversions can be strong. Winter inversions can inhibit vertical mixing of pollutants to a few hundred feet (SJVAPCD, 2015b).

### 3.3.2.3 Existing Air Quality and Attainment Status

ARB maintains ambient air monitoring stations for criteria pollutants throughout California. The air monitoring stations within the Program Area are located at 2334 M Street and 385 South Coffee Street. The South Coffee Station monitors ambient concentrations of ozone, $NO_2$, and $PM_{2.5}$. $PM_{10}$ data were obtained from the 2334 M Street Station. Table 3.3-2 summarizes available data from the two stations during the last 3 years. As shown, multiple exceedances of the NAAQS and CAAQS, primarily for ozone and particulate matter, have been recorded (2015 to 2017).

Table 3.3-2. Ambient Criteria Pollutants Concentration Data at Air Quality Monitoring Stations Closest to the Proposed Program Area

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Pollutant | Parameter | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| Ozone | Maximum 1-hour concentration (ppm) | 0.102 | 0.097 | 0.093 |
| | Maximum 8-hour concentration (ppm) | 0.089 | 0.086 | 0.084 |
| | # Days > NAAQS 8-hour std. of > 0.070 ppm | 29 | 28 | 16 |
| | # Days > CAAQS 1-hour std. of > 0.09 ppm | 2 | 2 | 0 |
| | # Days > CAAQS 8-hour std. of > 0.07 ppm | 34 | 29 | 17 |
| $NO_2$ | Maximum 1-hour concentration (ppm) | 0.035 | 0.035 | 0.038 |
| | Annual average (ppm) | 0.007 | 0.007 | 0.007 |
| | # Days > NAAQS 1-hour std. of > 0.100 ppm | 0 | 0 | 0 |
| | # Days > CAAQS 1-hour std. of > 0.180 ppm | 0 | 0 | 0 |
| $PM_{10}$ (respirable particulate matter) | Maximum 24-hour concentration (µg/m$^3$) | 94.0 | 64.5 | 144.0 |
| | Annual average (µg/m$^3$) | 30.6 | 29.5 | 35.8 |
| | # Days > NAAQS 24-hour std. of > 150 µg/m$^3$ | 0 | 0 | 0 |
| | # Days > CAAQS 24-hour std. of > 50 µg/m$^3$ | 31.8 | 38.9 | 76.6 |
| $PM_{2.5}$ (fine particulate matter) | Maximum 24-hour concentration (µg/m$^3$) | 61.2 | 43.0 | 66.7 |
| | Annual average (µg/m$^3$) | 12.7 | 11.9 | 12.6 |
| | # Days > NAAQS 24-hour std. of >35 µg/m$^3$ | 15 | 6.3 | 20.4 |

Source: ARB, 2018a

Note:

std. = standard

Attainment status for the project area is summarized in Table 3.3-3. Under the NAAQS, the area is currently designated as nonattainment for the ozone and $PM_{2.5}$ standards. The SJVAB is a maintenance area for the federal $PM_{10}$ standard. The area is in attainment for the federal CO and $NO_2$ standards and unclassified for $SO_2$ and lead. Under the CAAQS, the project area is currently designated as nonattainment for ozone, $PM_{10}$, and $PM_{2.5}$, and as attainment or unclassified for other pollutants.

Table 3.3-3. Attainment Status for the Program Area

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Pollutant | NAAQS | CAAQS |
|---|---|---|
| Ozone | Nonattainment/Extreme | Nonattainment |
| $PM_{10}$ | Maintenance | Nonattainment |
| $PM_{2.5}$ | Nonattainment | Nonattainment |
| CO | Attainment/Unclassified | Unclassified |
| $NO_2$ | Attainment/Unclassified | Attainment |
| $SO_2$ | Unclassified | Attainment |
| Lead (particulate) | Unclassified | Attainment |
| Hydrogen sulfide | No Standard | Unclassified |
| Sulfates | No Standard | Attainment |
| Visibility-reducing particles | No Standard | Unclassified |
| Vinyl chloride | No Standard | Attainment |

Sources: ARB, 2018b and EPA, 2018

Air quality planning documents for pollutants for which the Program Area is classified as a federal nonattainment or maintenance area are developed by SJVAPCD and ARB and approved by EPA. The following is a summary of the current SJVAPCD air quality plans (ARB, 2016c):

- **Ozone Plans:**
  - *2007 Ozone Plan for the San Joaquin Valley Air Basin* (SJVAPCD, 2007a): The plan was adopted by SJVAPCD in April 2007 and approved by ARB in June 2007. The plan addresses the NAAQS 1997 8-hour ozone standard of 84 parts per billion. The plan was revised in June 2011, and EPA approved the revised plan on March 1, 2012.
  - 2013 Ozone Plan (SJVAPCD, 2013): The plan was prepared for EPA's revoked 1997 1-hour ozone standard. The plan was approved by ARB on November 21, 2013.
  - *2016 Plan for the 2008 8-Hour Ozone Standard* (SJVAPCD, 2016a): ARB approved the plan on July 21, 2016, and submitted it to EPA for approval. The plan sets out the strategy to reduce $NO_x$ emissions by more than 60 percent between 2012 and 2031 and l to bring the San Joaquin Valley into attainment of the NAAQS 2008 8-hour ozone standard no later than December 31, 2031.
- **$PM_{10}$ Plan:**
  - *2007 $PM_{10}$ Maintenance Plan and Request for Redesignation* (SJVAPCD, 2007b): The plan provides verification of continued $PM_{10}$ attainment, a contingency plan, an attainment emissions inventory, a maintenance demonstration, and a demonstration of California's monitoring network.
- **$PM_{2.5}$ Plans:**
  - *Proposed 2008 $PM_{2.5}$ Plan for the San Joaquin Valley Air Basin* (SJVAPCD, 2008): ARB approved the plan on May 22, 2008. The plan sets out the strategy to attain the federal 1997 annual $PM_{2.5}$ standard by 2015. The plan was amended on April 28, 2011, and EPA approved the revised 2008 $PM_{2.5}$ Plan on November 9, 2011, except for the contingency measures.
  - *2012 $PM_{2.5}$ Plan* (SJVAPCD, 2012): ARB approved the plan January 24, 2013. The plan sets out the strategy to attain the federal 2006 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$ by 2019. SJVAPCD adopted a supplemental document to the *2012 $PM_{2.5}$ Plan* on September 18, 2014, which was approved by ARB on October 24, 2014.
  - *2015 $PM_{2.5}$ State Implementation Plan* (SJVAPCD, 2015b): ARB approved the plan on May 21, 2015. The plan sets out the strategy to attain the federal 1997 24-hour $PM_{2.5}$ standard by 2018 and the 1997 annual $PM_{2.5}$ standard by 2020.
  - *2016 Moderate Area Plan for the 2012 $PM_{2.5}$ Standard* (SJVAPCD, 2016b): SJVAPCD adopted the plan on September 15, 2016. The plan addresses the EPA federal annual $PM_{2.5}$ standard of 12 $\mu g/m^3$ established in 2012. The plan includes an attainment impracticability demonstration and request for reclassification of the Central Valley from moderate nonattainment to serious nonattainment.
  - *2018 $PM_{2.5}$ Plan* (SJVAPCD, in preparation): This single, comprehensive attainment plan will integrate the 1997, 2006, and 2012 NAAQS $PM_{2.5}$ standards.
- **CO Maintenance Plan:**
  - *Final Carbon Monoxide Redesignation Request and Maintenance Plan for Ten Federal Planning Area*s (ARB, 1998): ARB approved the plan, which covers SJVAPCD as part of the SIP for CO. EPA approved the revision on June 1, 1998. On July 22, 2004, ARB approved an update to the SIP that (1) shows how the 10 areas will maintain the standard through 2018, (2) revises emission estimates, and (3) establishes new on-road motor vehicle emission budgets for transportation conformity.

In addition to the SJVAPCD air quality plans, the Air Quality Element in the *2030 Merced County General Plan* (Merced County, 2013) sets the goals to protect and enhance air quality in Merced County.

- **Rule 9510 – Indirect Source Review**

Construction of new facilities that results in emissions that exceed the Rule 9510 threshold of 2 tons per year for $NO_x$ and $PM_{10}$ may be subject to Rule 9510 requirements. To comply with Rule 9510, projects must reduce $NO_x$ and $PM_{10}$ emissions by 20 and 45 percent, respectively, through onsite emission reduction, offsite emission offset, or a combination of the two. Onsite emission reduction measures typically include using less polluting construction equipment, which are generally achieved by using add-on controls, cleaner fuels, or newer lower emitting equipment. Compliance with Rule 9510 requires that for the required amount of emission reductions not achieved onsite by a given project, a project proponent must pay the required fees to SJVAPCD to offset the emissions.

### 3.3.2.4 Sensitive Receptors

Sensitive receptors include hospitals, residences, libraries, schools, daycare facilities, elderly housing, and convalescent facilities. These are places where the occupants may be relatively more susceptible to the adverse effects of exposure to TAC emissions and other pollutants. Some projects under the Proposed Program are located near residential, commercial, and manufacturing land uses; however, most of the project sites are in areas where the primary land uses are agricultural. Sensitive receptors within 0.5 mile[5] of projects that involve earth movement and larger-scale construction activities are identified in Table 3.3-4.

Table 3.3-4. Sensitive Receptors within 0.5 Mile of Proposed Program Facilities
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| | Number of Sensitive Receptors | |
|---|---|---|
| **Proposed Program Facility** | **Within Range of Potential Locations Boundary** | **Within 0.5 Mile around Range of Potential Locations Boundary** |
| Arena Canal Regulating Reservoir and Recharge Basin | 28 residences | Livingston High School<br>907 residences<br>1 apartment complex |
| Atwater Canal Regulating Reservoir and Recharge Basin | 12 residences | 125 residences |
| Bear Creek Regulating Reservoir | No sensitive receptors | 1 residence |
| Cressey Regulating Reservoir and Recharge Basin | No sensitive receptors | 32 residences |
| Deadman Creek Regulating Reservoir | No sensitive receptors | 7 residences |
| Hadley Lateral Reservoir | 8 residences | 30 residences |
| Increase Capacity of El Nido Reservoir Project | No sensitive receptors | 2 residences |
| Le Grand Canal near Black Rascal Automation Project | No sensitive receptors | University of California, Merced |
| Le Grand Reservoir | 1 residence | 15 residences |
| Main Canal Relining | No sensitive receptors | 3 residences |
| Main Canal Improvements at Tunnel No. 1 Project | No sensitive receptors | No sensitive receptors |
| McCoy Basin Reservoir | No sensitive receptors | 6 residences |
| McCoy Lateral Upper Regulating Reservoir | 6 residences | 41 residences |

[5] Air quality emission levels resulting from construction are anticipated to disperse to relatively low levels beyond 0.5 mile of each construction location/activity.

Table 3.3-4. Sensitive Receptors within 0.5 Mile of Proposed Program Facilities
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| | Number of Sensitive Receptors | |
|---|---|---|
| **Proposed Program Facility** | **Within Range of Potential Locations Boundary** | **Within 0.5 Mile around Range of Potential Locations Boundary** |
| Merced River Water Recovery Project | 3 residences | Washington Elementary School<br>18 residences |
| Northside Canal Flumes | No sensitive receptors | 8 residences |
| Northside Regulating Reservoir | 3 residences | 6 residences |
| Spilker Lateral Regulating Reservoir | 3 residences | 13 residences |

#### 3.3.2.5 Naturally Occurring Asbestos

Asbestos minerals naturally occur in rock and soil as the result of natural geologic processes, often in veins near earthquake faults in the coastal ranges, the foothills of the Sierra Nevada Mountains, and other areas of California. NOA takes the form of long, thin, flexible, separable fibers. Natural weathering or human disturbance can break down NOA into microscopic fibers, which are easily suspended in air. Asbestos is a known human carcinogen. It causes cancers of the lung and the lining of internal organs, as well as asbestosis and pleural disease, which inhibit lung function. EPA is addressing concerns about potential effects of NOA in several areas in California.

The California Geological Survey identifies ultramafic rocks in California to be the source of NOA. *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos* (DOC, 2000) indicates that the Program Area does not likely contain NOA.

### 3.3.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential impacts on air quality. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

#### 3.3.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and listed below. These thresholds also address the GAMAQI (SJVAPCD, 2015a) in evaluating the potential air quality impacts of projects in the SJVAB. GAMAQI numerical thresholds are discussed in more detail below. Impacts on air quality are considered significant if the Proposed Program would result in any of the following:

- Conflict with or obstruct implementation of the applicable air quality plan. Result in a cumulatively considerable net increase of any criteria pollutant for which the Proposed Program region is nonattainment under an applicable federal or state ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions such as those leading to odors adversely affecting a substantial number of people.

Air quality is evaluated in terms of emissions and impacts. SJVAPCD identifies thresholds that separate short-term (construction) and long-term (operations) emissions. Short-term emissions are typically associated with construction activities and are recognized to be short in duration. Long-term emissions are typically associated with project operations and occur over more than a year.

$PM_{10}$ is generally the pollutant of primary concern for most construction projects. Construction-related emissions can substantially increase localized concentrations of $PM_{10}$, as well as increased emissions of ozone precursors (SJVAPCD, 2015a). However, large construction projects might also exceed the SJVAPCD annual threshold for $NO_x$ and CO. The SJVAPCD approach to CEQA analyses of construction $PM_{10}$ impacts requires implementation of effective and comprehensive control measures rather than detailed quantification of emissions. Therefore, thresholds to determine levels of significance are not provided for short-term projects, and SJVAPCD requires a more qualitative approach to mitigating construction emissions.

**Numerical Significance Thresholds**

CEQA Guidelines state that the significance criteria established by the air quality management or air pollution control district may be relied on to make impact determinations. The GAMAQI (SJVAPCD, 2015a) provides recommended air quality emission thresholds for CO, $NO_x$, reactive organic gases (ROG), $SO_2$, $PM_{10,}$ and $PM_{2.5}$ for evaluating the significance of project emissions. If the emissions are below the significance thresholds, impacts would be considered less than significant. If the construction- or operations-phase emissions are greater than the significance thresholds, impacts during that phase would be considered significant.

Table 3.3-5 presents the SJVAPCD air quality significance thresholds applicable to the Proposed Program. Table 3.3-5 only includes construction emissions thresholds because operations emissions resulting from the Proposed Program are not be expected to increase as operations and maintenance activities during operation of the Proposed Program would be consistent with existing operations and maintenance activities and would not result in new or a significant increase to vehicle emissions.

Table 3.3-5. SJVAPCD Air Quality Thresholds of Significance – Criteria Pollutants
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| | Emissions (tons per year) | | | | | |
|---|---|---|---|---|---|---|
| **Alternative** | **CO** | **$NO_x$** | **ROG** | **$SO_2$** | **$PM_{10}$** | **$PM_{2.5}$** |
| SJVAPCD Construction Emission Thresholds | 100 | 10 | 10 | 27 | 15 | 15 |

Source: SJVAPCD,2015c

### 3.3.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to existing conditions and the No Program Alternative for each resource area as applicable. The No Program Alternative is functionally the same as the Existing Conditions as related to air quality because both represent a condition without air pollutant emissions generated by proposed construction activities. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource or issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

During any given year, multiple projects would be constructed simultaneously. Construction emissions resulting from implementation of the Proposed Program would primarily consist of CO, $NO_x$, $PM_{10}$, $PM_{2.5}$, $SO_2$, and ROG. In addition, site preparation and disturbance would result in fugitive dust emissions. Construction emissions from off-road construction equipment and fugitive dust were

estimated using the methodologies and emission factors described in California Emission Estimator Model (CalEEMod) User's Guide (CAPCOA, 2017). On-road vehicle emission factors were obtained from the latest ARB EMission FACtors model, EMFAC2017 (ARB, 2019).

The anticipated implementation schedule for the Proposed Program is provided in Table 2-13 in Section 2, Program Description and Alternatives. As described in Section 2, Merced Irrigation District (MID or District) anticipates that the implementation of projects will likely shift over the 30-year implementation period in part driven by funding availability, system priorities/customer needs, and market conditions. Proposed activities are projected to be the same in many of the years in the implementation schedule. However, to assess potential impacts, the schedule assumes that, in any given year, between 26 and 36 projects could be constructed. Individual project durations and equipment requirements vary, depending on the proposed structures for a given year, which results in differing annual project emissions for the duration of the program.

Projected construction emissions were calculated based on a grouping of expected projects for the duration of program implementation. Two year types were identified to represent a high and low construction activity year. Based on current District projections, 2021 and 2023 were identified as the high and low year types, respectively, to identify potential air quality impacts. The emissions associated with these two years types are summarized in Tables 3.3-6 and 3.3-7. Detailed assumptions regarding project schedule, construction equipment and vehicles, and yearly emission calculations by project category are provided in Appendix C.

As provided in Subsection 2.5, Environmental Commitments, project commitments and standard best management practices would be incorporated as part of the Proposed Program to avoid or minimize potential air quality impacts.

As part of project construction within the SJVAB, compliance with SJVAPCD Regulation VIII for fugitive dust emissions is required. Emission control measures included as part of the Proposed Program would include the following:

- Apply water to unpaved surfaces and areas.
- Use nontoxic chemical or organic dust suppressants on unpaved roads and traffic areas.
- Limit or reduce vehicle speed on unpaved roads and traffic areas.
- Maintain areas in a stabilized condition by restricting vehicle access.
- Install wind barriers, if necessary.
- During high winds, cease outdoor activities that disturb the soil.
- Keep bulk materials sufficiently saturated when handling.
- When storing bulk materials, apply water to the surface or cover the storage pile with a tarp.
- Do not overload haul trucks. Overloaded trucks are likely to spill bulk materials.
- Cover haul trucks with a tarp or other suitable cover. Or, wet the top of the load enough to limit visible dust emissions.
- Clean the interior of cargo compartments on emptied haul trucks prior to leaving a site.
- Prevent track-out by installing a track-out control device.
- Clean up track-out at least once a day. If along a busy road or highway, clean up track-out immediately.
- Monitor dust-generating activities and implement appropriate measures for maximum dust control.

For projects in which construction-related activities would disturb equal to or greater than 1 acre of surface area, SJVAPCD recommends, as a condition of project approval, receipt of a District-approved Dust Control Plan or Construction Notification form, before issuance of the first grading permit. As described in Subsection 3.3.2.3, construction projects that exceed the Rule 9510 threshold of 2 tons per year for $NO_x$ and $PM_{10}$ may be subject to Rule 9510 requirements. To comply with Rule 9510, projects must reduce $NO_x$ and $PM_{10}$ emissions by 20 and 45 percent, respectively, through onsite emission reduction, offsite emission offset, or a combination of the two. Compliance with Rule 9510 requires that for the required amount of emission reductions not achieved onsite by a given project, a project proponent must pay the required fees to SJVAPCD to offset the emissions. As such, these standard requirements are considered part of standard project implementation.

#### 3.3.3.3 Impacts Associated with the Proposed Program

**Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan.**

The Proposed Program does not include the construction of a new stationary source that would result in a new source of criteria pollutants. However, construction of capital improvement projects under the Proposed Program would be continuous for approximately 30 years; therefore, the project was evaluated for its potential to obstruct SJVAPCD's air quality attainment plan.

For most projects, construction activities would last from 1 to 6 months. Construction of each of the regulating reservoirs is expected to last up to 18 months, and construction of the Main Canal Improvements at Tunnel No. 1 Project could last up to 24 months. The anticipated implementation schedule for projects associated with the Proposed Program is provided in Section 2, Program Description and Alternatives.

Construction activities would cause temporary air pollutant emissions. Localized impacts are often caused by cumulated emissions from a large number of equipment or vehicles congregating at a single location. As stated above, construction emissions were calculated for projected high and low construction activity years (2021 and 2023, respectively). Tables 3.3-6 and 3.3-7 provide the estimated emissions for these 2 year types as compared to SJVAPCD CEQA construction emission thresholds of significance. As shown, the high construction activity year (2021) would exceed the $NO_x$ and $PM_{10}$ thresholds; however, other construction emissions would be below the thresholds. Thresholds are not anticipated to be exceeded for the low construction activity years, which represent the majority of projected annual emission totals.

Although the Proposed Program as a whole would exceed SJVAPCD's air quality thresholds for NOx and $PM_{10}$ in high activity years, construction would be temporary and would generate diesel vehicle travel that would be disbursed throughout project areas for short periods of time. Additionally, operation of the Proposed Program would not generate significant amounts of diesel vehicle travel. Therefore, the Proposed Program is not expected to have substantial long-term emissions to cause new violation or worsen existing violations to hinder the implementation of the air quality plans.

In conclusion, overall thresholds are not anticipated to be exceeded for the low construction activity years, which represent the majority of projected annual emission totals. ***However, although thresholds for $NO_x$ and $PM_{10}$ would not be exceeded in most years, projected exceedances of $NO_x$ and $PM_{10}$ thresholds in high construction activity years would be a potentially significant air quality impact.***

Table 3.3-6. Total Emissions of Potential Overlapping Projects During a High Construction Year (2021)
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project | Number of Projects | Total Emissions with Multiple Projects (tons per year) | | | | | |
|---|---|---|---|---|---|---|---|
| | | CO | $NO_x$ | ROG | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ |
| Main Canal Improvements at Tunnel No.1 Option 1 | 1 | 6.36 | 10.63 | 1.02 | 0.02 | 5.18 | 1.63 |
| Main Canal Improvements at Tunnel No.1 Option 2[a] | 1 | 5.85 | 10.17 | 0.95 | 0.02 | 5.57 | 1.60 |
| Main Canal Improvements at Tunnel No.1 Option 3 | 1 | 3.56 | 6.01 | 0.57 | 0.01 | 2.95 | 0.89 |
| Main Canal Improvements at Tunnel No.1 Option 4 | 1 | 2.76 | 4.14 | 0.42 | 0.01 | 2.69 | 0.74 |
| Canal Rebuilding/Relining | 3 | 1.53 | 1.76 | 0.18 | 0.00 | 1.78 | 0.25 |
| Table Topping Dead-end Facilities | 2 | 0.30 | 0.36 | 0.04 | 0.00 | 0.40 | 0.05 |
| Canal Automation | 5 | 1.48 | 1.82 | 0.19 | 0.01 | 1.35 | 0.20 |
| Flow Measurement | 5 | 0.01 | 0.00 | 0.00 | 0.00 | 0.05 | 0.01 |
| Siphon Demolition/Modifications | 5 | 2.36 | 2.842.84 | 0.30 | 0.00 | 1.18 | 0.23 |
| Intertie | 1 | 0.77 | 1.08 | 0.10 | 0.00 | 1.02 | 0.14 |
| Reservoirs and Recharge Basins | 1 | 2.84 | 4.62 | 0.43 | 0.01 | 3.61 | 0.63 |
| Highlands | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Owens Creek Diversion Channel | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Black Rascal Creek Diversion Channel | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Merced River Water Recovery | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Le Grand Canal near Black Rascal Automation | 1 | 0.83 | 1.12 | 0.11 | 0.00 | 0.91 | 0.15 |
| Northside Canal Flumes | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Emissions of Potential Overlapping Projects in Analysis Year[b]** | | 16.46 | **24.23** | 2.36 | 0.05 | **15.87** | 3.29 |
| **SJVAPCD Construction Emission Thresholds** | | 100 | 10 | 10 | 27 | 15 | 15 |

[a] Emissions associated with Option 2 are reflected in the total emissions for the year as they are greater than the emissions under Options 1, 3, and 4.

[b] Exceedances are shown in bold font.

Table 3.3-7. Total Emissions of Potential Overlapping Projects During a Low Construction Year (2023)
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project | Number of Projects | Total Emissions with Multiple Projects (tons per year) | | | | | |
|---|---|---|---|---|---|---|---|
| | | CO | $NO_x$ | ROG | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ |
| Main Canal Improvements at Tunnel No. 1 Option 1[a] | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Main Canal Improvements at Tunnel No. 1 Option 2 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Main Canal Improvements at Tunnel No. 1 Option 3 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Main Canal Improvements at Tunnel No. 1 Option 4 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Canal Rebuilding/Relining | 3 | 1.43 | 1.28 | 0.14 | 0.00 | 1.76 | 0.23 |
| Table Topping Dead-end Facilities | 2 | 0.27 | 0.26 | 0.03 | 0.00 | 0.39 | 0.05 |
| Canal Automation | 5 | 1.39 | 1.31 | 0.15 | 0.00 | 1.32 | 0.18 |
| Flow Measurement | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.01 |
| Siphon Demolition/Modifications | 5 | 2.23 | 2.07 | 0.24 | 0.00 | 1.14 | 0.19 |
| Interties | 1 | 0.70 | 0.76 | 0.08 | 0.00 | 1.01 | 0.13 |
| Reservoirs and Recharge Basins | 1 | 2.54 | 3.24 | 0.34 | 0.01 | 3.56 | 0.58 |
| Highlands | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Owens Creek Diversion Channel | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Black Rascal Creek Diversion Channel | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Merced River Water Recovery | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Le Grand Canal near Black Rascal Automation | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Northside Canal Flumes | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Emissions of Potential Overlapping Projects in Analysis Year[b]** | | 8.58 | 8.92 | 0.99 | 0.03 | 9.23 | 1.37 |
| **SJVAPCD Construction Emission Thresholds** | | 100 | 10 | 10 | 27 | 15 | 15 |

[a] Emissions associated with Option 2 are reflected in the total emissions for the year as they are greater than the emissions under Options 1, 3, and 4. [b] Exceedances are shown in bold font.

**Impact AQ-2: Result in a cumulatively considerable net increase of any criteria pollutant for which the Proposed Program region is nonattainment under an applicable federal or state ambient air quality standard.**

Under NAAQS, Merced County is currently designated as nonattainment for 8-hour ozone, the 1997 $PM_{2.5}$ standards, and the 2006 24-hour $PM_{2.5}$ standard (35 µg/m$^3$). The area is in maintenance for $PM_{10}$. Under CAAQS, the area is currently designated as nonattainment for 1-hour ozone, 8-hour ozone, $PM_{10}$, and $PM_{2.5}$, but is in attainment for $NO_2$ (see Table 3.3-3).

Pursuant to CEQA Guidelines Section 15064(h)(3), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project would comply with the requirements in a previously approved plan or mitigation program, including an air quality attainment or maintenance plan that provides specific requirements that would avoid or substantially lessen the cumulative problem within the geographic area in which the project is located. MID would comply with SJVAPCD's mitigation program as established in the GAMAQI (SJVAPCD, 2015a) and would not conflict with the established emission reduction goals and measures and the attainment strategies. ***Therefore, the project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard; air quality impacts from project construction and operation would be less than significant.***

**Impact AQ-3: Expose sensitive receptors to substantial pollutant concentrations.**

As discussed under Impacts AQ-1 through AQ-3, $NO_X$ or $PM_{10}$ emissions associated with construction of the Proposed Program as a whole under certain years would exceed the emission thresholds. However, most construction activities associated with individual projects would be below the SJVAPCD thresholds (see Tables 3.3-6 and 3.3-7). Construction activities would be short-term, with most projects lasting approximately 6 months. Additionally, MID would route construction equipment and truck traffic away from local neighborhoods or sensitive receptor areas to the extent possible as part of the implementation of the Proposed Program. ***Therefore, construction of the Proposed Program would not expose sensitive receptors to substantial criteria pollutant concentrations, and impacts during construction would be less than significant***.

Operations and maintenance activities during operation of the Proposed Program would be consistent with existing operations and maintenance activities and would not result in new or a significant increase to vehicle emissions. ***Therefore, operation of the Proposed Program would not expose sensitive receptors to substantial criteria pollutant concentrations, and impacts would be less than significant.***

**Impact AQ-4: Result in other emissions such as those leading to odors adversely affecting a substantial number of people.**

During construction, odor emissions could occur from diesel-powered construction equipment and vehicles. Such odors would be short term and limited to the immediate vicinity of the activity. As feasible, construction equipment and truck traffic would be located or routed away from local neighborhoods or sensitive receptor areas.

During operation, it is expected that future maintenance activities would be consistent with or less than existing maintenance activities and would not result in increased odor emissions from diesel equipment. No other odor sources are expected from operation of the Proposed Program. ***Air quality impacts associated with odors during construction and operation would be less than significant***.

## 3.3.4 Mitigation Measures

Prior to the onset of any project, MID will assess each project's expected emissions and, as appropriate, work with SJVAPCD to determine the potential level of project-related impacts and applicable regulations. For projects expected to exceed SJVAPCD's thresholds, MID will implement the following

mitigation measures (MMs) to address potentially significant air quality impacts (Impacts AQ-1 and AQ-2). After implementation of these mitigation measures, impacts will be less than significant.

**MM AQ-1: Reduce $PM_{10}$ and $NO_x$ emissions during construction.**

As defined by SJVAPCD, the following mitigation measures will be implemented, as appropriate, to reduce potential air quality impacts. The measures, appropriate for construction projects, include mitigation for both $PM_{10}$ and $NO_x$ emissions. The measures listed below also include the most stringent measures listed for projects considered to be significant or projects near sensitive receptors.

Fugitive Dust

Water will be applied every 4 hours to the area within 100 feet of a structure being demolished to reduce vehicle track-out.

Dust suppressants or ground cover will be applied to disturbed areas within 1 week upon completion of construction or demolition.

Demolition activities will be suspended when wind speeds exceed 25 miles per hour.

Unpaved roads that are frequently used during construction (e.g., more than 3 months) will have aggregate base applied or will be paved.

Exhaust Emissions – Construction Activities

***To reduce*** emissions associated with $NO_x$, to the extent feasible, MID will require construction contractors to use construction-related equipment powered by engines meeting, at a minimum, Tier II emission standards, as set forth in *California Code of Regulations* Title 13 Section 2423 and 40 *Code of Federal Regulations* 89.

To the extent feasible, construction equipment and truck routes will be located away from neighborhoods or sensitive receptors (e.g., hospitals, schools, and playgrounds).

**MM AQ-2: Voluntary emission reduction agreement.**

To address mitigation of construction-related emissions that cannot be reduced by implementation of Regulation VIII and MM AQ-1, MID will enter into a Voluntary Emission Reduction Agreement with SJVAPCD. Under this agreement, MID will provide pound-for-pound mitigation of air emissions increases through a process that funds and implements emission reduction projects with SJVAPCD.

# 3.4 Biological Resources

This section describes the regulatory and environmental setting for biological resources and evaluates potential impacts that could result from implementation of the Proposed Program. The review of potential impacts on biological resources included the evaluation of the "footprint" of the currently identified Proposed Program projects and relevant surrounding area. In addition, portions of the Merced River or other streams potentially affected by proposed water transfers included as part of the Proposed Program are also discussed. This study area for biological resources is based on the habitat and species known or likely to occur in the area (including the Merced Irrigation District [MID or District] service area) and typical standards for biological resource assessments.

## 3.4.1 Regulatory Setting

This section describes federal, State, and local guidelines and regulations for evaluating potential biological impacts and mitigation.

### 3.4.1.1 Federal

**Endangered Species Act of 1973, United States Code, Title 16, Sections 1531 through 1543**

The federal Endangered Species Act (FESA) and its amendments protect plants and wildlife (and their habitats) listed as endangered or threatened by U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). Section 9 of the FESA specifically prohibits the taking of FESA-protected wildlife and lists prohibited actions. The FESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (50 *Code of Federal Regulations* [CFR] 17.3). The FESA also governs the removal, possession, malicious damage, or destruction of endangered plants on federal land. Taking is allowed only when incidental to an otherwise legal activity through the FESA Section 7 process for federal agencies and through the FESA Section 10 Habitat Conservation Plan process for private entities.

**Magnuson Stevens Fishery Conservation and Management Act of 1976 (as Amended)**

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) for commercially managed marine and anadromous fish species. EFH includes specifically identified waters and substrate necessary for fish spawning, breeding, feeding, or growing to maturity. EFH also includes all habitats necessary to allow the production of commercially valuable aquatic species, to support a long-term sustainable fishery, and to contribute to a healthy ecosystem (16 United States Code Section 1802(10)). Riverine areas (including portions of the San Joaquin and Merced Rivers) and creeks in the Program Area lie within designated EFH for Chinook salmon under the Pacific Coast Salmon Fishery Management Plan.

**Migratory Bird Treaty Act, United States Code, Title 16, Sections 703 through 711**

The Migratory Bird Treaty Act implements international treaties between the United States and other nations to protect migratory birds and their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized by regulation or permit. Examples of authorized activities include USFWS-issued permits to qualified applicants for falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. Regulations governing migratory bird permits are found in 50 CFR 13 – General Permit Procedures and 50 CFR 21 – Migratory Bird Permits.

**Invasive Species, Executive Order 13112 (February 3, 1999)**

Executive Order (EO) 13112 directs federal agencies to prevent and control the spread of invasive plants and animals and avoid direct or indirect impacts whenever there is a practicable alternative. EO 13112 was intended to build on existing laws, such as National Environmental Policy Act, the Nonindigenous Aquatic Nuisance Prevention and Control Act, the Lacey Act, the Plant Pest Act, the Federal Noxious Weed Act, and the FESA. EO 13112 established a national Invasive Species Council composed of federal agencies and departments and a supporting Invasive Species Advisory Committee composed of State, local, and private entities. The Invasive Species Council and Species Advisory Committee oversee and facilitate implementation of EO 13112, including preparation and revision of the National Invasive Species Management Plan.

#### 3.4.1.2 State

**California Endangered Species Act, Fish and Game Code Section 2050 et seq.**

The California Endangered Species Act (CESA) provides that certain species of fish, wildlife, and plants that are of ecological, educational, historical, recreational, aesthetic, economic, and scientific value to the people of California are of statewide concern and should be conserved, protected, and enhanced, along with their habitats.

The CESA establishes that it is the policy of the State that State agencies should not approve projects as proposed that would jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat that would prevent jeopardy.

Furthermore, the CESA provides that reasonable and prudent alternatives shall be developed by California Department of Fish and Wildlife (CDFW) with the project proponent and the State lead agency that are consistent with conserving the species, while at the same time maintaining the project purpose to the greatest extent possible.

**Native Plant Protection Act, Fish and Game Code Sections 1900 through 1913**

California's Native Plant Protection Act prohibits the taking of listed plants from the wild and requires that State agencies use their authority to conserve endangered and rare native plants. In compliance with the Native Plant Protection Act and California Environmental Quality Act (CEQA), CDFW shall notify project proponents of the fact that a rare or endangered native plant is growing within project boundaries and provide information to the project proponents concerning the protection of such plants as may be appropriate. CDFW must also be given 10-day advance notification of a land use change to provide CDFW an opportunity to salvage listed plant species that might be destroyed.

**Fish and Game Code Sections 1601 through 1603**

Under Sections 1601 through 1603 of the Fish and Game Code, project proponents are required to notify CDFW prior to diverting, obstructing, or otherwise changing the natural flow, bed, channel, or bank of a river, stream, or lake. If CDFW determines that an existing fish or wildlife resource might be substantially adversely affected by project activities, it would issue a Streambed Alteration Agreement to project proponents that includes reasonable measures necessary to protect the resource. Project proponents are allowed to conduct project activities in accordance with the Streambed Alteration Agreement.

**Fish and Game Code Section 1602**

Section 1602 of the Fish and Game Code states that any entity proposing to substantially divert or obstruct the natural flow or alter streambed materials, channel, or bank in any river, stream, or lake must provide a detailed description and map of the project location, name, and description of the river, stream, or lake affected by streamflow diversions, and copies of applicable local, State, or federal permits

and/or other documents already issued as part of a Streambed Alteration Agreement. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and that supports wildlife, fish, or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. The Streambed Alteration Agreement must include measures designed to protect the affected fish and wildlife and associated riparian resources.

**Raptors, Fish and Game Code Section 3503.5**

Section 3503.5 of the Fish and Game Code states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Disturbance during the raptor breeding season could result in the incidental loss of fertile eggs or nestlings, or lead to nest abandonment. Although no permits are issued for species protected under this code, coordination with CDFW is required.

**Non-game and Migratory Birds, Fish and Game Code Sections 3513 and 3800**

Sections 3513 and 3800 of the Fish and Game Code regulate unlawful take of non-game or migratory bird species. Disturbance during the breeding season could cause the incidental loss of fertile eggs or nestlings, or lead to nest abandonment. Although no permits are issued for species protected under these code sections, coordination with CDFW is required.

#### 3.4.1.3 Local

**2030 Merced County General Plan**

The plan provides guidance for land use, development, and natural resource conservation in the Merced County Planning Area, which includes both incorporated and unincorporated areas. The plan includes the following goals and policies to protect, preserve, and enhance biological resources within Merced County (County) that are applicable to the Program (Merced County, 2012):

**Goal NR-1:** Preserve and protect, through coordination with the public and private sectors, the biological resources of the County.

**Policy NR-1.1: Habitat Protection**
Identify areas that have significant long-term habitat and wetland values including riparian corridors, wetlands, grasslands, rivers and waterways, oak woodlands, and vernal pools, and provide information to landowners.

**Policy NR-1.2: Protected Natural Lands**
Identify and support methods to increase the acreage of protected natural lands and special habitats, including but not limited to, wetlands, grasslands, and vernal pools, potentially through the use of conservation easements.

**Policy NR-1.4: Important Vegetative Resource Protection**
Minimize the removal of vegetative resources which stabilize slopes, reduce surface water runoff, erosion, and sedimentation.

**Policy NR-1.5: Wetland and Riparian Habitat Buffer**
Identify wetlands and riparian habitat areas and designate a buffer zone around each area sufficient to protect them from degradation, encroachment, or loss.

**Policy NR-1.6: Terrestrial Wildlife Mobility**
Encourage property owners within or adjacent to designated habitat connectivity corridors that have been mapped or otherwise identified by the California Department of Fish and Game or U.S. Fish and Wildlife Service to manage their lands in accordance with such mapping programs.

**Policy NR-1.7: Agricultural Practices**
Encourage agricultural, commercial, and industrial uses and other related activities to coordinate with environmental groups in order to minimize adverse effects to important or sensitive biological resources.

**Policy NR-1.8: Use of Native Plant Species for Landscaping**
Encourage the use of native plant species in landscaping, and, where the County has discretion, require the use of native plant species for landscaping.

**Policy NR-1.9: Rural to Urban Redesignations**
Carefully consider the potential impacts on significant habitats from new development when redesignating land from a rural to an urban use.

**Policy NR-1.10: Aquatic and Waterfowl Habitat Protection**
Cooperate with local, State, and federal water agencies in their efforts to protect significant aquatic and waterfowl habitats against excessive water withdrawals or other activities that would endanger or interrupt normal migratory patterns or aquatic habitats.

**Policy NR-1.11: On-Going Habitat Protection and Monitoring**
Cooperate with local, State, and federal agencies to ensure that adequate on-going protection and monitoring occurs adjacent to rare and endangered species habitats or within identified significant wetlands.

**Policy NR-1.12: Wetland Avoidance**
Avoid or minimize loss of existing wetland resources by careful placement and construction of any necessary new public utilities and facilities, including roads, railroads, high speed rail, sewage disposal ponds, gas lines, electrical lines, and water/wastewater systems.

**Policy NR-1.13: Wetland Setbacks**

Require an appropriate setback, to be determined during the development review process, for developed and agricultural uses from the delineated edges of wetlands.

**Policy NR-1.17: Agency Coordination**
Coordinate with private, local, State, and federal agencies to assist in the protection of biological resources and prevention of degradation, encroachment, or loss of resources managed by these agencies.

**Merced Vision 2030 General Plan**

The *Merced Vision 2030 General Plan* identifies the following goals, policies, and implementing actions to protect sensitive wildlife and plant species and habitats known to occur in the local area, and that are applicable to the Program (City of Merced, 2016):

**Goal Area OS-1:** Open Space for the Preservation of Natural Resources

**Policy OS-1.1: Identify and Preserve Wildlife Habitats Which Support Rare, Endangered, or Threatened Species.**

1.1.a Identify, and recognize as significant wetlands and critical habitat areas which meet the appropriate legal definition under federal and State law.

1.1.c Establish development review procedures which minimize impact on sensitive species and their habitat.

1.1.e Manage Open Space areas to reduce the risk of injuring wildlife species with harmful chemicals, insecticides, herbicides, etc.

**Policy OS-1.2: Preserve and Enhance Creeks in Their Natural State Throughout the Planning Area.**

1.2.a Designate major creeks, streams, woodlands, and other appropriate areas in the City's SUDP/SOI as Open Space corridors.

1.2.d Recognize Bear, Black Rascal, Cottonwood, and Fahrens Creeks as important open space resources and promote their protection and enhancement through the use of natural plant materials.

**City of Atwater General Plan**

The 2020 City of Atwater General Plan identifies goals and policies protect sensitive biological resources. The following goals and policies pertain to the Program (City of Atwater, 2000):

**Goal CO-5:** Minimize impacts of future development on sensitive habitats.

**Policy CO-5.1:** Where feasible, avoid development in areas identified as sensitive habitat. Where avoidance is not feasible, apply mitigation measures to development projects to minimize impacts on sensitive habitats.

**Goal CO-6:** Minimize impacts of development on wildlife and wildlife habitat, particularly special-status species.

**Policy CO-6.1: Consider opportunities for habitat preservation and enhancement in conjunction with public facility projects, particularly parks and storm drainage facilities.**

**Policy CO-6.2: Encourage the preservation of corridors between natural habitat areas to allow for the movement of wildlife and to prevent the creation of "biological islands."**

**Livingston General Plan**

The 1999 City of Livingston General Plan identifies objectives, policies, and standards to protect sensitive wildlife and plant species and habitats known to occur in the local area. The following objective and policies apply to the Proposed Program (City of Livingston, 1999):

Objective

**A.** Protect natural resources including groundwater, soils, and air quality, to meet the needs of present and future generations.

Policies, Standards

**6.** Promote biological diversity and the use of plant species compatible with the bio-region.

**10.** Properties which have the potential to support listed animal and plant species will be required to have a biological investigation as a condition of development. Surveys for species shall follow both federal and State protocols.

## 3.4.2 Environmental Setting

The Proposed Program is located in eastern Merced County and shown on the U.S. Geological Survey (USGS) Turlock Lake, Snelling, Turlock, Cressey, Winton, Yosemite Lake, Stevinson, Arena, Atwater, Merced, Planada, Sandy Mush, El Nido, Plainsburg, Le Grand, Santa Rita Bridge, and Bliss Ranch 7.5-minute quadrangles. Site elevations range between approximately 70 and 345 feet above sea level. The Merced River flows southwest from Lake McClure (and New Exchequer) and is the primary source of water for the District. A number of other smaller tributaries to the San Joaquin River are located in and adjacent to the Program Area, including Bear Creek, Burns Creek, Owens Creek, and Black Rascal Creek. Within the Program Area, MID operates an extensive conveyance system of canals and laterals, including portions of said creeks.

To assess Proposed Program site conditions and determine potential presence of regulated habitats and special-status species, reconnaissance-level site assessments were conducted on June 27, 28, and October 24, 2017 (see Appendix D). The purpose of the site assessments was to identify the potential presence of species and habitats in the Study Area.

As shown on Figure 3.4-1, the Program Area consists primarily of farmland, with large tracts of disturbed annual grassland associated with the foothills of the Sierra Nevada range in the east. Small areas of blue oak woodland are located in the eastern portion of the Program Area; however, the majority is located outside of the Program Area to the east as the elevation increases toward the foothills. The developed urban areas associated with Merced, Atwater, and Livingston are located toward the middle and northwest portions of the Program Area. Streams and drainages, as well as a limited number of wetlands and vernal pools, can be found throughout the Program Area, with some vernal pool complexes present outside of the MID boundary in the eastern grasslands of the Program Area. The western and southwestern areas of the Program Area support some seasonal wetlands and generally wet areas, the vast majority of which are located outside of the MID service area. The topography is generally flat with rolling foothills toward the east. Lands converted from native habitats include cultivated fields, irrigated pastures, rangeland, residences, commercial structures, water impoundments, water conveyance structures (lined and unlined ditch and canals), and other industrial developments. Riverine and riparian habitats are restricted to areas adjacent to the area's rivers and streams.

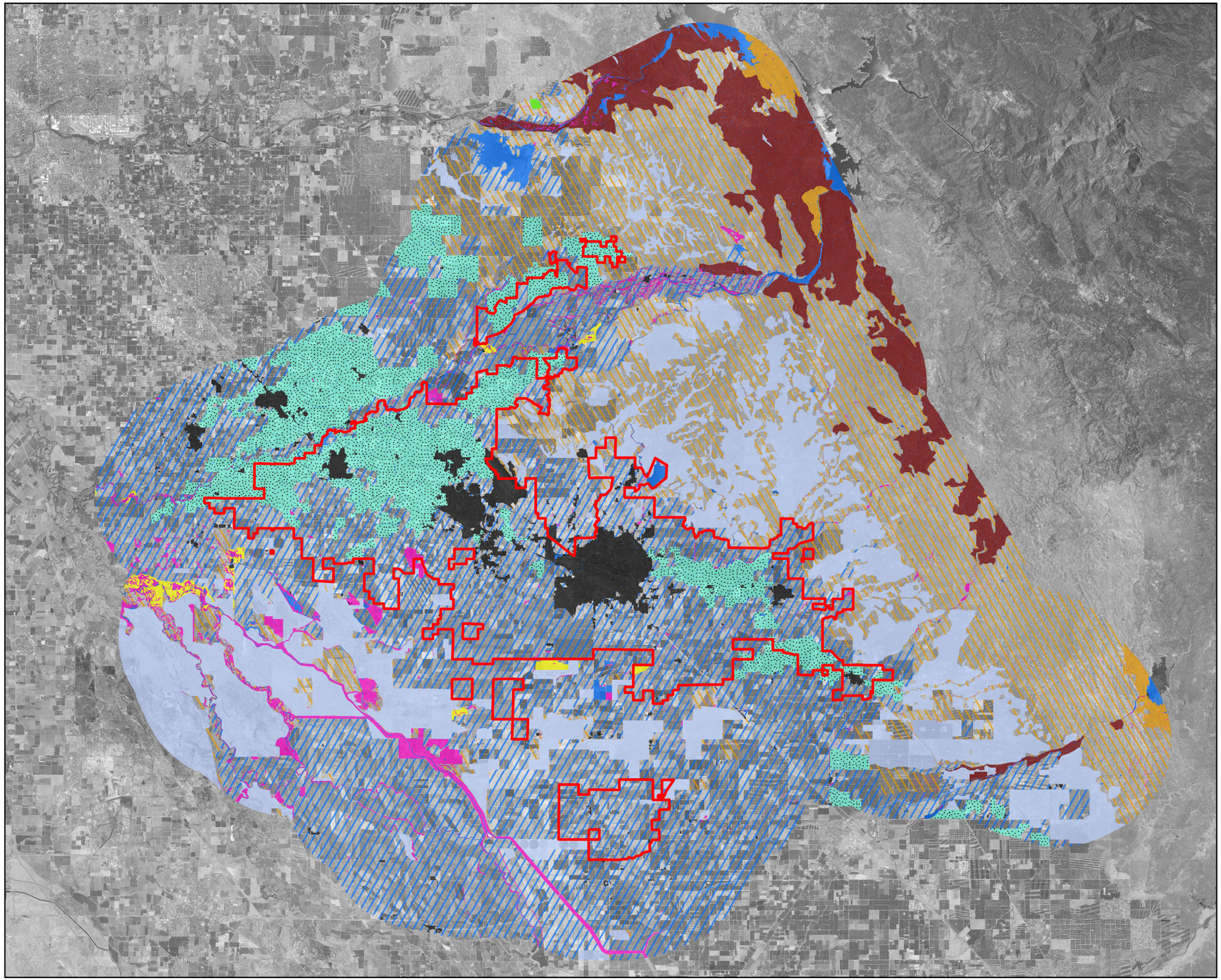
#### 3.4.2.1 Habitat Presence Evaluation Methodology

A biological technical memorandum was prepared to evaluate habitat presence and likelihood of special-status species occurrence in the Study Area (Appendix D). The CDFW California Natural Diversity Database (CNDDB) and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants database were searched and reviewed to identify the potential for occurrence of special-status species and habitats within the Study Area. In addition, Official Species Lists were obtained from USFWS and NMFS. The searches were based on a 5-mile search radius of the projects currently identified in the Proposed Program, or the USGS topographical quadrangles that are within and adjacent to the MID Program Area. These include the Turlock Lake, Snelling, Turlock, Cressey, Winton, Yosemite Lake, Stevinson, Arena, Atwater, Merced, Planada, Sandy Mush, El Nido, Plainsburg, Le Grand, Santa Rita Bridge, and Bliss Ranch quadrangles.

Other commercially available or resource agency-provided databases and software employed in the background/baseline research included the CDFW California Wildlife Habitat Relationships system; the University of California, Santa Barbara Biogeography Lab's California Gap Analysis Project: Regional Datasets; and the USFWS's National Wetlands Inventory. In addition, environmental documents for other projects in the region were consulted.

On June 27, 28, and October 24, 2017, biological reconnaissance-level surveys were used to identify habitat types, potential wetlands, environmentally sensitive areas, and potential special-status species issues associated with implementation of the Proposed Program. Approximately 30 individual locations were evaluated. The sites that were selected for evaluation included sites that are being proposed for upgrades to existing facilities or proposed new facilities and were considered characteristic of other Proposed Program facilities and associated potential habitat. In addition, existing MID pipelines, service canals, and groundwater wells were reviewed as a general point of reference for proposed facility improvements included as part of the Proposed Program. These surveys were conducted to provide a baseline understanding of habitat and potential for special-status species within the Program Area. The sites visited are identified on Figure 3.4-2, and the general habitat characteristics are presented in Appendix D.

The characteristics of each land cover type and associated wildlife occurring within these types of habitats in the Program Area are described in Subsection 3.4.2.2.




LEGEND

MID Service

**Land Cover Type**

- Annual Grassland
- Blue Oak Woodland
- Blue Oak-Foothill Pine
- Irrigated Pastures, Row Crops, and Field Crops
- Open-Water Aquatic
- Orchard and Vineyard
- Urban
- Valley Oak Woodland
- Valley-Foothill Riparian
- Vernal Pool
- Wetlands

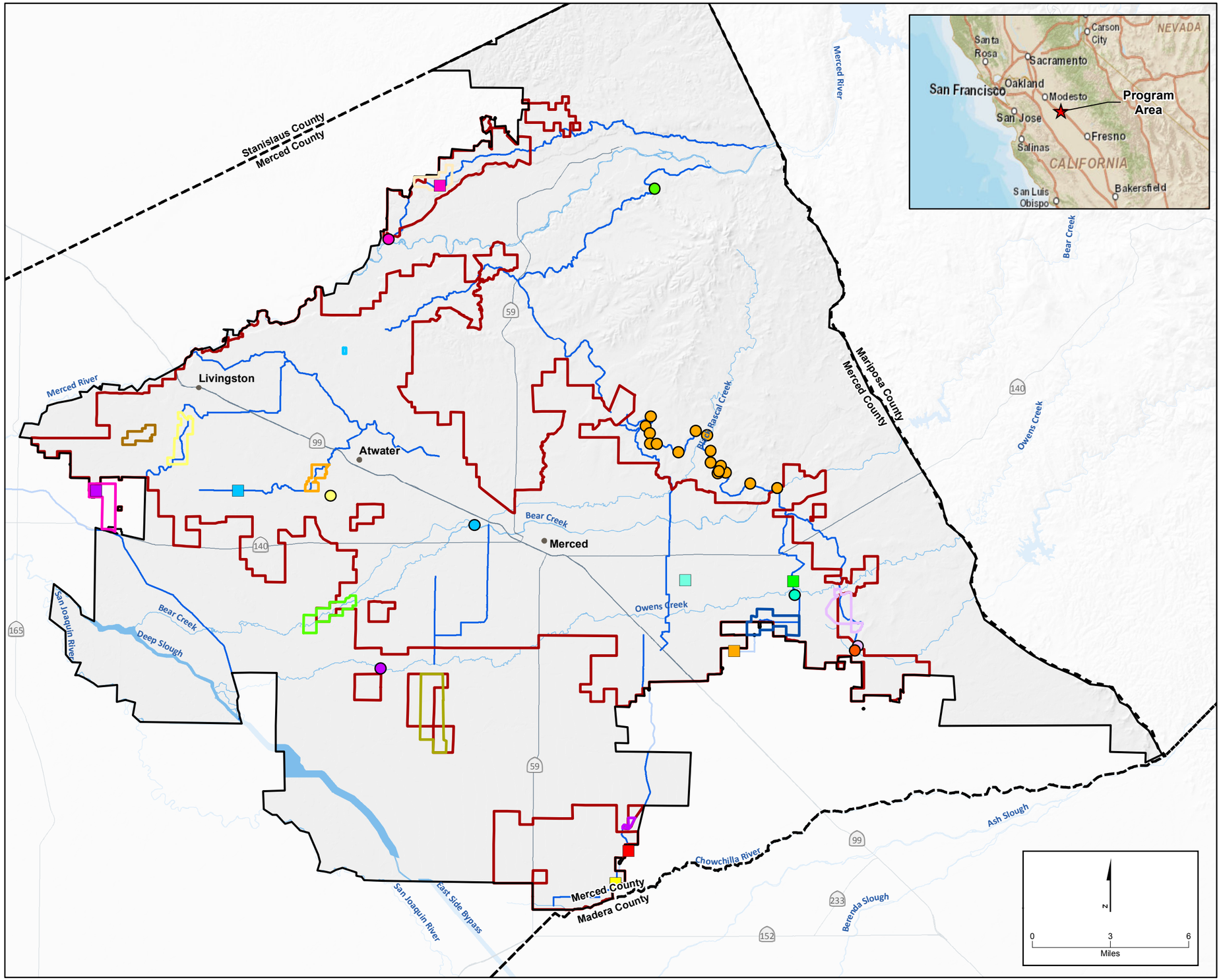
N

0 2.5 5 10
Miles

-Open-Water Aquatic Habitat includes Freshwater Pond, Lacustrine, Lake and Riverine habitat types.
-Wetlands includes Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, and Wet Meadow habitat types.

Source: GAP, http://www.biogeog.ucsb.edu/projects/gap/gap_data_reg.html, Sept 2017; NWI, https://www.fws.gov, May 2017; Vernal Pool Area, vernalpools.org 2012

**FIGURE 3.4-1 LAND COVER TYPES IN THE PROGRAM AREA**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA




LEGEND

MID Program

MID Service

**Main Canal Improvements at Tunnel No. 1 Project**

- Main Canal Improvements at Tunnel No. 1 Project

**Canal Rebuilding/Lining and Table Topping Dead-end Facilities**

- Fancher Lateral Upgrades
- Le Grand Canal Response Time Improvements
- Relining of Main Canal/Levee Improvement

**Canal Automation and Flow Measurement**

- Bifurcation-Planada Canal-Dibblee Lateral
- Crocker Dam Improvements
- Flow Measurement Improvements – Le Grand Canal to Bear Creek Spill
- Flow Measurement Improvements – Owens Creek West Boundary
- Miles Dam Improvements
- Northside Canal at Spill

**Siphon Modifications**

- El Nido Canal - Washington Road Siphon
- El Nido Canal Creek Crossing
- Planada Canal Check Structure Enlargement
- Planada Canal Siphon under Santa Fe
- Vaughn Lateral Siphon under Gerard

**Interties**

- Deane Drain Booster Pump
- Supplement Fairfield Canal Flows with Creek Flows – Miles Creek
- Supplement Fairfield Canal Flows with Creek Flows – Owens Creek

**Reservoir and Recharge Basins**

- Arena Canal Regulating Reservoir
- Atwater Canal Regulating Reservoir and Recharge Basin
- Bear Creek Regulating Reservoir
- Cressey Regulating Reservoir and Recharge Basin
- Hadley Lateral Reservoir
- Increasing Capacity of the El Nido Reservoir
- Le Grand Reservoir
- McCoy Lateral Lower Regulating Reservoir
- McCoy Lateral Upper Regulating Reservoir
- Northside Regulating Reservoir
- Spilker Canal Regulating Reservoir

**FIGURE 3.4-2 BIOLOGICAL RECONNAISSANCE SURVEY LOCATIONS**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

In addition to the specific site surveys, existing information was reviewed to further inform the evaluation of aquatic resources. The Program Area includes the Merced River below the Crocker-Huffman Diversion Dam and other surrounding smaller streams, where MID has operational considerations or control structures. Special-status and managed anadromous game fish (Chinook salmon) are only located in the lower Merced River (below Crocker-Huffman Diversion Dam) and were analyzed within that geographic scope. Habitat for *O. mykiss* is also present. All Program activity occurring outside of the Merced River was considered to potentially interact with native or introduced species of those related creeks, but is not considered to potentially affect anadromous or special-status aquatic species.

#### 3.4.2.2 Land Cover/Habitat Types and Associated Terrestrial and/or Aquatic Species

Historically, the Sacramento and San Joaquin Valleys, including the lands within the Program Area, contained a mosaic of riverine, wetland, and riparian habitats along rivers and streams, with surrounding terrestrial habitats consisting of perennial grassland and oak woodland. With settlement of the Sacramento and San Joaquin Valley, agricultural and urban development has resulted in the conversion of land from native habitats to cultivated fields, pastures, residences, water impoundments, flood control structures, and other developments. As a result, native habitats generally are restricted in their distribution and size and are highly fragmented. This is also true of the Program Area other than the eastern portion of the Program Area where there are extensive grasslands on low- to mid-elevation terraces that are associated with rangeland as described below.

The Program Area (including lands adjacent to the District boundary) contains the following major land cover types that support a diverse array of plant and animal species.

- Annual Grassland
- Blue Oak Woodland
- Blue Oak-Foothill Pine
- Irrigated Agriculture (Irrigated Pastures, Row Crops, Field Crops, Orchards, and Vineyards)
- Open-Water Aquatic Habitats
- Urban
- Valley Oak Woodland
- Valley-Foothill Riparian
- Wetlands (including Vernal Pools) and Other Waters

The characteristics of each land cover type and associated wildlife occurring within these communities in the Program Area are described below and shown on Figure 3.4-1. The figure shows land cover within the Program Area plus a 5-mile buffer.

**Annual Grassland**

Annual grasslands in the Program Area are open habitats composed primarily of non-native grass species. The majority of annual grasslands in the Program Area are disturbed by grazing and include mostly introduced annual grass species including wild oat (*Avena* spp.), soft chess brome (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), wild barley (*Hordeum* sp.), and foxtail fescue (*Festuca myuros*). Common forbs include redstem filaree (*Erodium cicutarium*), turkey-mullein (*Croton setiger*), and clovers (*Trifolium* spp.), and include other non-native and native plant species. Annual grassland is the second most extensive land cover type in the Program Area and is predominately present in the eastern portion of the Program Area. Smaller areas of annual grasslands are also located in the central and western portion of the Program Area that support agricultural uses such as irrigated pastures, row crops, and field crops and in the western areas of the Program Area associated with wetlands. These grasslands provide important foraging habitat for many birds including white-tailed kite (*Elanus caeruleus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), prairie falcon (*Falco mexicanus*), burrowing owl

(*Athene cunicularia*), yellow-billed magpie (*Pica nuttalli*), loggerhead shrike (*Lanius ludovicianus*), and many other avian species (CDFG, 2005). Mammals found in this habitat type generally include deer mouse (*Peromyscus maniculatus*), California vole (*Microtus californicus*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), California ground squirrel (*Spermophilus beecheyi*), and Botta's pocket gopher (*Thomomys bottae*), all of which support larger predatory species such as mountain lion (*Felis concolor*), coyote (*Canis latrans*), Americana badger (*Taxidea taxus*), and bobcat (*Lynx rufus*). Characteristic reptiles and amphibians include western toad (*Bufo boreas*), western fence lizard (*Sceloporus occidentalis*), common kingsnake (*Lampropeltis getula*), western rattlesnake (*Crotalus oreganus*), and gopher snakes (*Pituophis catenifer*).

**Blue Oak Woodland**

Blue oak woodland can be dense, with a closed canopy, but typically is more often a grassy understory savanna rather than a closed woodland (CDFG, 1988b). General distribution of this community occurs along the western foothills of the Sierra Nevada-Cascade Ranges, the Tehachapi Mountains, and in the eastern foothills of the Coast Range. These woodlands form a nearly continuous belt around the Central Valley, between the foothill grassland and lower montane mixed conifer forest. Relatively small areas of blue oak woodlands are located on shallow, rocky, infertile, well-drained soils present in the northeastern portion of the Program Area and, more extensively, outside of the northeast portion of the Program Area within 5 miles.

Blue oak (*Quercus douglasii*) is the dominant species, with interior live oak (*Quercus wislizeni*) as the subdominant tree species in the Sierra Nevada region (CDFG, 1988b). Associated shrubs include poison-oak (*Toxicodendron diversilobum*), California coffeeberry (*Frangula californica*), buckbrush (*Ceanothus cuneatus*), California buckeye (*Aesculus californica*), and manzanitas (*Arctostaphylos* spp.). The understory for these areas is usually dominated by various introduced annual herb and grass species. Numerous wildlife (about 29 species of amphibians and reptiles, 57 species of birds, and 10 species of mammals) are known to use blue oak woodland as breeding habitat, assuming that other special habitat requirements are met (CDFG, 1988b). Many of the avian species that occur in this land cover type use old woodpecker holes or other tree cavities as nest sites (i.e., are secondary cavity nesters that are reliant on the abilities of woodpeckers to make nest holes), hence the value of older trees and snags that often occur in this community.

**Blue Oak-Foothill Pine**

Blue oak-foothill pine woodland varies in terms of vertical and horizontal structure, with a mix of hardwoods, conifers, and shrubs (CDFG, 1988c). Small accumulations of dead and downed woody material and relatively few snags are typically present. Blue oak and foothill pine (*Pinus sabiniana*), also known as gray pine, typically comprise the overstory of this habitat, with blue oak usually most abundant. Stands dominated by gray pine tend to lose their blue oak, which is intolerant of shade. Other associated species are coast live oak (*Quercus agrifolia*), interior live oak, and California buckeye. The understory usually includes patches of shrubs in addition to annual grasses and forbs. Shrub species include *Ceanothus* spp., manzanita spp., California coffeeberry, poison-oak, silver lupine (*Lupinus albifrons*), California yerba santa (*Eriodictyon californicum*), rock gooseberry (*Ribes quercetorum*), and western redbud (*Cercis occidentalis*).

These woodlands are generally located on well-drained soils, often with rock fragments (CDFG, 1988c). These woodlands form a nearly continuous belt around the Central Valley between 500 and 3,000 feet above sea level. In the western Sierra Nevada, numerous wildlife, about 29 species of amphibians and reptiles, 79 species of birds, and 22 species of mammals, find the mature stages of this habitat type suitable for breeding, assuming that other special habitat requirements are met. Much of the avian use of this community (especially for nesting) is similar to that found in blue oak woodland. This community is not represented within the Program Area and generally occurs at slightly higher elevations. It does occur within 5 miles or less of the eastern boundary of the Program Area.

**Irrigated Agriculture (Irrigated Pastures, Row Crops, Field Crops, Orchards, and Vineyards)**

Irrigated agriculture includes all methods of irrigation, such as flooding, drip, and spray applications. Seasonally flooded agricultural land includes farmland and rangeland farmed for cattle, grain, rice, field, truck, and other crops that require seasonal flooding for at least 1 week at a time as a management practice (e.g., for pest control and irrigation) or are purposely flooded seasonally to enhance habitat values for specific wildlife species (e.g., waterfowl) (Reclamation, 2003). Orchard habitat consists of cultivated fruit- or nut-bearing trees, and vineyards support grapevines. Typically, orchards and vineyards are open, tree- or vine-dominated habitats consisting of a single species. This habitat is planted in a uniform pattern and intensively managed. Understory vegetation is usually sparse; however, in some areas, grasses or forbs are allowed to grow between orchard rows to reduce erosion. (Agricultural ditches and drains, although often associated with maintaining seasonally flooded agricultural lands, are described in the Open Water Aquatic Habitats section below.)

As described in Subsection 3.2, Agricultural Resources and Land Use, in 2014, more than 90 percent of the 1.27 million acres inventoried in Merced County were designated for agricultural purposes (DOC, 2015). At over 165,000 acres (including parcels with the remaining acreage in rights-of-way, roads, canals, and rail), the MID service area accounts for approximately 13 percent of the total land area in the County. MID includes approximately 128,620 acres of irrigated crops (CH2M HILL, 2019). Therefore, this land cover type is the most abundant cover type in the Program Area and is primarily located in the western, central, and southern portions of the Program Area. The majority of the Program Area, approximately 34 percent, is orchard (primarily almonds). Various field crops account for 15 percent, and 15 percent is pasture and alfalfa (CH2M HILL, 2019).

Many wildlife species inhabit or use agricultural lands, both when active or fallow. In winter, flooded fields such as rice fields attract thousands of waterfowl and other wetland-dependent birds that winter in the Central Valley. In summer, these fields provide habitat for various wetland-associated species such as the federally and State threatened giant garter snake (*Thamnophis gigas*) and western pond turtle (*Emys marmorata*). Other crop types and grazing lands provide foraging habitat for raptors and a wide variety of other birds, as well as American badger (*Taxidea taxus*), coyote (*Canis latrans*), and various species of snakes (e.g., Pacific gophersnake [*Pituophis catenifer*]).

Wildlife use of orchards and vineyards is typically limited. In the Program Area, deer and rabbits (*Sylvalagus* spp.) might occasionally browse on the trees and vines, while other wildlife such as squirrels and numerous birds feed on fruits or nuts (CDFG, 1988a). Some wildlife species (e.g., mourning dove [*Zenaida macroura*] and California quail [*Callipepla californica*]) use the habitat for cover and nesting. Other species may occasionally nest in orchards; however, orchards in the Program Area do not experience significant wildlife use.

**Open-Water Aquatic Habitats**

Reservoirs, rivers, creeks, and canals within the Program Area can provide open-water habitats for aquatic invertebrate and fish communities. The Central Valley Subprovince of the Sacramento-San Joaquin ichthyologic province contains 28 native and 40 non-native species of fish (Moyle, 2002). The San Joaquin and Merced Rivers are major perennial watersheds within the Central Valley and provide habitats for both anadromous and resident fish and aquatic invertebrate species within the MID Program Area and vicinity.

The San Joaquin River is the second largest river in California and is the largest hydrologic feature in the Program Area. The Merced River is a principal tributary to the San Joaquin River. In addition, there are several relatively smaller tributaries to the San Joaquin River located in and adjacent to the Program Area, including Bear Creek, Burns Creek, Owens Creek, and Black Rascal Creek. Within the Program Area, MID uses portions of some creeks to convey irrigation water supplies, some of which provide open-

water aquatic habitats that support or could support fish and invertebrate species (at least seasonally). The Program Area provides habitat for numerous native as well as non-native fish species.

Open-water aquatic habitat conditions in the Merced River are influenced by operations of the upstream dams and by water withdrawals at and downstream of the Crocker-Huffman Diversion Dam (FERC, 2015). The Merced Falls Dam operates as a "run-of-river" facility generating power between 500 to 1,750 cubic feet per second (cfs) and passing flow above and below that range. Flows from McClure and McSwain Reservoirs are limited to a maximum flow of 6,000 cfs at Merced Falls Dam. Aquatic habitat conditions in the Merced River between Merced Falls Dam and Crocker-Huffman Diversion Dam are generally stable with relatively higher releases observed during spring precipitation or summer water conveyance. Fish populations between Merced Falls Dam and Crocker-Huffman Diversion Dam were found to be primarily composed of native fish species from surveys by Pacific Gas and Electric Company (2011) and Stillwater Sciences (2008) and included: Sacramento sucker (*Catostomus occidantalis*), hitch (*Lavina exilicauda*), sculpins (*Cottus* sp.), lampreys (*Lampetra* spp.), and rainbow trout (*Oncorhynchus mykiss*). Sacramento sucker represented 79 percent of the total catch, and sculpin composed 12 percent; all other species were less than 5 percent of the total catch.

Downstream of Crocker-Huffman Diversion Dam, 29 fish species were observed during seasonal fish surveys conducted from summer 2006 through spring 2008 (Stillwater Sciences, 2008). Twelve of the observed fish species are native to the Merced River drainage, and 17 species are introduced. The introduced western mosquitofish (*Gambusia affinis*) and spotted bass (*Micropterus punctulatus*), and the native Sacramento sucker, hardhead (*Mylopharodon conocephalus*), and Sacramento pikeminnow (*Ptychocheilus grandis*) were the most abundant species, in total comprising 82 percent of the fishes observed or captured.

Crocker-Huffman Diversion Dam is the upstream limit for anadromous fish passage in the Merced River. Downstream of Crocker-Huffman Diversion Dam, habitat for anadromous salmonids in the Merced River has degraded as a result of historic gold mining activities, reduced riparian vegetation, increased sedimentation from adjacent land uses, reduced spawning gravel recruitment, and degraded water quality. Three anadromous species are present downstream of the Crocker-Huffman Diversion Dam: the native Chinook salmon (*Oncorhynchus tshawytscha*) and Pacific lamprey (*Entosphenus tridentatus*) and the introduced striped bass (*Morone saxatilis*). Chinook salmon in the lower Merced River are within the Central Valley fall-run[6] evolutionarily significant unit, which is considered a species of special concern by CDFW.

Chinook salmon are generally present in the Merced River from September through June as either returning adults or outmigrating juveniles. Table 3.4-1 provides an overview of general periods when fall-run Chinook are expected to occur by stage based on trends in population data collected from field monitoring. Figures 3.4-3 and 3.4-4 provide direct field data. Recent surveys conducted by CDFW from 2015 to 2017 indicate that adult spawning activity begins in October, but primarily occurs through November and December (Figure 3.4-3). Redds and corresponding redd incubation occur following spawning. Figure 3.4-4 shows that counts of redds from CDFW during 2015 to 2017 surveys generally reach 50 percent accumulation by late November and are over 90 percent by late December. Egg incubation is completed over 40 to 60 days, and the emergence of fry occurs 30 to 40 days following hatching (Moyle, 2002).

[6] Late fall-run Chinook are a sub-race of fall-run Chinook. Although fall- and late fall-run are not managed differently or recognized as unique runs, the current sub-race is believed to primarily occur in the Sacramento River and a lesser number in tributaries in the upper Sacramento River (e.g., Deer, Mill, Battle Creeks [NMFS, 2016]).

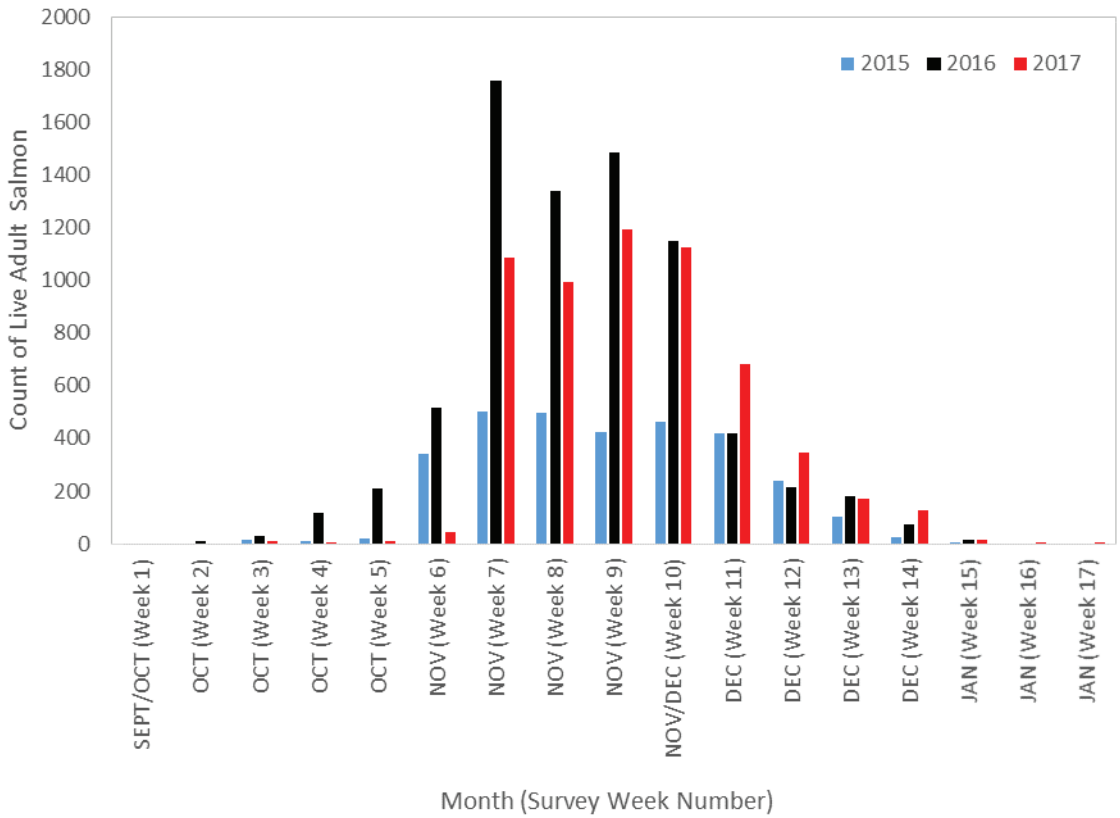



**FIGURE 3.4-3 SUMMARY OF THE NUMBER OF RETURNING ADULT SALMON BY SURVEY WEEK FROM 2015 TO 2017**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

Note: Survey week is used due to slight differences in calendar dates between years.

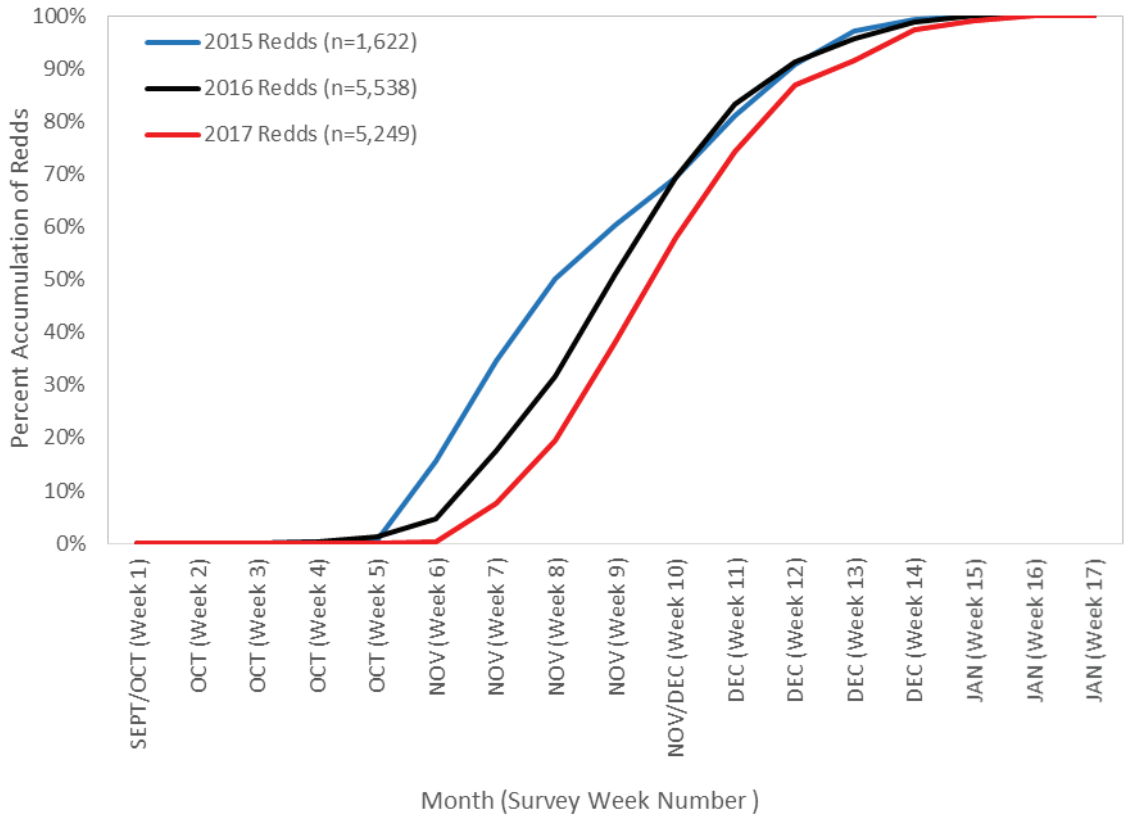



**FIGURE 3.4-4 PERCENT ACCUMULATION OF REDDS BY SURVEY WEEK FROM 2015 TO 2017**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

Note: Survey week is used due to slight differences in calendar dates between years.

ch2m

Table 3.4-1. Typical Freshwater Life History Periodicity for Central Valley Fall-run Chinook Salmon
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity or Life Stage | Month | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Adult Immigration | | | | | | | | | | | | |
| Spawning | | | | | | | | | | | | |
| Incubation | | | | | | | | | | | | |
| Rearing or Holding | | | | | | | | | | | | |
| Outmigration | | | | | | | | | | | | |

Note: Life stage information adapted from Hallock, 1989; Vogel and Marine, 1991; CDFG, 1993; and Yoshiyama et al., 1998.

Key: Gray cells represent the months when the life stage occurs in the Merced River or when water transfers are occurring.

Rainbow trout (*Oncorhynchus mykiss*) were also observed in the reach immediately downstream of Crocker-Huffman Diversion Dam, but the sampling methods did not allow for distinction between the anadromous form (*O. mykiss*) and resident form (rainbow trout). Overall, there is not any direct evidence of an *O. mykiss* population in the Merced River and generally a paucity of data suggesting individuals currently occur. There is also a general lack of *O. mykiss* population monitoring in most of the Central Valley (NMFS, 2009; 2014). Lindley et al. (2007) stated that there are almost no data with which to assess the status of any of the *O. mykiss* populations. They further stated that *O. mykiss* populations are classified as data deficient, with the exceptions restricted to streams with long-running hatchery programs including Battle Creek and the Feather, American, and Mokelumne Rivers. However, NMFS has designated the Merced River as critical habitat (discussed in Section 3.4.2.5) for *O. mykiss*. Table 3.4-2 summarizes the periodicity of *O. mykiss* in the event that they were present for general analyses. The temporal values cannot be verified with field data in the Merced River due to the absence of documented *O. mykiss*, but the values represent generalized life history by Workman (2014) that was adapted from USFWS (2009).

Table 3.4-2. Generalized Life History Periodicity of *O. mykiss* in the Central Valley
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Activity or Life Stage | Month | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Adult Immigration | | | | | | | | | | | | |
| Spawning | | | | | | | | | | | | |
| Incubation | | | | | | | | | | | | |
| Rearing or Holding | | | | | | | | | | | | |
| Outmigration | | | | | | | | | | | | |

Note: Data are based on USFWS (2009), NMFS (2011), and Workman (2014).

Three other special-status fish species were found in the lower Merced River during the 2006 to 2008 seasonal fish surveys: Kern brook lamprey (*Lampetra hubbsi*), hardhead, and Sacramento splittail (*Pogonichthys macrolepidotus*) (Stillwater Sciences, 2008).

Aquatic resources on the Merced River from Merced Falls Dam to the confluence of the San Joaquin River are heavily altered as a result of historical practices. In addition to historical water diversion and

overall water management, physical habitat within the stream has been affected by mining operations. Historically, seven gold companies operated more than 24 aggregate mines in this reach of river. Three of these companies still operate within this reach. Gold dredging activities occurred in both the channel and floodplain, and annually removed between 1.4 and 3.4 million cubic yards of material. Excavations extended 20 to 35 feet below what was then the river channel down to the bedrock (Clark, 1970). The dredger tailings were placed on the river banks in huge windrows, which are still present today.

Mining has also affected water quality. Mercury contamination is common in California aquatic food webs, affecting both the fishing and aquatic life beneficial uses in many areas of the state, with long-term trends indicating little change over the past few decades (Melwani et al., 2009).

A number of restoration projects have been proposed or completed on the Merced River. Two recently completed projects include the Merced River Ranch and Henderson Park projects. The Merced River Ranch Salmonid Habitat Restoration Project was completed in 2013 by Cramer Fish Sciences, with funding from the USFWS Anadromous Fish Restoration Program and CDFW. This enhancement project created approximately 6 acres of seasonally inundated floodplains and side channels and 5.5 acres of instream salmonid spawning and rearing habitat. The Henderson Park Salmonid Habitat Restoration Project was completed in 2015 by Cramer Fish Sciences with funding by the USFWS Anadromous Fish Restoration Program. The Henderson Park project rehabilitated approximately 15 acres of seasonally inundated floodplain habitat and 7.8 acres of instream salmonid spawning and rearing habitat. Efforts to improve habitat have also been completed by the CDFW and California Department of Water Resources' (DWR's) Merced River Salmon Enhancement Project, which extends from approximately River Mile (RM) 40 to 43.5 (Stillwater Sciences, 2002). In 2009, CDFW and DWR renovated 2,500 feet of river habitat by constructing a low-flow channel with a setback berm to isolate 45 acres of ponded water from the main channel (USFWS, 2001) between RM 40 and 40.5. In addition, just upstream of the Highway 59 Bridge, CDFW and DWR realigned the channel to repair damage done during the 1997 flood when the river breached the mining berms that had confined the river. As a result, the river abandoned the historical channel in favor of a gravel pit. When the river abandoned the channel, most of the salmonid spawning and nursery habitat in this reach was lost (USFWS, 2002). Restoration work created 12 riffles at 3 different gradients (USFWS, 2002). Upcoming restoration projects include the Merced River Instream and Off-Channel Habitat Rehabilitation Project where floodplains disconnected by dredger tailing piles and channel incision would be reclaimed. The dredger tailing piles would be removed, the sediment would be sorted, and appropriately sized cobbles and gravels would be used for gravel augmentation in the main channel to enhance salmonid spawning and rearing habitat. The project would be funded in part by CDFW, Bureau of Reclamation, USFWS, and MID.

Gravel augmentation in this river reach has been ongoing since around 1990, with the main area of gravel augmentation within a 300-foot reach immediately downstream of the Crocker-Huffman Diversion Dam (Stillwater Sciences, 2004). Between 1990 and 2010, approximately 11,706 tons of gravel were added to the augmentation site. Although restoration efforts and gravel augmentation work to remedy historical impacts, the magnitude of those impacts result in limited overbank ecological functionality. Floodplain habitat is absent due to large amounts of dredger tailings. Banksides are channelized with minimal riparian cover. Therefore, current restoration efforts and habitat revitalization work to create off-channel habitat that resides within the full-bank flow, but does not overbank.

Anadromous salmonids migrating upstream from the ocean are prevented from traveling up the San Joaquin River beyond the confluence with the Merced River by the Hills Ferry Barrier. This fish screen, operated by CDFW, is intended to divert up-migrating salmonids into the Merced River or to be trap-and-hauled for those experimental salmonids created from the San Joaquin River Restoration Program into the upper San Joaquin River (SJRRP, 2011). Because the streams in the Program Area eventually flow to the San Joaquin River, upstream of its confluence with the Merced, the fish screen and trapping operations prevent anadromous salmonids from reaching streams in the Program Area such as Bear Creek, Burns Creek, Owens Creek, and Black Rascal Creek. Anadromous species are not likely to occur in

other creeks, and thus, not in the connecting network of irrigation canals in the Program Area, given that the priority for these water features is delivery of water for agricultural purposes.

The Bear Creek watershed, which includes Black Rascal, Cottonwood, Burns, and Bear Creeks, originates in the foothills of the Sierra Nevada and drains into the San Joaquin River. Bear Creek once had highly variable flows and regularly flooded its banks after seasonal rainfall, but now has been highly modified. The creek has been contained between two steep flood control levees, and is used to transport water to and from agricultural fields. The water level in the creek is maintained at artificially high levels during irrigating season (approximately March–October), and there are diversion dams that regulate flows and restrict the movement of fish in the creek. Black Rascal Creek and the other streams in the Bear Creek watershed have also been highly modified from their natural condition. In 1944 U.S. Army Corps of Engineers (USACE) implemented the Merced Streams Group Project and constructed several flood control dams and reservoirs on Bear Creek, Owens Creek, Canal Creek, Burns Creek, and Mariposa Creek.

The CALFISH database (2018) lists a number of native fish species that are found in Bear Creek and Black Rascal Creek, including rainbow trout, inland threespine stickleback (*Gasterosteus aculeatus*), Kern brook lamprey, prickly sculpin (*Cottus asper*), Sacramento blackfish (*Orthodon microlepidotus*), Sacramento perch (*Archoplites interruptus*), Sacramento pikeminnow, Sacramento sucker, hitch (*Lavinia exilicauda*), and thicktail chub (*Gila crassicauda*). Non-native species found in Bear Creek and Black Rascal Creek include common carp (*Cyprinus carpio*), catfishes (*Ameiurus* spp. *Ictalurus punctatus*), bass (*Micropterus* spp.), bluegill (*Lepomis macrochirus*) and other sunfish (*Lepomis* spp.), Mississippi silversides (*Menidia beryllina*), threadfin shad (*Dorosoma petenense*), western mosquitofish, and black crappie (*Pomoxis nigromaculatus*). The fish species found in Burns Creek, Canal Creek, Owens Creek, and other small creeks in the Program Area are similar to those found in Bear and Black Rascal Creeks (CALFISH, 2018).

**Urban**

Urban land is land in both incorporated and unincorporated areas that can be or is developed free of hazards and without disruption or significant impact on public safety, health hazards, and natural resources. Urban land involves a human-created change to improve unimproved land and includes: subdividing land; construction and alteration of buildings, structures, roads, and utilities; mining; dredging; filling; grading; paving; excavating; and drilling. Urban lands, such as incorporated cities, account for approximately 3 percent of the lands in the County (DOC, 2016). Urban lands within Merced County comprise residential, commercial, public/quasi-public (such as airports, hospitals, cemeteries, landfills, and schools), and open space.

The Program Area includes the cities of Merced, Atwater, and Livingston, where approximately half of the County's population resides along the State Route 99 corridor. In addition, it includes the towns of Winton, Cressey, LeGrand, Planada, Franklin-Beachwood, Tuttle, and El Nido. Merced is the largest urban area in the County and is located completely within the MID Program Area. In 2013, urban area comprised 13 percent (20,483 acres) of land in MID. A variety of species are common in urban areas of Merced County as well as other surrounding counties within California. These species include native urban-tolerant species such as California towhee (*Melozone crissalis*), northern mockingbird (*Mimus polyglotto*s), Anna's hummingbird (*Calypte anna*), house finch (*Haemorhous mexicanus*), and mourning dove (*Zenaida macroura*), as well as non-native urban-tolerant species such as European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and rock pigeon (*Columba livia*). Urban-tolerant mammals, other than a small number of rodent species, that occur in urban areas include raccoon (*Procyon lotor*) and California ground squirrel (*Otospermophilus beecheyi*).

**Valley Oak Woodland**

This land cover type varies from savanna-like to forest-like stands with partially closed canopies, composed mostly of winter-deciduous, broad-leaved species and is limited but present north of the

District boundary. Denser stands typically grow in valley soils along natural drainages. Tree density decreases with the transition from lowlands to the less fertile soils of drier uplands. Similarly, the shrub layer is best developed along natural drainages, becoming insignificant in the uplands with more open stands of oaks. Valley oak (*Quercus lobata*) stands with little or no grazing tend to develop a partial shrub layer of bird-disseminated species, such as poison-oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), and California coffeeberry (*Frangula californica*). Canopies of this land cover type are dominated almost exclusively by valley oaks. However, tree associates in the Central Valley include western sycamore (*Platanus racemosa*), Hinds black walnut (*Juglans hindsii*), interior live oak, boxelder (*Acer negundo*), and blue oak. The shrub understory consists of poison-oak, blue elderberry (*Sambucus nigra* ssp. *caerulea*), California wild grape (*Vitis californica*), toyon, California coffeeberry, and California blackberry (*Rubus ursinus*). Various sorts of wild oats (*Avena* spp.), bromes (*Bromus* spp.), barleys (*Hordeum* spp.), blue wildrye (*Leymus triticoides*), and California needlegrass (*Nasella pulchra*) dominate the ground cover.

Where these woodlands extend to the foothills surrounding the valley, they integrate with blue oak woodland or blue oak-foothill pine. Near major stream courses, this community integrates with valley-foothill riparian. Valley oak woodlands are important to many wildlife species because of the foraging, cover, and nesting habitat they provide. For example, more resident breeding birds in the Central Valley use valley oak woodland than any other vegetation type. In many areas, there is little valley oak recruitment to replace mature tree losses due to both natural and human causes. As such, most local jurisdictions have land use policies to protect this vegetation community whenever feasible.

**Valley-Foothill Riparian**

The valley-foothill riparian habitat occurs along and somewhat back from active river and stream channels, in areas that experience overbank flooding. Formerly very extensive through the Sacramento and northern San Joaquin Valleys, these forests have largely been cleared for agriculture, flood control, and urban expansion. Mixed riparian forests now occur more frequently in a reduced and highly fragmented state along water courses. Typically, the tree canopy is fairly well closed and moderately dense with numerous species such as box elder (*Acer negundo*), California black walnut (*Juglans hindsii*), western sycamore (*Platanus racemos*a), Fremont's cottonwood (*Populus fremontii*), and various willow (*Salix* sp.) species. This land cover type occurs in the northern portion of the Program Area in various locations associated with the Merced River and in the central portion of the Program Area near McNamara and Healy Roads, and outside but within 5 miles west of the Program Area boundary associated with the San Joaquin River.

Riparian zones provide important resources to both obligate riparian species and upland species. Species diversity is typically higher in riparian zones than in upland vegetated zones, and the diversity of wildlife species using these zones is related to habitat diversity. Riparian habitats provide food, water, migration, and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. At least 50 amphibians and reptiles occur in lowland riparian systems (CDFG, 1988d). Additionally, 55 species of mammals are known to use the Central Valley's riparian communities. Wildlife species associated with riparian areas include a variety of songbirds, raptors, and mammals. Many are permanent residents; others are transient or temporal visitors. The most substantial stands of valley-foothill riparian habitat that occur within the Program Area are associated with the Merced River.

**Wetlands (Including Vernal Pools) and Other Waters**

Vernal pools and vernal pool swale complexes are typically found in association with annual grassland habitat, but constitute a unique habitat type. Vernal pools form in shallow depressions that are underlain by hardpan or volcanic rock. The hardpan or volcanic rock impedes drainage such that, in winter, the depressions fill with water and inundate or retain moist soil into late spring. The pools are then dry during summer and fall until rains commence the following winter. The soils and moist microhabitat of these pools provide a unique habitat within a general matrix of annual grassland habitat.

Most of the vernal pool habitat is associated with the annual grassland along the eastern extent of the Program Area, outside of MID. These areas east and north of the District support the larger vernal pool and vernal pool swale complexes characteristic of hardpan or volcanic rock pools. Seasonal wetlands including vernal pools are also located outside of MID in the western and southwestern portion of the Program Area.

Plant species of vernal pools differ from those of the surrounding annual grassland habitat, and many animals associated with annual grassland habitat depend on the occurrence of vernal pools to persist in the annual grassland landscape. Common plant species found in vernal pools include popcorn flower (*Plagiobothrys stipitata*), navarretia (*Navarretia leucocephala*), toad rush (*Juncus bufonius*), goldfields (*Lasthenia chrysostoma*), yellow carpet (*Blennosperma nanum*), coyote thistle (*Eryngium alismifolium*), tidy tips (*Layia* spp.), water buttercup (*Ranunculus* spp.), and annual hairgrass (*Deschampsia danthonioides*).

Listed species associated with vernal pools in the Program Area include species such as Bogg's Lake hedge hyssop (*Gratiola heterosepala*), Hoover's spurge (*Euphorbia hooveri*), Greene's tuctoria (*Tuctoria greenei*), vernal pool fairy shrimp, and vernal pool tadpole shrimp. In addition to the above-listed species, the California tiger salamander (*Ambystoma californiense*) breeds in vernal pools and is a federally threatened and State threatened species.

Freshwater marshes and seasonal wetlands are characterized by specialized plant species that require moist soils and inundation, but are tolerant of periodic drying. Species composition within and among marshes and other wetlands varies according to hydroperiod, soils, water chemistry, soil chemistry, and climate among other factors. Freshwater marsh habitats are among the most productive wildlife habitats in California. They provide food, cover, and water for more than 160 species of birds and numerous mammal, amphibian, and reptile species (CDFG, 1988c). Wildlife species commonly found in this habitat include waterfowl, songbirds, and a variety of amphibians, reptiles, and mammals. Several species of raptors (e.g., northern harrier [*Circus cyaneus*]) often visit marshes while foraging.

Moist-soil plant species such as big leaf sedge (*Carex amplifolia*), baltic rush (*Juncus balticus*), redroot (*Cyperus erythrorhizos*), and nutgrass (Cy*perus esculentus*) inhabit these portions of wetlands. On wetter sites or in portions of marshes with deeper or more regular inundation, cattails (*Typha* spp.), bulrush (*Schoenoplectus* spp.), and arrowhead (*Sagittaria* spp.) dominate. Thus, the characteristics of freshwater marshes are intimately linked with the marsh's water regime. This habitat type is generally restricted to scattered locations along the area's streams and rivers, as well as isolated areas with suitable hydrology (typically close to the valley floor in the Program Area), and generally not within the MID service area.

#### 3.4.2.3 Special-status Plants and Wildlife Species

The FESA (50 CFR 17) provides legal protection and requires definition of critical habitat and development of recovery plans for plant and animal species in danger of extinction. California has a parallel mandate in the CESA and the California Native Plant Protection Act of 1977. These laws regulate the process of determining which plant and animal species are endangered or threatened. Table 3.4-3 presents federal and State species with the highest levels of protections (listed as threatened, endangered, or State-listed fully protected species) known to occur or potentially occurring in the Study Area. Table 1 in Appendix D presents a full list of sensitive and special-status species that are known to occur or potentially occurring in the Study Area, and also provides additional information on habitat and likelihood of occurrence, as indicated by searches of databases provided by the USFWS, CDFW, CNPS, and onsite field reconnaissance surveys.

Table 3.4-3. Federal and State Threatened and Endangered Species and State Fully Protected Species Occurring or Potentially Occurring in the Study Area

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Scientific Name | Common Name | Status (Federal/CA/Other) |
|---|---|---|
| **Plants** | | |
| *Castilleja campestris* ssp. *succulenta* | succulent owl's-clover | FT/SE/CNPS list 1B.2 |
| *Eryngium racemosum* | Delta button-celery | FE/None/CNPS list 1B.1 |
| *Euphorbia hooveri* | Hoover's spurge | FT/None/CNPS list 1B.2 |
| *Gratiola heterosepala* | Bogg's Lake hedge-hyssop | None/SE/CNPS list 1B.2 |
| *Navarretia myersii* ssp. *myersii* | pincushion navarretia | FSC/None/CNPS list 1B.1 |
| *Neostapfia colusana* | Colusa grass | FT/SE/CNPS list 1B.1 |
| *Orcuttia pilosa* | hairy orcutt grass | FE/SE/CNPS list 1B.1 |
| *Orcuttia inaequalis* | San Joaquin Valley orcutt grass | FT/SE/CNPS list 1B.2 |
| *Pseudobahia bahiifolia* | Hartweg's golden sunburst | FE/SE/CNPS list 1B.1 |
| *Sidalcea keckii* | Keck's checkerbloom | FE/None/CNPS list 1B.1 |
| *Tuctoria greenei* | Greene's tuctoria | FE/CR/CNPS list 1B.1 |
| **Invertebrates** | | |
| *Branchinecta conservatio* | Conservancy fairy shrimp | FE/None/None |
| *Branchinecta longiantenna* | longhorn fairy shrimp | FE/None/None |
| *Branchinecta lynchii* | vernal pool fairy shrimp | FT/None/None |
| *Lepidurus packardi* | vernal pool tadpole shrimp | FE/None/None |
| *Desmocerus californicus dimorphus* | valley elderberry longhorn beetle | FT/None/None |
| **Fishes** | | |
| *Oncorhynchus mykiss irideus* | *O. mykiss* – Central Valley DPS | FT/None/None |
| **Amphibians** | | |
| *Ambystoma californiense* | California tiger salamander | FT/ST/None |
| **Reptiles** | | |
| *Gambelia sila* | blunt-nosed leopard lizard | FE/SE/None |
| *Thamnophis gigas* | giant garter snake | FT/ST/None |
| **Birds** | | |
| *Buteo swainsoni* | Swainson's hawk (nesting) | None/ST/None |
| *Elanus leucurus* | white-tailed kite (nesting) | None/CFP/None |
| *Haliaeetus leucocephalus* | bald eagle | None/SE/None |
| *Vireo bellii pusillus* | least Bell's vireo (nesting) | FE/SE/None |
| **Mammals** | | |
| *Dipodomys nitratoides exilis* | Fresno kangaroo rat | FE/SE/None |
| *Vulpes macrotis mutica* | San Joaquin kit fox | FE/ST/None |

**FEDERAL**
FE = Federally listed as Endangered
FT = Federally listed as Threatened
FSC = Federal Species of Concern

**STATE**
SE = State listed as Endangered
ST = State listed as Threatened
R = Rare
CFP = California Department of Fish and Wildlife designated "Fully Protected"
CNPS = California Native Plant Society

#### 3.4.2.4 Designated Critical Habitat

As described in Appendix D, when a species is proposed for listing as endangered or threatened under the FESA, USFWS and NMFS must consider whether there are areas of habitat believed to be essential to the species' conservation. Such areas may be proposed for designation as critical habitat. Activities that involve a federal permit, license, funding, or authorization (i.e., federal nexus) and are likely to destroy or adversely modify an area of critical habitat can be affected by the designation. USFWS and NMFS typically work with the appropriate federal lead agency as well as (when appropriate) private or other landowners to amend their project to allow it to proceed without adversely affecting the critical habitat.

Although primarily outside of MID's service area, critical habitat units for 12 federally listed species have been designated within the MID study area, 11 of which would have proposed projects within unit boundaries (see Appendix D for additional information and figures of designated critical habitat units). Critical habitat for longhorn fairy shrimp (*Branchinecta longiantenna*) is present within the MID Study Area; however, proposed projects have not yet been identified within any of the designated units for this species. Future Proposed Program refinements could result in currently unidentified impacts within critical habitat units. As described in Subsection 3.4.3.2, under Environmental Commitments, a standardized approach/checklist (see Appendix A to this PEIR) would be used to evaluate the potential for biological and other impacts, including potential impacts on areas designated as critical habitat.

#### 3.4.2.5 *O. mykiss* Critical Habitat

On February 16, 2000 (65 *Federal Register* [FR] 7764), NMFS published a final rule designating critical habitat for *O. mykiss*. This critical habitat included all river reaches accessible to *O. mykiss* in the Sacramento and San Joaquin Rivers and their tributaries in California. NMFS proposed new critical habitat for *O. mykiss* on December 10, 2004 (69 FR 71880), and published a final rule on September 2, 2005 (70 FR 52488). This critical habitat includes the Merced River from the confluence with the lower San Joaquin River upstream to Crocker-Huffman Diversion Dam, as well as the San Joaquin River downstream of the Merced River and the Delta.

The critical habitat designation for *O. mykiss* lists physical or biological features (PBFs), which are elements essential for the conservation of the listed species. The PBFs include sites essential to support one or more life stages of the DPS (e.g., sites for spawning, rearing, migration, and foraging). The specific PBFs include:

- Freshwater spawning habitat
- Freshwater rearing habitat
- Freshwater migration corridors
- Estuarine habitat
- Nearshore coastal marine areas
- Offshore marine areas

The most recent discussion of *O. mykiss* critical habitat PBFs is provided in NMFS (2009), which focus on rivers downstream of Central Valley Project (CVP) and State Water Project (SWP) facilities on the Sacramento and San Joaquin Rivers. Provided below is a brief description of these PBFs from NMFS (2009), and if available, other information. The nearest CVP or SWP facility to the Program is New Melones Reservoir on the Stanislaus River, a tributary to the mainstem of the San Joaquin River. Given documentation of these activities in the Merced River is generally not available, the Stanislaus River is the nearest representation.

#### 3.4.2.6 Habitat Conservation Plans and Easements

**Merced Falls Conservation Easement**

A conservation easement held by the Sierra Foothills Conservancy covers approximately 20 acres of land owned by MID known as Merced Falls in the northeastern area of the District. The easement provides the following protections:

- Habitat for plants and animals that are native to the area
- The scenic viewshed of the property visible to passersby on the nearby roads and highways
- Watershed values
- Outdoor recreation
- Identified historical and cultural values

#### 3.4.2.7 Historical and Recent Water Transfers

Over the last several decades, the District has executed water transfers with a variety of entities for a variety of purposes including to support fishery habitat, environmental programs including Vernalis Adaptive Management Plan, and local as well as regional water users. Water has been made available through transfers for a variety of out-of-District purposes essentially every year since 1967, ranging from 734 acre-feet in 2016 (a below-average water year preceded by 4 critical years) up to 193,715 acre-feet in 1999 (an above-average water year preceded by 4 wet years). As discussed in Section 2, Program Description and Alternatives, transfers including for irrigation, drought, and refuge supply purposes both in and out of basin and to federal, State, and local interests have been conducted.

Over the past 25 years, water transfers have occurred almost every year and in all year types. The District is generally able to make the greatest amount of water available for transfer in years following wet water years types when reservoir carryover storage volumes are higher than average. Transfers have been implemented via either storage or direct diversions. Sources have included Lake McClure, the Merced River, from Lake Yosemite via Bear Creek, or from other local creeks. Board of Director determinations with regard to water transfers are generally guided by conditions each year, by water right, availability, timing, and the location of the transfer recipient.

### 3.4.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to biological resources. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

#### 3.4.3.1 Thresholds of Significance

The thresholds that were used to evaluate the potential impacts are based on Appendix G of the CEQA Guidelines and listed below. Impacts on biological resources are considered significant if the Proposed Program would result in any of the following:

- A substantial adverse effect either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW and USFWS. This includes a potential reduction in the number, restricted range, increased mortality, or lowered reproductive success that jeopardizes the long-term persistence of local populations of an endangered or threatened native anadromous or resident fish species.
- A substantial adverse effect on State or federally protected wetlands (including but not limited to marsh, vernal pool, and coastal), riparian habitat, essential fish habitat (EFH), or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW and USFWS through direct removal, filling, hydrological interruption, or other means.

- Substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- A conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

#### 3.4.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to existing conditions and the No Program Alternative, as applicable. Future anticipated conditions under the No Program Alternative, such as changes in land use or associated demand, are presented below based on information developed as part of the Water Resources Management Plan. Other anticipated future changes, such as implementation of the Federal Energy Regulatory Commission (FERC) Final Environmental Impact Statement (EIS) and required increased flow releases from Lake McClure into the Merced River, are also considered in the following analysis. It is also assumed that some amount of District water transfer activity would continue to occur as has occurred almost every year over the last several decades. These transfers have, in turn, typically influenced river flow and temperature to some degree depending on transfer amount and timing.

As identified above, field reconnaissance-level surveys were conducted in summer and fall 2017 to identify habitat presence and the likelihood for species use and presence. Findings from the field surveys and literature reviews are provided in the Biological Resources Technical Memorandum (Appendix D). These findings were used to evaluate potential impacts on biological resources associated with the Proposed Program and No Program Alternatives.

Given some system improvement project locations and associated details are known, while other proposed projects have not been fully defined, anticipated impacts are identified in the context of each project category to the extent possible. Some project types (e.g., projects within the canal automation and flow measurement improvements category) would generally be limited to less than 1 acre of previously disturbed areas within or directly adjacent to existing MID facilities and/or right-of-way). Other proposed projects, such as those within the reservoir and recharge basin category would be larger in scale and anticipated disturbance and, thus, are discussed individually. The evaluation of potential impacts by category below identifies the anticipated scale/disturbance (temporary and permanent) for each project type in the context of the potential for significant impact.

As described in Subsection 2.1, three elements of the Proposed Program are evaluated in this PEIR including (1) system improvements, (2) Class II to Class I conversions, and (3) water transfers. The system improvements element of the Proposed Program includes projects that have been grouped into project categories based on common features of proposed improvements. To avoid repetitive text, where an impact analysis applies to more than one project category, the analysis is presented as a single discussion with the relevant categories specified. Similarly, if anticipated effects are similar across impact type (e.g., BR-1 and BR-2), potential effects are referenced across impact type as appropriate. The system improvements are presented by the following project categories:

- Main Canal Improvements at Tunnel No. 1 Project
- Canal/Lateral operations and flow measurement projects
  - Canal rebuilding/lining and table topping dead-end facilities
  - Canal automation and flow measurement improvements
  - Siphon modifications

  - Interties
  - Pipelining, rerouting, and new channel construction on customer property (Note: These projects are currently undefined and would be addressed through the checklist process described in Section 2, Program Description and Alternatives. They are therefore not included in the following analysis.)
- Reservoirs and recharge basins
- Conjunctive water use management projects
  - Highlands projects
  - Stormflow diversions
  - Merced River Water Recovery Project

**Class II to Class I Conversions**

The Class II to Class I conversion program element would offer an opportunity to expand the MID Class I user base and potentially result in an increase in applied water delivery in the El Nido area and an equivalent reduction in local groundwater pumping because the surface water deliveries would take the place of groundwater extraction. Surface water deliveries associated with the Class II to Class I conversion would be within the District's current water rights and conveyed by existing facilities. Water delivery routes would not change; however, existing canals and laterals would convey more or less water when compared to current conditions, depending on water year type and annual user allocation. This would not affect terrestrial or aquatic habitat as the canals and laterals that would be used to convey water deliveries do not function as habitat. The Class II to Class I conversion program element separate from the other proposed elements would result in increased diversions from the Merced River. However, the proposed system improvements element would improve the management of surface water supplies, including reduction of losses to seepage and spills, such that the increase in applied water demand associated with the Class II to Class I conversion program element would be offset and would not result in the need for increased Merced River diversions. Therefore, the Class II to Class I conversion program element is not included in the following analysis.

**Water Transfers**

The District-proposed water transfer element (through temporary term and 1-year temporary water transfers) would include transfers within the District's sphere of influence and both within and outside the Merced Groundwater Subbasin. Water transfers are proposed to be implemented via reservoir release of previously stored water and would likely be subject to typical refill agreements with DWR and Bureau of Reclamation as well as MID water right license and FERC-related requirements.

Total transfers would range from 10,000 to 80,000 acre-feet across all water supply (March 31 storage in addition to April–October inflow) availability conditions. Transfer volumes would likely be lowest in very dry and very wet years due to water supply availability and in-basin delivery constraints and out-of-basin pumping system constraints. An anticipated maximum amount of 50,000 acre-feet would be transferred in-basin and up to 30,000 acre-feet of out-of-basin in any year.

Transfers would occur in years when there is both water available to transfer and capacity available to divert and convey transfer water. In the wetter years, when the available water supply is highest, conveyance system constraints may limit the ability to transfer more water. Additionally, in wetter years, demand for transfer water may be less than in less wet or drier years, other than some potential transferees looking for transfer water to support groundwater recharge. Water transfers are proposed to be implemented from April through September on a variety of different patterns depending in part on water supply and reservoir storage conditions, and the location and needs of the transferee.

**Aquatic Resources**

While terrestrial biological resources are not anticipated to be influenced by required future FERC-related flow releases (other than along riparian corridors affected by flow levels), the No Program Alternative for aquatic biological resources has the potential to be different from existing conditions. Related to future Merced River flows and Lake McClure releases, although a flow schedule is provided in the FERC Final EIS, there are several unknown factors that may influence what the final flow schedule on the Merced River may be. These unknown factors include the update to the Bay-Delta Water Quality Control Plan, which currently suggests that (if implemented) future Merced River flows would follow an unimpaired flow schedule between 30 and 50 percent. In addition, there is the potential conditioning requirements under the 401 Water Quality Certification that may lead to revision in the FERC Final EIS flow schedule. While either of these processes may result in no change to the FERC Final EIS flow schedule, the current uncertainty does not allow for a reasonably foreseeable operation. As such, the following analysis for aquatic resources evaluates potential impacts associated with the Proposed Program when compared to both existing conditions and the No Program Alternative.

Comparing the existing environment to the No Program Alternative, Lake McClure operations identified in the current proposed interim Merced River base flows and a spring pulse in May are anticipated to incrementally increase the amount of available fish habitat and cool water temperature as analyzed in the FERC Final EIS. The FEIS flows are considered an incremental improvement to aquatic conditions that would not be substantially altered with the Proposed Program. Generally, the trending response of the Proposed Program flows with the aquatic ecosystem is similar to both the existing project and No Program Alternative and can be generally assessed similarly.

Project-related activity that may potentially affect aquatic resources were analyzed primarily from existing information and data recently collected as part of MID's ongoing FERC relicensing process. It is assumed that maintaining habitat for anadromous fish would also be sufficient for other native fish, which are relatively more abundant and resilient in comparison to Chinook salmon populations that undergo additional pressures such as recreational and commercial (ocean) harvest. The potential for any appreciable change, specifically addressing anadromous fish (i.e., Chinook), is influenced by species periodicity and distribution. Periodicity defines the potential for a specific life stage to be present based on temporal factors. Distribution refers to general areas where specific life stages generally are within identified general time periods. For example, spawning adult Chinook are commonly found in areas of suitable gravel and temperature from October to December, while rearing juveniles may be found in similar areas or potentially farther downstream from January through June. Construction and general operation occur outside of the lower Merced River, so the primary assessment focused on the water transfer element that would create changes in areas accessible to Chinook or designated *O. mykiss* habitat.

Potential impacts (both adverse and beneficial) were evaluated through the use of existing habitat and temperature models. To model usable habitat, in 2011 and 2012, MID conducted an instream flow study in the 19.2-mile-long section of the Merced River from Crocker-Huffman Diversion Dam (RM 52.0) downstream to Shaffer Bridge. The project area represents the uppermost 37 percent of the lower river and includes areas where Chinook and *O. mykiss* are found. The Study Area was divided into three subreaches (Table 3.4-4). As part of the study, MID estimated Chinook salmon life stage-specific habitat versus flow relationship indices using the 1-dimensional PHABSIM system (Waddle, 2001). The life stages were spawning, fry, juvenile, and adult. A flow-habitat relationship was calculated for each life stage in each of the three subreaches. Results for each subreach for each target life stage are reported as weighted usable area (WUA) in terms of square feet per 1,000 linear feet of stream. A WUA value is an index, not actual area.

Table 3.4-4. Description and Location of Subreaches Used for the MID Instream Flow Study
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Subreach Name | Subreach Abbreviation | Subreach Description | Location (approximate begin–end RM)[a] | Length (miles) | Channel Slope[b] (%) |
|---|---|---|---|---|---|
| Subreach 1 | SR1 | Shaffer Bridge to Highway 59 Bridge | 32.8–42.0 | 9.2 | 0.12 |
| Subreach 2 | SR2 | Highway 59 Bridge to Snelling Road Bridge | 42.0–46.4 | 4.4 | 0.22 |
| Subreach 3 | SR3 | Snelling Road Bridge to Crocker-Huffman Diversion Dam | 46.4–52.0 | 5.6 | 0.24 |

[a] Recent high-resolution aerial photography shows differences between the river miles and the Merced River as the river has been realigned due to channel migration and restoration activities.

[b] Slopes are estimated based on contour intervals and distances measured from USGS 1:24,000 topographic maps from Terrain Navigator Pro© (V. 3) software and useful only for comparison between subreaches.

Water temperature modeling was achieved by integrating both the MID relicensing Water Balance/Operations model, which simulates operational scenarios for the Merced River Hydroelectric Project, and the relicensing Merced-5Q model, which simulates water temperatures that resulted from those operations in project reservoirs and in the Merced River downstream to Shaffer Road Bridge (Appendix D). Output from the relicensing water temperature model (Merced-5Q) comprised sub-daily water temperatures occurring over the 27-year simulation period from 1980 through 2006. This period covers a range of hydrologic and meteorological conditions including two multi-year periods of below-average inflow to Lake McClure—1987 through 1992 and 2001 through 2004.

**Environmental Commitments**

As identified in Section 2, Program Description and Alternatives, the following environmental commitments would be incorporated as part of the Proposed Program to assist in avoiding or minimizing potential impacts:

- **Initial Siting Evaluation/Site-specific Resource Evaluation** – MID and a qualified biologist (as necessary) will use a standardized approach/checklist (see Appendix A to this PEIR) to evaluate the potential for biological and other impacts and screen out/modify proposed facility locations to the extent possible.
- **Conduct Appropriate Surveys** – A qualified biologist will determine the extent of potential impacts on biological resources and assist in identifying additional mitigation (and additional environmental documentation as necessary) for future projects determined to require measures not included in this PEIR.
- **Avoid/Minimize/Mitigate Impacts on Sensitive Habitat and Special-status Species** – All proposed facilities and associated construction areas will be situated to avoid sensitive species and associated habitats to the extent possible. Avoidance distances by habitat type are listed in Table 3.4-5.

Table 3.4-5. Avoidance Distances by Habitat Type
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Habitat | Potential Presence by Land Cover Category | Buffer Distance |
|---|---|---|
| Vernal Pools | Vernal Pool Areas, Annual Grassland | 250 feet |
| Wetlands | Wetlands, Annual Grassland | 250 feet |
| Riparian Vegetation | Valley-Foothill Riparian, Wetlands | 100 feet from dripline |

Table 3.4-5. Avoidance Distances by Habitat Type
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Habitat | Potential Presence by Land Cover Category | Buffer Distance |
|---|---|---|
| Native Grasslands | Annual Grassland, Vernal Pool Areas | 250 feet |
| Oak Woodlands | Blue Oak Woodland, Blue Oak-Foothill Pine, Valley Oak Woodland | 100 feet from dripline |

**Existing Conditions Assumptions**

As described in Section 2, Program Description and Alternatives, the CEQA baseline for assessing the significance of project impacts is the environmental setting, or existing conditions. The existing conditions assumptions account for all current conditions at the time of the release of the Notice of Preparation (May 18, 2017), including applicable regulatory requirements and current operational FERC license requirements.

As described above, the District has executed water transfers with a variety of entities for a variety of purposes including to support fishery habitat, environmental programs, and local as well as regional water users. Accordingly, some degree of water transfer is assumed to occur each year (depending on water year type and reservoir storage) but is not specified or included in the modeling conducted as part of the assumed existing condition.

**No Program Alternative Assumptions**

As also described in Section 2, CEQA requires an analysis of an alternative in which the project (in this case the Program), is not implemented. The No Program Alternative allows decision makers to use the PEIR to compare the impacts of approving the Program with the future conditions of not approving the Program.

It is assumed that in the absence of the Proposed Program, land use in the area would continue to be primarily agricultural and urban; and thus, existing biological resource conditions associated with agricultural use and operations would remain generally the same. However, with increased urbanization as forecast in the Water Resources Management Plan, by 2040, agricultural lands adjacent to the populated areas would increasingly become urbanized. Likewise, currently native land (approximately 2,000 acres of the 166,000 total acres within the MID service area) is anticipated to be converted to agriculture, likely resulting in some decreased habitat availability (CH2M HILL, 2019). It is also assumed that some degree of water transfer would be implemented each year (depending on water year type and reservoir storage) as part of the No Program Alternative. Because existing biological resource conditions associated with agricultural use and operations would remain generally the same with the No Program Alternative, the impact analysis below focuses on potential impacts associated with the Proposed Program when compared to existing conditions. Additionally, future anticipated conditions under the No Program Alternative, such as implementation of the FERC Final EIS and ultimate license renewal, would result in increased flow releases from Lake McClure into the Merced River. These changes are assumed to be beneficial with respect to fishery habitat and considered in the following analysis to the degree such changes are known.

### 3.4.3.3 Impacts Associated with the Proposed Program

The following identifies potential impacts on biological resources. Each project category and specific project as applicable is evaluated below by potential impact. Table 3.4-6 presents a summary of potential impacts and proposed mitigation to lessen potentially significant impacts.

**Impact BR-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS. This includes potential reduction in the number, restricted range, increased mortality, or lowered reproductive success that jeopardizes the long-term persistence of local populations of an endangered or threatened native anadromous or resident fish species.**

***System Improvement Element***

**Main Canal Improvements at Tunnel No. 1 Project**

***Construction***

Construction of any of the four options for the Main Canal Improvements at Tunnel No. 1 Project would require use of heavy equipment such as bulldozers, backhoes, loaders, and compactors. Construction-related ground disturbance and new permanent footprints could result in temporary and permanent impacts on special-status plant and animal species as well as protected habitat. Options 1, 2, and 3 would result in approximately 60, 55, and 25 acres of new permanent footprint, respectively (Option 4 would not result in a new permanent footprint). Although construction activities associated with Option 3 would be conducted within the MID right-of-way, construction of Options 1 and 2 would be constructed on new alignments as described in Section 2, Program Description and Alternatives. As identified in Appendix D and described below, the Proposed Program could affect sensitive biological resources known to occur or potentially occur within the disturbance area of the project.

*Special-status Terrestrial Species*

*Nesting Birds*

Many nesting birds are protected under the FESA and CESA as well as the Migratory Bird Treaty Act. Based on the conditions observed during the reconnaissance-level surveys, nesting birds may occur on or near the proposed project site. If project activities occur during the nesting season (February 15 through August 31), nests with eggs or young could be lost (directly affected) during construction activities such as vegetation removal, topsoil stripping/stockpiling, canal construction, and tunnel demolition. Disturbance associated with construction activities could indirectly cause the abandonment of nests. The loss of a small number of nesting birds through implementation would a less than significant impact; however, the loss of a large number of birds would be a potentially significant impact. The loss of a special-status species nest would be a significant impact.

***Impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other parts of the project proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on nesting birds would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

*Burrowing Owl*

The burrowing owl is a California species of special concern and is protected under the Migratory Bird Treaty Act. No individuals of this species were observed during the reconnaissance-level surveys. However, suitable habitat (i.e., annual grassland, sparse or non-existent tree or shrub canopies) does occur within the project site and surrounding area. Burrowing owls often occur very close to human habitation or operations. Given the large number of documented occurrences (during all seasons) and

distribution, burrowing owls have the potential to occur within or near the Main Canal Improvements at Tunnel No. 1 project site. ***Impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other parts of the project proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on burrowing owls would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

*Tricolored Blackbird*

Identified as a State candidate for listing as endangered, tricolored blackbirds have been recorded in the area and may find suitable habitat (dense stands of blackberry as well as grasslands or rangelands; wheat fields in winter and post-breeding flocks in mid-summer) within or near the project site. ***Impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other parts of the project proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on tricolored blackbirds would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

*Western Pond Turtle*

The western pond turtle is a California species of special concern and is proposed for listing under the FESA. While not observed during reconnaissance-level survey, there have been documented occurrences in the project area, and this species may occur on the proposed project site. ***Impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other parts of the project proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on western pond turtle would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

*California Tiger Salamander*

The annual grasslands with seasonal wetlands in the vicinity of the proposed project provide suitable habitat for this federally and State-listed species. Over 70 occurrences have been documented within the Proposed Program Area including the location of the proposed Main Canal Improvements at Tunnel No. 1 Project. ***Impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other parts of the project proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under

Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on California tiger salamander would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

*Vernal Pool Invertebrates*

Longhorn fairy shrimp (federally endangered), vernal pool fairy shrimp (federally threatened), midvalley fairy shrimp (CDFW Special Animal), vernal pool tadpool shrimp (federally endangered), and California fairy shrimp (CDFW Special Animal) were not observed during the reconnaissance-level surveys; however, suitable habitat (i.e., vernal pools and similar season wetlands) does occur in the area of the proposed project. ***Impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other parts of the project proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on vernal pool invertebrates would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

*Merced Kangaroo Rat*

While little suitable habitat (deep, well-drained, sandy soils supporting grassland or blue oak savannah) exists in the Proposed Program Area, known occurrences of this species, identified as a CDFW Special Animal, have been documented north of Lake Yosemite to areas north and east of Snelling, near the project. ***Impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other parts of the project proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on the Merced kangaroo rat would be potentially significant compared to existing conditions and the No Program Alternative. Mitigation*** to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

*San Joaquin Pocket Mouse*

The San Joaquin pocket mouse (SJPM) is a CDFW Special Animal that may occur in the location of the proposed project. Known occurrences have been documented north and northeast of Lake Yosemite and near the intersection of SR 140 and Cunningham Road. The species is known to exist on fine-textured, sandy soils on ridge tops and hillsides supporting grasslands or blue oak savannah. ***Impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other parts of the project proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on SJPM would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

*San Joaquin Kit Fox*

Suitable denning habitat (along canals and unplowed field edges) for this federally endangered, State threatened species is located in the project area even though the species is known mostly as an occasional vagrant to the area. ***Impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other parts of the project proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on the San Joaquin kit fox would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

*Critical Habitat for Special-status Terrestrial Species*

The Main Canal Improvements at Tunnel No. 1 Project area is within the boundaries of designated critical habitat units for Conservancy fairy shrimp and vernal pool fairy shrimp. Portions of the project that would potentially occur within critical habitat would be evaluated and re-located if feasible in accordance with the environmental commitments described under Subsection 3.4.3.2 and would, therefore, be ***less than significant***. If other portions of the project are within critical habitat and cannot be re-located, there is potential that they may result in a direct or indirect alteration that appreciably diminishes the conservation value of critical habitat for one or more of these species.[7] See Appendix D for additional information on critical habitat units. Avoidance and minimization of impacts on critical habitat would be coordinated with regulatory agencies as necessary. However, some impacts on critical habitat may be unavoidable. ***Therefore, depending on the project footprint and whether the "physical or biological features" used to designate the critical habitat are present, impacts on critical habitat for special-status plant species may be potentially significant.***

***Special-status Plant Species***

Special-status plant species have the potential to occur within the Program Area, and thus also the Main Canal Improvements at Tunnel No. 1 Project area, including, but are not limited to Sanford's arrowhead, Henderson's bent grass, alkali milk vetch, heartscale, brittlescale, lesser saltscale, subtle orache, round-leaved filaree, Hoover's calycadenia, succulent owl's clover, beaked clarkia, recurved larkspur, dwarf downingia, Delta buttoncelery, spiny-sepaled button-celery, San Joaquin spearscale, Bogg's Lake hedge-hyssop, Coulter's goldfields (see Appendix D for full list). ***Impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other parts of the project proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on special-status plant species would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

[7] Such alterations may include, but are not limited to, effects that preclude or significantly delay the development of the "physical or biological features" that support the life history needs of the species for recovery. (Note that one or more of the "physical or biological features" upon which the designations were based would have to be adversely affected to the magnitude that the effects preclude or delay the recovery of the species-it is not enough that the project is simply within the boundaries of a critical habitat unit-this narrative also applies to designated critical habitat units for wildlife that may occur within the boundaries of a project).

*Critical Habitat for Special-Status Plant Species*

The Main Canal Improvements at Tunnel No. 1 Project area is within the boundaries of designated critical habitat units for Colusa grass, succulent owl's clover, Greene's tuctoria, and San Joaquin orcutt grass. ***Portions of the project that would potentially occur within critical habitat would be evaluated and re-located if feasible in accordance with the environmental commitments described under Subsection 3.4.3.2 and would, therefore, be less than significant***. If other portions of the project are within critical habitat and cannot be re-located, there is potential that they may result in a direct or indirect alteration that appreciably diminishes the conservation value of critical habitat for one or more of these species. See Appendix D for additional information on critical habitat units. Avoidance and minimization of impacts on critical habitat would be coordinated with regulatory agencies as necessary. However, some impacts on critical habitat may be unavoidable. ***Therefore, depending on the project footprint and whether the "physical or biological features" used to designate the critical habitat are present, impacts on critical habitat for special-status plant species may be potentially significant.***

*Special-status Native Anadromous or Resident Fish Species*

The intake to the Main Canal is above Crocker-Huffman Diversion Dam, which is considered the upstream limit for anadromous fish passage in the Merced River. Therefore, no anadromous special-status species are present in the canal. Kern brook lamprey and hardhead minnows both represent California special-status species. The Kern brook lamprey is a freshwater, non-parasitic species that generally resides in deep, slow, backwater environments generally in the lower Merced River. Hardhead are found in either lacustrine habitat or clear, deep streams with the presence of mild flows (CALFISH, 2019a; 2019b). These habitats do not exist within the areas planned for Proposed Program implementation. Habitat within the Main Canal is highly modified, including frequent flow fluctuations and regular periods of being dry (non-irrigation season, absent storm flows). ***Improvements at Tunnel No. 1 are not anticipated to affect anadromous or resident fish species given lack of fish presence and habitat; therefore, impacts on special-status fish species would be less than significant.***

***Operation***

Operations and maintenance activities for the tunnel options would generally include activities similar to those currently performed under existing conditions within the Program Area. Activities would include accessing the canals and control structures by MID operations staff on an as-needed basis to operate and maintain flow control gates and conduct routine maintenance and inspections. During the winter shutdown, vegetation control, inspections, and repairs would be required. However, operations and maintenance-related activities are anticipated to be infrequent and consistent with existing activity in the Program Area. In addition, there would be very little (if any) change to the operations or flows in the canals from existing conditions. ***No significant adverse impacts on biological resources are anticipated from operations and maintenance of the Main Canal Improvements at Tunnel No. 1 Project.***

**Canal/Lateral Operations and Flow Measurement Projects**

***Construction***

Potential impacts related to the various projects planned under the canal/lateral operations and flow measurement projects are described below, and greater detail is provided in Section 2. While the project types in this category vary, there are similarities in the construction related-disturbance and new, permanent footprint. Canal/Lateral operations and flow measurement projects are located throughout the Program Area. Locations, project type, and specific construction details may be adjusted to adequately address the needs of the District.

Up to 81 canal rebuilding/lining projects and 230 table topping dead-end lateral facilities projects are proposed throughout the Program Area (Figure 2-2). The canal rebuilding/lining and table topping dead-end facilities projects would result in approximately 10 acres and 6 acres of disturbance per project,

respectively; however, it is possible that up to three of these projects may result in a disturbance area of up 25 acres.

The canal automation and flow measurement projects, and siphon modification projects would each result in up to 1 acre of total disturbance per project. The intertie projects would result in 2.5 acres of disturbance per project. Up to 30 canal automation and level control projects and up to 150 flow measurement improvement projects are proposed throughout the Program Area (Figure 2-4). Up to 50 locations to extend and/or enlarge existing road siphons, including construction of necessary headwalls, are proposed throughout the Program Area (Figure 2-6). Up to 11 intertie projects would occur throughout the Program Area to increase water supply reliability and reduce bottlenecks in canals, laterals, and creeks (Figure 2-8).

None of the canal/lateral operations and flow measurement projects would require a new, permanent footprint, with the exception of 0.2 acre for the intertie projects. All projects would be within existing MID right-of-way and typically within previously and ongoing disturbed areas. Excavated soils would be stockpiled onsite or at another District stockpile location to be used for maintenance purposes, or spread along canal banks adjacent to the project. The majority of the work would be scheduled to occur outside of the irrigation season between November 1 and March 1.

Construction of the canal/lateral operations and flow measurement projects would typically require using heavy equipment such as bulldozers, backhoes, dump trucks, and concrete trucks/equipment and would result in increased human activity during construction. This increased noise and activity could disturb wildlife and plants including special-status species, either directly or adjacent to construction areas. Construction could displace or directly injure wildlife, including special-status species. As identified in Appendix D and described below, the proposed projects could affect sensitive biological resources known to occur or with the potential to occur in the project site area.

*Special-status Terrestrial Species*

*Nesting Birds*

Based on the conditions observed during the reconnaissance-level surveys, nesting birds may occur on or near all of the proposed project sites visited during the reconnaissance-level surveys. Both a cliff swallow colony and a great blue heron nesting colony were observed within 600 of two of the projects. If project activities occur during the nesting season (February 15 through August 31), nests with eggs or young may be lost (directly affected) during construction activities such as vegetation removal, topsoil stripping/stockpiling, canal construction, and tunnel demolition. Disturbance associated with construction activities may indirectly cause the abandonment of nests. The loss of a small number of nesting birds through implementation would be a less than significant impact; however, the loss of a large number of birds would be a potentially significant impact. The loss of a special-status species nest would be a significant impact.

***Impacts associated with proposed canal/lateral operations and flow measurement projects in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other facilities proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on nesting birds would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

Similar to anticipated impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project, potential impacts on the following species are anticipated as part of implementing the canal/lateral operations and flow measurement projects:

- Burrowing owl
- Tricolored blackbird
- Western pond turtle
- California tiger salamander
- Vernal pool invertebrates
- San Joaquin kit fox
- Tree roosting bats
- American badger
- Western spadefoot
- Valley elderberry longhorn beetle
- Blunt-nosed leopard lizard

***Impacts associated with proposed canal/lateral operations and flow measurement projects in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence.*** For other facilities proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. However, some impacts may be unavoidable and therefore, impacts on these terrestrial wildlife species would be potentially significant.

*Swainson's Hawk*

Swainson's hawks are listed as a State threatened species due to population declines associated with reduction in riparian habitats and development of open foraging areas. Typical foraging habitat for Swanson's hawk include grasslands and pastures as well as riparian forests or lone trees or groves of trees in agricultural fields for nesting that occurs in the Program Area. Habitat for Swainson's hawks was present, and the bird were observed soaring during the reconnaissance-level surveys near the Le Grand Canal Response Time Improvements – South (siphon under Bear Creek), Le Grand Canal to Bear Creek Spill, Miles Dam Improvements, and Crocker Dam Improvements. While the environmental commitments identified above would be implemented to minimize project impacts, some impacts may be unavoidable given typically required buffer areas even in areas which have been previously disturbed. ***Therefore, impacts on Swainson's hawk would be potentially significant.***

*Critical Habitat for Special-status Terrestrial Species*

Some of the canal/lateral operations and flow measurement project areas are within the boundaries of designated critical habitat units for California tiger salamander (Automate Le Grand Canal 1, Le Grand Canal near Black Rascal Creek Automation, and Le Grand Lining Project areas), Conservancy fairy shrimp, and vernal pool fairy shrimp (several, primarily flow measurement project areas). Facilities that would potentially occur within critical habitat would be evaluated and re-located if feasible in accordance with the environmental commitments described under Subsection 3.4.3.2 and ***would therefore be less than significant***. If other facilities are within critical habitat and cannot be re-located, there is potential that they may result in a direct or indirect alteration that appreciably diminishes the conservation value of critical habitat for one or more of these species. See Appendix D for additional information on critical habitat units. Avoidance and minimization of impacts on critical habitat would be coordinated with regulatory agencies as necessary. However, some impacts on critical habitat may be unavoidable. ***Therefore, depending on where projects are located and whether the "physical or biological features" used to designate the critical habitat are present, impacts on critical habitat may be potentially significant.***

*Special-status Plant Species*

Special-status plant species have the potential to occur within the Program Area and are identified above for the Main Canal Improvements at Tunnel No. 1 Project. However, much of the area to be affected by the proposed canal/lateral operations and flow measurement projects is in existing MID right-of-way in previously disturbed areas adjacent to active District facilities. ***Impacts on special-status plant species would be less than significant due to lack of habitat or species presence.*** Evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, for those facilities that cannot be located to avoid areas containing potential habitat, some impacts may be unavoidable; and therefore, impacts on these special-status plant species would be potentially significant.***

*Critical Habitat for Special-status Plant Species*

Some of the proposed canal/lateral operations and flow measurement project areas are within the boundaries of designated critical habitat units for Colusa grass, succulent owl's clover, Greene's tuctoria, San Joaquin orcutt grass, hairy Orcutt grass, and Hoover's spurge. ***Facilities that would potentially occur within critical habitat would be evaluated and relocated if feasible in accordance with the environmental commitments described under Subsection 3.4.3.2 and would therefore be less than significant***. If other facilities are within critical habitat and cannot be relocated, there is potential that they may result in a direct or indirect alteration that appreciably diminishes the conservation value of critical habitat for one or more of these species. See Appendix D for additional information on critical habitat units. Avoidance and minimization of impacts on critical habitat would be coordinated with regulatory agencies as necessary. However, some impacts on critical habitat may be unavoidable. ***Therefore, depending on where projects are located and whether the "physical or biological features" used to designate the critical habitat are present, impacts on critical habitat may be potentially significant.***

*Special-status Native Anadromous or Resident Fish Species*

Anadromous salmonids migrating upstream from the ocean are prevented from traveling up the San Joaquin River beyond the confluence with the Merced River by the Hills Ferry Barrier. Because the smaller streams in the Program Area eventually flow to the San Joaquin River upstream of its confluence with the Merced, the barrier would prevent anadromous salmonids from reaching streams in the Program Area such as Bear Creek, Burns Creek, Owens Creek, and Black Rascal Creek. Anadromous species are not likely to occur in other creeks, and thus, not in the connecting network of irrigation canals in the Program Area, given that the priority for these water features is delivery of water for agricultural purposes. Suitable habitat for special-status native resident fish species Kern brook lamprey and hardhead does not exist within the areas planned for Proposed Program implementation. Similar to the Main Canal, habitat within the creeks and canals associated with the canal/lateral operations and flow measurement projects is highly modified, including frequent flow fluctuations. ***Canal/lateral operations and flow measurement projects are not anticipated to affect anadromous or resident fish species given lack of fish presence and habitat; therefore, impacts on special-status fish species would be less than significant.***

*Critical Habitat for Special-status Native Anadromous or Resident Fish Species*

At least one canal/lateral operations and flow measurement project, the Livingston Canal Spill Water Tightening Auto No. 5 Project, is adjacent to the boundary of a critical habitat unit within the Merced River for *O. mykiss* (California Central Valley Unit). Given the proposed project would be adjacent to but not in the Merced River, and measures would be taken to avoid impacts on the river including avoiding potential sedimentation, impacts would be less than significant.

***Operation***

Operation activities related to implementation of the canal/lateral operations and flow measurement projects would include periodic maintenance to various systems and related equipment. This would result in vehicle traffic throughout the MID Program Area related to maintenance activities. However, operations and maintenance-related activities are anticipated to be infrequent and consistent with existing activity in the Program Area. In addition, there would be very little (if any) change to the operations or flows in the canals from existing conditions. ***No significant adverse impacts on biological resources are anticipated from operation of the canal/lateral operations and flow measurement projects.***

**Reservoirs and Recharge Basins**

***Construction***

Eleven new regulating reservoirs and increased capacity at one existing reservoir are proposed as part of the modernization projects. Proposed regulating reservoir projects would each have storage capacities of up to approximately 120 acre-feet and occupy up to approximately 60 acres. Construction activities (including staging and laydown areas) for the proposed reservoir and basin projects would typically be contained within an approximate 60-acre construction footprint or within and adjacent to the canal and existing facility footprints (approximately 2 of the 60 acres would be temporary) in areas generally used for ongoing agricultural purposes. With the exception of the proposed Bear Creek Regulating Reservoir, which would divert water from or to Bear Creek, water within the reservoirs would come from existing canal or lateral flows. The reservoirs would not impound natural surface water flows or other inflows. The projects would be designed so that fill material would not need to be imported and excess material would be stockpiled onsite. Potential impacts related to the various reservoir and recharge basin projects are described below.

As shown on Figure 2-10, reservoir and recharge basin projects are located throughout the Program Area with most located in the southern and western portions of the Program Area. Locations, project type, and specific construction details may be adjusted to adequately address the needs of the District.

As with the other project categories, construction of the reservoir and recharge basin projects would require using heavy equipment such as graders, backhoes, bulldozers, and dump trucks and would result in increased human activity during construction. This increased noise and activity could disturb wildlife and plants including special-status species if present, either directly or adjacent to construction areas. Construction could displace or directly injure wildlife, including special-status species.

As identified in Appendix D and described below, the proposed projects could affect sensitive biological resources known to occur or with the potential to occur in the project site area.

*Special-status Terrestrial Species*

Similar to anticipated impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project and canal/lateral operations and flow measurement projects, potential impacts on the following species are anticipated as part of implementing the reservoir and recharge basin projects:

- Nesting birds
- Burrowing owl
- Swainson’s hawk
- Tricolored blackbird
- Western pond turtle
- California tiger salamander
- Vernal pool invertebrates
- San Joaquin kit fox
- Tree roosting bats

- American badger
- Western spadefoot
- Blunt-nosed leopard lizard

***Although the majority of areas under consideration for regulating reservoirs are actively used for agricultural purposes, projects in previously disturbed areas adjacent to active District facilities within existing MID right-of-way would be less than significant due to lack of habitat or species presence***. For other facilities proposed within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as an environmental commitment as described under Subsection 3.4.3.2. ***However, some impacts may be unavoidable; and therefore, impacts on special-status terrestrial species would be potentially significant compared to existing conditions and the No Program Alternative.*** Mitigation to offset impacts would be implemented as specified below, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

*Critical Habitat for Special-status Terrestrial Species*

As currently proposed, there are no reservoirs or recharge basins within or adjacent to designated critical habitat.

*Special-status Plant Species*

Special-status plant species have the potential to occur within the Program Area and are identified above for the Main Canal Improvements at Tunnel No. 1 Project. Similar to anticipated impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project, potential impacts on these species are anticipated in areas potentially containing special-status plant species as part of implementing the reservoir and recharge projects. While most areas would likely not contain suitable habitat, and the environmental commitments identified above would be implemented to minimize project impacts, some impacts may be unavoidable. ***Therefore, impacts on special-status plant species would be potentially significant.***

*Critical Habitat for Special-status Plant Species*

As currently proposed, there are no reservoirs or recharge basins proposed within or adjacent to designated critical habitat.

*Special-status Native Anadromous or Resident Fish Species*

As described above, reservoir and recharge basin projects would primarily be built adjacent to existing canals and reservoirs, and water within the reservoirs would come from existing canal or lateral flows. One exception is the proposed Bear Creek Regulating Reservoir that would be constructed adjacent to Bear Creek and would divert flows to and from the creek. All reservoirs would be built in areas that are inaccessible to anadromous salmonids, as the proposed locations are above the Hills Ferry Barrier or isolated from the Merced River. As such, anadromous salmonids would not be present in any of the project areas during construction. Furthermore, and specifically with the case of the Bear Creek Regulating Reservoir, no effects related to construction would extend downstream to waters that may be occupied by anadromous salmonids (i.e., FESA-listed fish, *O. mykiss*, and Chinook salmon). As discussed previously, habitat within MID canals is highly modified, including frequent flow fluctuations; therefore, suitable habitat for Kern brook lamprey or hardhead species does not exist, and these species are not anticipated to be present. ***Regulating reservoir and recharge basin construction is not anticipated to affect anadromous or resident fish species given lack of fish presence and habitat; therefore, impacts on special-status fish species would be less than significant.***

***Operation***

Operation activities related to implementation of the reservoir and recharge basin projects would include periodic maintenance to various systems and related equipment. This would result in vehicle traffic throughout the MID Program Area related to maintenance activities. However, operations and

maintenance-related activities are anticipated to be infrequent and consistent with existing activity in the Program Area. Future MID operations and in-District irrigation facility flows would remain similar to current operations. ***No significant adverse impacts on biological resources are anticipated from operation of the reservoir and recharge basin projects.***

**Conjunctive Water Use Management Projects**

***Construction***

As part of the Proposed Program, MID would implement 11 conjunctive water use management projects located primarily in the northwestern and southeastern areas of the Program Area (Figure 2-23). Conjunctive water use management projects would include both highlands projects and stormflow diversion projects.

Total construction footprint for the highlands projects, including staging and laydown areas, would be approximately 3 acres or less for each project site. Construction could occur any time of the year but would avoid wet conditions. Construction activities would occur within existing MID rights-of-way, generally in areas that are previously and continually disturbed, including areas under active agricultural cultivation. These projects would not result in new permanent footprint.

Stormflow diversion projects include the Owens Creek Diversion Channel Project (Figure 2-25) and the Black Rascal Creek Diversion Channel Project (Figure 2-26). The Owens Creek Diversion Channel Project would entail construction across agricultural fields from Owens Creek to Le Grand Canal. Total construction footprint, including staging and laydown areas, would be approximately 10 acres with a permanent footprint of approximately 9 acres. The Black Rascal Creek Diversion Channel Project would entail construction across undeveloped land from Black Rascal Creek to Le Grand Canal. Total construction footprint, including staging and laydown areas, would be approximately 3 acres, and a permanent footprint of approximately 1.5 acres would result.

Construction work on the stormflow diversion projects could occur any time of the year, with tie-ins occurring in winter months, outside of the irrigation season between November 1 and March 1. Construction for the conjunctive water use management projects would typically require using heavy equipment such as bulldozers, backhoes, dump trucks, and concrete trucks/equipment and would result in increased human activity during construction. This increased noise and activity could disturb wildlife and plants including special-status species, either directly or adjacent to construction areas depending on species and habitat presence. Construction could displace or directly injure wildlife, including special-status species if present.

*Special-status Terrestrial Species*

The highlands projects would be built adjacent to existing canals, and water would be pumped from existing canals or lateral flows. The stormflow diversion projects would be constructed on undeveloped land but would require siphons under roadways and construction of new diversion channels that divert water through new control structures from upstream creeks.

Proposed conjunctive water use management projects are proposed in the same general locations as other projects, such as the canal rebuilding/lining and table topping dead-end facilities (Figure 2-2). Similar to anticipated impacts associated with the proposed Main Canal Improvements at Tunnel No. 1 Project and other system improvement projects, potential impacts on the same species are anticipated as part of implementing the conjunctive water use management projects as construction activities would occur within existing MID rights-of-way generally in areas that are previously and continually disturbed, including areas under active agricultural cultivation. ***As such, impacts on special-status species would be less than significant due to lack of habitat or species presence***. ***However, for those facilities that cannot be located to avoid areas containing potential habitat, some impacts may be unavoidable; and therefore, impacts on these terrestrial wildlife species would be potentially significant.***

*Special-status Plant Species*

Similar to anticipated impacts associated with the other system improvement projects, potential impacts on the same species are anticipated as part of implementing the conjunctive water use management projects.

Special-status plant species have the potential to occur within the Program Area and are identified above for the Main Canal Improvements at Tunnel No. 1 Project. However, much of the area to be affected by the proposed conjunctive water use management projects is in existing MID right-of-way within previously disturbed areas adjacent to active District facilities. ***Impacts on special-status plant species would be less than significant due to lack of habitat or species presence***. ***For those facilities that cannot be located to avoid areas containing potential habitat, some impacts may be unavoidable; and therefore, impacts on these special-status plant species would be potentially significant.***

*Special-status Native Anadromous or Resident Fish Species*

As described above for the other types of system improvements, anadromous salmonids are not expected to be present in any of the project areas during construction. Because habitat within the creeks and canals is highly modified, including frequent flow fluctuations, suitable habitat for Kern brook lamprey or hardhead species does not exist. ***Conjunctive water use management projects construction is not anticipated to affect anadromous or resident fish species given lack of fish presence and habitat; therefore, impacts on special-status fish species would be less than significant.***

***Operation***

Similar to current practices, long-term operations and maintenance activities would vary between the irrigation season and winter shutdown periods. During the irrigation season, each facility would be accessed using existing access roads one or more times per day for general inspections and routine maintenance or repairs. Supervisory control and data acquisition (SCADA) features and local automated controls would minimize the need for manual control by MID staff. During the winter shutdown, operations and maintenance activities would include scheduled maintenance and inspections of mechanical equipment as necessary. Pipelines, canals, structures, and siphons would require inspections and repairs once every 2 years, as necessary. This would result in vehicle traffic throughout the MID Program Area related to maintenance activities. However, operations and maintenance-related activities are anticipated to be infrequent and consistent with existing activity in the Program Area. Future MID operations and flows would remain similar to current operations. ***No significant adverse impacts on biological resources are anticipated from operation of the conjunctive water use management projects.***

***Water Transfer Element***

**Construction**

The implementation of the water transfer element would not require any construction or new facilities and, therefore, would not result in any potential construction-related impacts.

**Operation**

As discussed in Subsection 3.4.2.7, Historical and Recent Water Transfers, MID has conducted numerous water transfers within the Merced River watershed for decades in all water year types. Sources have included Lake McClure, the Merced River, Lake Yosemite via Bear Creek and Crocker Dam, or from local creeks. Transfers have generally been dictated by water right, availability, timing, and the location of the transfer recipient/use. Recipients or releases have been made to support fishery habitat, environmental programs including Vernalis Adaptive Management Plan, and local and regional water users. Historical and proposed water transfer activity has and is proposed to continue to include in-basin and out-of-basin transfers. In-basin water transfers have historically and would continue to divert flow from the

Merced River above Crocker-Huffman Dam at the MID Main Canal and would not decrease the flow downstream of Crocker-Huffman Dam during the transfer, given water would be used from existing Lake McClure storage. Out-of-basin transfers have historically and likely would continue to move water through the lower Merced River, which have and would result in an overall increase in flows below Crocker-Huffman Dam during the transfer. These transfers have historically and would generally reach the CVP and/or SWP pumping facilities and would increase flow in the San Joaquin River and portions of the Delta. However, some transfer activity has occurred through the MID conveyance system and through more local conveyance systems.

Most transfer activity has typically and would continue to occur between April and October of each calendar year. Due to the elevated outflow, greater amounts of water would be reserved during winter months. Reductions in outflow primarily occur in wetter years, where accretion would naturally increase streamflow, and temperature is cool as a result of ambient conditions. This document presents an analysis of the potential environmental effects of implementing the WRMP. The analysis is conducted from a baseline that represents MID's operations as of the filing of the Notice of Preparation. The baseline includes operations wherein MID provides irrigation water to over 100,000 acres of land. An additional 33,400 acres of irrigable lands within the MID service area pay a standby fee and retain the right to request MID water deliveries throughout any irrigation season. These lands have not historically requested water from MID, but may request water in the future. Requests for water to irrigate these lands may be similar in volume to the water transfers analyzed in this document. Therefore, operational changes and the resulting effects of providing water to these additional lands, if it were requested, may be similar to the effects of implementing the WRMP.

MID's annual irrigation season varies in length and in amount of diversions, depending on hydrology, crop changes, and irrigated acreage. The amount of diversions is affected by whether there is a wet or dry spring, among other reasons. For example, in a dry spring, the demand for pre-irrigation is increased, resulting in increased diversions for that irrigation season. Conversely, in a wet spring, pre-irrigation demand is minimal. Irrigated acreage also varies by year, fluctuating by up to 15,000 acres depending on grower's irrigation plans. Crops are also always changing, requiring varied demands annually. As a result, the impact of implementing the WRMP overall falls within the maximum bookend of existing demand variability. The following summarizes anticipated potential impacts on special-status terrestrial, plant, and native anadromous or resident fish species***.***

***<u>Special-status Terrestrial Species</u>***

Implementation of the water transfer element is anticipated to increase or not affect in-river Merced flows during the time of the transfer and subsequently depending on a given transfer and year-type/reservoir inflow conditions. As discussed above, all transfer activity has typically and would continue to occur between April and October of each calendar year when flows are generally at their highest levels given either spring flow accretions and/or irrigation-related releases. The quantities and duration of water proposed to be transferred and resulting in either increased or generally unchanged (in most years) Merced River and other streamflow would not be of sufficient amount to affect adjacent riparian vegetation in terms of providing water to support growth or erosive force to scour streambanks. ***As such, no significant impacts on special-status terrestrial species are anticipated from operation of the water transfer element.***

***<u>Special-status Plant Species</u>***

As discussed above, all transfer activity has typically and would generally continue to occur between April and October of each calendar year when flows are generally at their highest levels given either spring flow accretions and/or irrigation-related releases. The quantities and duration of water proposed to be transferred and resulting in either increased or generally unchanged (in most years) Merced River and other streamflow would not be of sufficient amount to affect adjacent riparian vegetation including potential special-status species in terms of providing water to support growth or erosive force to scour

streambanks. ***As such, no significant impacts on special-status plant species are anticipated from operation of the water transfer element.***

***<u>Special-status Native Anadromous or Resident Fish Species</u>***

The effect of the proposed water transfer element would result in the potential for both positive and adverse ecological impacts on all native fishes, including anadromous fish. Although the quantities and duration of water proposed to be transferred would generally result in either increased or generally unchanged (in most years) Merced River and other streamflow, decreases in Merced River flows are anticipated after a transfer has been completed in some years.

A summary of the periodicity of fall-run Chinook salmon in the lower Merced River is provided in Table 3.4-1. Figure 3.4-5 shows that the majority of flow reduction as a result of the water transfer element would occur during wetter winter and spring months. Flow reductions would coincide with adult immigration, spawning, and rearing, during periods that already experience increased runoff due to seasonal precipitation. Additional discharge within the Merced River as a result of the water transfer element would occur during warmer summer and fall months (Figure 3.4-5) when juvenile Chinook may be rearing or absent from the system (e.g., July and August; Table 3.4-1).

While the presence of *O. mykiss* (anadromous form of *O. mykiss*) in the Merced River has not been documented and is uncertain (discussed in Subsection 3.4.3), habitat within the Merced River is considered part of the FESA protected area for *O. mykiss* to potentially occur. A summary of the periodicity for *O. mykiss* is presented in Table 3.4-2, which provides specific periods that are important to maintain habitat by life stage need in the Merced River. *O. mykiss* life history displays broader temporal ranges of activity than Chinook salmon, but the majority of activity is from late November through May. Rearing may occur year-round, which makes offering cooler summer conditions of greater value.

Projected WUA for Chinook salmon based on the flow-habitat relationship generally showed relatively minor changes in percent WUA overall across months and year types as a result of the proposed water transfer element in comparison to existing conditions. Projected WUA during the spawning life stage reflected the greatest projected percent change for individual values in one of the year types (above normal water year) ranging up to an additional 23 percent (December) and reductions of 9–12 percent (October). Given spawning activity generally begins in mid- to late October and primarily occurs in November and December, the projected reduction in October in the above normal water year type would occur when few fish are generally present and a substantial portion of preferred habitat (54 to 65 percent remaining maximum WUA) is not undergoing competition for a large number of individuals. Conversely, the projected gain in WUA in December would occur when relatively high activity is normally observed. Spawning maximum WUA in below normal water years was generally unchanged with only a less than 5 percent reduction in December, but no change in other months. There was virtually no change in percent maximum WUA for dry and critical water year types. Fry and juvenile life stage-projected-WUA for Chinook, associated with the proposed water transfer element, were less than 10 percent of the maximum WUA available for all year types and months (Appendix D). Projected fry WUA is anticipated to change little compared to the other life stages and is projected to generally experience the greatest reductions in wet and above normal water years (9 and 6 percent WUA reductions in February at Reach 2, respectively) compared to existing conditions. Even following the reduction, the remaining 37 and 16 percent WUA in Reach 2 during wet and above normal water years remains the highest percent maximum WUA in Reach 2. In Reaches 1 and 3, there was a projected change of less than 5 percent (increase and reduction) in maximum WUA in comparison to the existing condition. Reaches 1 and 3 both offer the most consistently high values of percent of maximum WUA for fry habitat for all water years and relevant months under the existing condition and the Proposed Program.

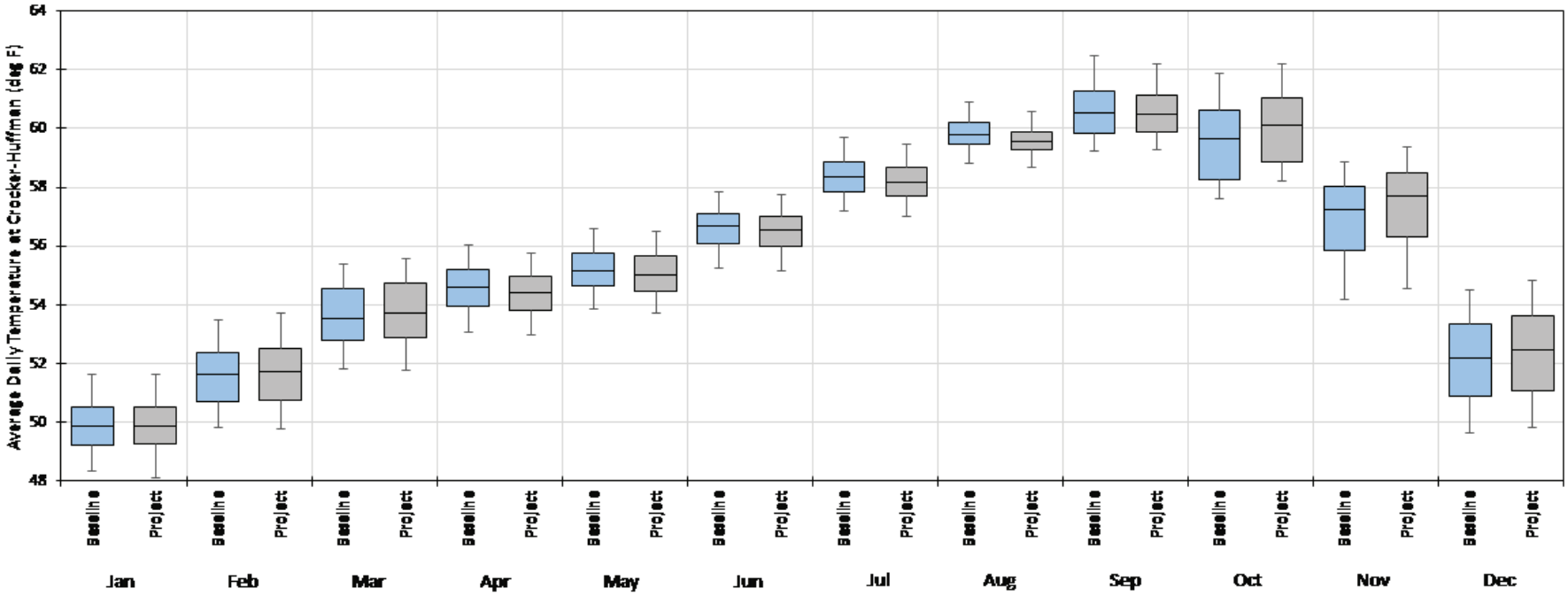



**FIGURE 3.4-5 MODELED WATER TEMPERATURE AT CROCKER-HUFFMAN DIVERSION DAM DISPLAYING THE MAXIMUM, 3RD/1ST QUARTILES, MEDIAN, AVERAGE, AND MINIMUM DAILY AVERAGE TEMPERATURE FOR EACH MONTH IN EACH YEAR (27-YEAR DATASET, 1980–2006)**

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*Weighted Usable Area*

Modeled WUA for *O. mykiss* is projected to result in similar trends as were projected for chinook salmon. Overall, decreases in WUA are anticipated to be less than 10 percent for all life stages, reaches, and months (Appendix D). Most projected negative values were less than 5 percent reductions overall across year types and months. The greatest projected improvements were observed for adult *O. mykiss*, with projected increase in WUA availability exceeding 30 percent in comparison to existing conditions. The majority of the gains for adults are projected to occur in August and September in dry, below normal, and above normal year types in all reaches, where adults would be holding (based on Table 3.4-2). Juvenile rearing in July and August is projected to decrease by less than 10 percent associated with greater flows from the proposed transfer, which in turn would be expected to result in a reduction of modeled WUA habitat due to higher velocity and greater depth, without consideration to temperature benefits discussed below. Reduction in juvenile WUA inversely results in gains in adult WUA, but changes to juvenile WUA were relatively low and not indicative of an appreciable negative impact.

*Temperature*

Water temperature is an important component to determine whether physical habitat modeled for salmonids is actually usable. While the velocity, depth, and substrate may all meet the desired model requirement for specific life history habitat suitability, water temperature may eliminate otherwise suitable habitat. Outputs from the Merced-5Q temperature model provided a comparison of the existing environment and Proposed Program. Figures 3.4-5 and 3.4-6 show the range of daily average temperatures by month for water temperature at Crocker-Huffman Diversion Dam (Figure 3.4-5) and Shaffer Bridge (Figure 3.4-6).

The modeled analyses shows that the difference of average daily temperature comparing the existing environment to the Proposed Program ranged from a difference of no more than 0.07 degree Fahrenheit (°F) warmer to no more than 0.19°F cooler from January through September at Crocker-Huffman Diversion Dam. From October through December, projected daily average water temperature at Crocker-Huffman Diversion Dam generally warmed, but by no greater than a daily average difference of 0.65°F. The warming is likely due to less water in storage, which results in increased water temperature (less thermal buffering). Temperature is not a limiting factor in the winter when ambient conditions are already cool. Therefore, the slight warming during the winter would have negligible impact on salmonids.

At Shaffer Bridge, the modeled differences in temperature are again projected to be only incrementally different from all months, excluding the summer. From May through June and October through December, the difference in daily average temperature from the existing environment to the Proposed Program are mixed, but differences are less than 0.5°F. From July through September, reduction in daily average temperature ranged from 1.9 to 3.0°F cooler as a result of the Proposed Program. The marked drop in daily average temperature is projected to occur when the river is typically most limited by water temperature.

The reduction in temperature during summer months could increase the amount of viable habitat for rearing *O. mykiss* that may be present during that time of year. Exceedance plots of modeled water temperature outputs at four locations (Crocker-Huffman Diversion Dam – RM 52.0, Snelling Bridge – RM 45.4, HWY 59 Bridge – RM 42, and Shaffer Bridge – RM 32.8) are presented in Appendix D. The plots show relatively similar exceedance curves from the existing environment and Proposed Program as presented alongside the EPA (2003) temperature guidelines for salmonids. There is little change in modeled temperature exceedance between the existing environment and Proposed Program for most months. Cooling is projected to occur from August through September as a result of the Proposed Program and can be observed lowering water temperature into the preferred EPA (2003) guideline range as far as Snelling Bridge and likely result in an increase in usable habitat for *O. mykiss*. Differences for other months appear to be generally negligible.

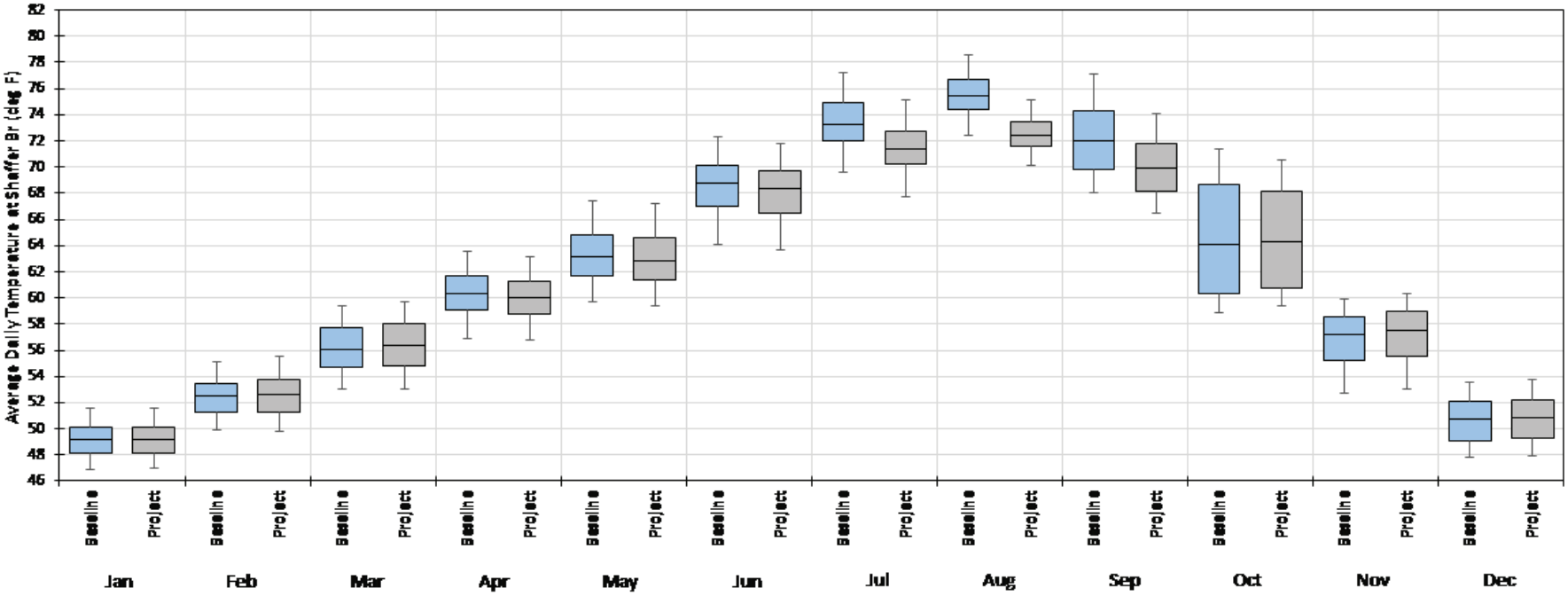


**FIGURE 3.4-6 MODELED WATER TEMPERATURE AT SHAFFER ROAD BRIDGE DISPLAYING THE MAXIMUM, 3RD/1ST QUARTILES, MEDIAN, AVERAGE, AND MINIMUM DAILY AVERAGE TEMPERATURE FOR EACH MONTH IN EACH YEAR (27-YEAR DATASET, 1980–2006)**

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Based on the analyses conducted for Chinook salmon, the water transfer element is projected to result in both a mix of habitat increases and reductions. The projected reductions are anticipated to be relatively minor, and evidence is lacking to suggest that Chinook are limited based on the differences in habitat. Conversely, the increases in habitat and additional benefit of improved temperature during late rearing and early adult return both offer incremental improvements. ***Based on these analyses, it is expected that potential effects (positive or negative) would not be substantial; and therefore, impacts on Chinook salmon would be less than significant.***

Analyses for *O. mykiss* show a similar mix of increased and reduced habitat from the water transfer element. Again, reductions are relatively minor, and given the general absence of *O. mykiss*, the differences would not limit the ecological requirements for completing the typical life cycle process in the Merced River. *O. mykiss* have the potential to be present year-round, and the improvements to summer water temperature would have an even greater potential benefit for *O. mykiss* than Chinook, which are generally absent in August and July. ***Based on analyses, it is expected that potential effects (positive or negative) would not be substantial; and therefore, impacts on O. mykiss habitat would be less than significant.***

**Impact BR-2: Have a substantial adverse effect on State or federally protected wetlands (including but not limited to marsh, vernal pool, and coastal), riparian habitat, essential fish habitat (EFH), or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW and USFWS through direct removal, filling, hydrological interruption, or other means.**

Wetlands (including riparian habitats and EFH) represent a unique habitat type that is a subset of the habitat and associated species discussed above under Impact BR-1. Accordingly, the discussion below references impacts discussed for Impact BR-1 as appropriate.

***System Improvements Element***

Similar to the impacts identified for Impact BR-1, construction of the various system improvement projects could result in the temporary and permanent loss of riparian and/or wetland habitat (including vernal pools) as well as other sensitive natural communities, which would reduce habitat availability for riparian, wetland, and other associated wildlife. Many special-status species identified above use riparian and wetland habitats (Appendix D). The majority of existing MID canals and operational facilities are maintained so as to minimize vegetation, and riparian and wetland habitats; and most other areas proposed for projects/improvements are within areas under active agricultural use that do not include wetland (including vernal pool), riparian, or stream-related habitats. Therefore, impacts on these habitat types during the construction of the majority of projects would either not occur or be limited. ***As such, impacts associated with the vast majority of proposed system improvement projects in existing MID right-of-way within previously disturbed areas adjacent to active District facilities would be less than significant due to lack of habitat or species presence. For other facilities proposed within areas containing potential habitat, some impacts may be unavoidable; and therefore, impacts on these terrestrial wildlife species would be potentially significant.***

Rivers (including portions of the San Joaquin and Merced Rivers) and creeks in the Program Area may be considered historical (inaccessible) or unused EFH under the Pacific Coast Salmon Fishery Management Plan. With the exception of the Merced River up to Crocker-Huffman Dam, there are significant fish passage barriers that preclude Chinook salmon from accessing the Project Area for the Main Canal Improvements at Tunnel No. 1 Project. ***The temporary and permanent loss of riparian and wetland habitat is considered a potentially significant impact.*** Proposed Program activities would not affect the major component of freshwater EFH for Pacific Salmon. ***With implementation of mitigation measures, impacts on EFH would be less than significant.***

Operations and maintenance of the system improvement projects is described under **Impact BR-1**. The area within the District would continue to be operated and maintained consistent with current

practices. Future operations and flows would remain similar to current operations. ***No significant adverse impacts on biological resources are anticipated from operation of the Proposed Program.***

***Water Transfer Element***

The implementation of the water transfer element would not require any construction and therefore not result in any potential construction-related impact to analyze.

Similar to the discussion of operational impacts in response to BR-1, implementation of water transfers could potentially entail changes to Merced River flows. In-basin water transfers would generally not result in reduction of flow in the lower Merced River during the transfer. Out-of-basin transfers could continue to move water through the lower Merced River, which would result in an overall increase in flows below Crocker-Huffman Diversion Dam, and thus, would also increase flow in the San Joaquin River and portions of the Delta. Due to the elevated outflow, greater amounts of water could be reserved during winter months. These operational impacts could affect fish as described below.

**Essential Fish Habitat**

Essential Fish Habitat occurs below Crocker-Huffman Diversion Dam and would overlap with revised releases as a result of the water transfer element. EFH in the vicinity of the project occurs in the USGS fourth field HUC number 18040008, *Upper Merced*, which extends from the confluence with the San Joaquin River upstream to the headwaters of the Merced River, and identifies Crocker-Huffman Diversion Dam as the "*Impassable Dam(s)*," which would limit the upstream extent of the designated EFH. EFH is not present in any project component outside of the lower Merced River.

Analyses provided earlier show the water transfer element is anticipated to provide a mix of minor decreases and increases of percent maximum WUA for Chinook, a species that uses EFH. The water transfer element would also incrementally improve water temperature in June and September, which are times when juvenile outmigration or adult return may occur. Based on analyses presented earlier, there is no significant impact on Chinook salmon anticipated. ***Therefore, based on the prior analyses, there also is not evidence of impact on EFH, and it is concluded that potential impacts on EFH would be less than significant.***

Prior analyses also addressed *O. mykiss* habitat. Evidence of *O. mykiss* presence currently in the Merced River is lacking, but the accessible habitat below Crocker-Huffman Diversion Dam is identified as critical habitat for *O. mykiss*. Analyses found that changes in percent maximum WUA were generally less than 10 percent and mostly less than 5 percent. Temperature was anticipated to improve during summer rearing months that could benefit any juvenile or adult *O. mykiss* habitat during typically warmer conditions. ***Based on analyses, it is anticipated that changes (positive or negative) to habitat would be relatively minor; and therefore, the analyses conclude that potential impacts on O. mykiss critical habitat would be less than significant.***

**Impact BR-3: Substantially interfere with the movement of any native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites.**

***System Improvements Element***

Disruption of wildlife movement corridors could occur both directly and indirectly through establishment of a physical barrier such as a developed use, road, or canal, or by changing the nature or function of a natural feature used in migration or dispersal such as by dewatering a wetland. Wildlife are known to move among population sites within the County, and between undeveloped or otherwise protected lands such as State and federal wildlife refuges. Establishment of physical barriers or developed uses within these movement corridors could adversely affect breeding, foraging, and dispersal. The most significant movement corridor within the MID service area is the Merced River. The riparian corridor associated with the river provides the most intact habitat along which wildlife can

move without impediment and provides habitat connections to lands both upstream and downstream of the MID Program Area. Other smaller drainages in the MID Program Area (e.g., Bear Creek, Black Rascal Creek, etc.) may also provide corridors for habitat linkage. ***Because none of the proposed projects would affect drainages that provide corridors for habitat linkage, these activities would not substantially interfere with the movement of any resident or migratory fish species, and potential impacts would be less than significant.***

As described under Impact BR-1, migratory fish (anadromous salmonids) are largely isolated from the proposed project construction areas. Native resident fish species may be present in the creeks and canals adjacent to the projects. Construction activities would largely occur on dry land, the exception being the tie-ins to existing or new channels or placement of control and measurement facilities, which would occur outside of the irrigation season. ***Therefore, these activities would not substantially interfere with the movement of any resident or migratory fish species, and potential impacts would be less than significant.***

Operation of the system improvement projects is described under Impact BR-1 above. The area within the District would continue to be maintained consistent with current practices. Future operations and flows would remain similar to current operations. ***No significant adverse impacts on biological resources are anticipated from operation of the system improvement projects.***

***Water Transfer Element***

The implementation of the water transfer element would not require any construction and, therefore, would not result in any potential construction-related impact to analyze.

See operational impact discussion under Impact BR-2.

**Special-status Native Anadromous or Resident Fish Species**

The water transfer element is projected to result in both increased and generally unaffected flows below Crocker-Huffman Diversion Dam. In very unusual cases, reductions would be no greater than 12 percent of maximum WUA (based on life stage, reach, and month), but generally are less than 5 percent overall (Appendix D). These reductions would not affect fish passage within the lower Merced River. The lower Merced River is accessible to all native and anadromous fish species present from the confluence of the San Joaquin River to the Crocker-Huffman Diversion Dam and would remain so with the implementation of the Proposed Program. ***The water transfer element would result in a less than significant impact on Chinook salmon or O. mykiss regarding continuity or passage impediments in the lower Merced River.***

**Impact BR-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.**

Local policies, ordinances, plans, and provisions related to biological resources for the Proposed Program are described in Subsection 3.4.1.3. Potential construction-related impacts resulting in conflicts with local policies and protections are included in the analysis of Impacts BR-1, -2, and -3. Environmental commitments and mitigation measures identified would provide for continued compliance and mitigation where applicable.

A conservation easement held by the Sierra Foothills Conservancy covers approximately 20 acres of land owned by MID, known as Merced Falls in the northeastern area of the District. ***There are no planned projects located within the conservation easement; therefore, there would be no impact related to potential conflicts with conservation plans or easements***.

Operation of the Proposed Program is described under Impacts BR-1, -2, and -3. The area within the District would continue to be maintained consistent with current practices. Future operations and flows

would remain similar to current operations. ***Therefore, potential conflicts with local policies, ordinances, plans, and provisions would be a less than significant impact.***

## 3.4.4 Mitigation Measures

Environmental commitments (Section 2 and Subsection 3.4.3.2) are included as part of the Proposed Program and are designed to avoid and minimize impacts on regulated habitats, special-status species, and other biological resources to the extent feasible. Additional mitigation measures identified in Table 3.4-6 would need to be implemented to reduce impacts to a less than significant level as required if potential habitat or species presence occurs related to a given project. The following mitigation measures (MMs) would be implemented to avoid or substantially lessen potentially significant impacts on biological resources. Table 3.4-6 summarizes the mitigation measures identified for each project category and individual project as applicable.

Table 3.4-6. Summary of Mitigation Measures for MID Project Impacts on Biological Resources
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project | LOS before Mitigation | Mitigation Measure | LOS after Mitigation |
|---|---|---|---|
| **Impact BR-1:** Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS. This includes potential reduction in the number, restricted range, increased mortality, or lowered reproductive success that jeopardizes the long-term persistence of local populations of an endangered or threatened native anadromous or resident fish species. | | | |
| **SYSTEM IMPROVEMENT PROJECTS** | | | |
| Main Canal Improvements at Tunnel No. 1 Project | Potentially significant | MM BR-1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1m | Less than significant |
| Canal/Lateral Operations and Flow Measurement Projects | Potentially significant | MM BR-1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1m | Less than significant |
| Reservoirs and Recharge Basins Projects | Potentially significant | MM BR-1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1m | Less than significant |
| Le Grand Canal Response Time Improvements– North | Potentially significant | MM BR-1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1m | Less than significant |
| Conjunctive Water Use Management Projects | Potentially significant | MM BR-1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1m | Less than significant |
| **WATER TRANSFERS** | | | |
| All Projects – *O. mykiss* Habitat | Less than significant | NA | Less than significant |
| All Projects – Fall-run Chinook Salmon | Less than significant | NA | Less than significant |
| All Projects – Resident Fish Species | Less than significant | NA | Less than significant |
| **Impact BR-2:** Have a substantial adverse effect on State or federally protected wetlands (including but not limited to marsh, vernal pool, and coastal), riparian habitat, essential fish habitat (EFH), or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW and USFWS through direct removal, filling, hydrological interruption, or other means. | | | |
| **SYSTEM IMPROVEMENT PROJECTS** | | | |
| All Projects – Wetland and Riparian Habitats | Potentially significant | MM BR-1f, -2 | Less than significant |
| All Projects – Essential Fish Habitat | Less than significant | NA | Less than significant |

Table 3.4-6. Summary of Mitigation Measures for MID Project Impacts on Biological Resources
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project | LOS before Mitigation | Mitigation Measure | LOS after Mitigation |
|---|---|---|---|
| **WATER TRANSFERS** | | | |
| All Projects – Essential Fish Habitat | Less than significant | NA | Less than significant |
| **Impact BR-3:** Substantially interfere with the movement of any native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites. | | | |
| All Projects – Wildlife Nursery Sites or Corridors | Less than significant | NA | Less than significant |
| All Projects – Native Resident/Migratory Fish Nursery Sites or Corridors | Less than significant | NA | Less than significant |
| **Impact BR-4:** Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan. | | | |
| All Projects – Local Policies, Ordinances, or Plans | Less than significant | NA | Less than significant |
| All Projects – Conservation Easements | Less than significant | NA | Less than significant |

Notes:

Potential impacts on fish species would be less than significant and, therefore, do not require mitigation. However, environmental commitments would be applied as appropriate.

Information is based on finding presented in Appendix D.

LOS = level of significance
NA = not applicable

As described in Subsection 3.4.2.1, the reconnaissance-level surveys conducted as part of the impact assessment conducted for this PEIR were intended to assist in impact evaluation; and additional appropriately timed, focused surveys for specific special-status species would need to be conducted as part of project implementation. Appendix D provides recommendations for surveys to determine if species are likely to be adversely affected by projects in the Proposed Program and provides mitigation measures for species that are considered to have some potential to occur within or immediately adjacent to a Proposed Program project site.

**MM BR-1a: Nesting birds**

The following measures are recommended to avoid adverse effects on nesting birds (including loggerhead shrike, but not including Swainson's hawk or other special-status raptor species) that nest within or immediately adjacent to the project site.

- If construction occurs during the bird nesting season (generally February 15–August 31), preconstruction nesting bird surveys (two visits at least 1 week apart) will be conducted by a qualified biologist within the 14 days prior to construction to detect the presence of any nesting birds within or adjacent to the proposed project (within 400 feet for non-special-status raptors and within 100 feet for all other non-special-status birds). If construction occurs during the nonbreeding season for nesting birds (September 1–January 31), preconstruction surveys are not required.
- If the preconstruction nesting bird surveys detect actively nesting birds, the results of the surveys shall be submitted to CDFW within 3 days of completing the surveys. If any active non-special-status bird nests are found onsite, the applicant shall avoid initiating any construction activities within the standard buffers described above (i.e., 400 and 100 feet as appropriate). The applicant will then

develop and implement a plan for the protection and monitoring of these nests, to be approved by CDFW, in a timely manner. The results of any protective measures instituted as a part of the protection and monitoring plan shall be provided to CDFW in electronic format within 1 week of implementation.

**MM BR-1b: Burrowing owl**

Adverse effects on burrowing owls will be mitigated as follows:

- The results of preconstruction surveys for burrowing owl, including negative findings, will be submitted to CDFW within 3 days of survey conclusion. If burrowing owls are found during the nesting season (i.e., February 15–August 31), no ground disturbance will occur within 250 feet of occupied burrows until a qualified biologist determines that fledging has occurred (i.e., the juveniles are no longer dependent upon the nest burrows). If burrowing owls are found during the non-nesting season (i.e., September 1–February 14), no ground disturbance will occur within 160 feet of occupied burrows.
- Alternatively, the applicant may retain a qualified biologist to conduct passive relocation of individuals from occupied burrows using one-way doors for a minimum of 3 consecutive days (only during the non-nesting season). Once the occupied burrows have been cleared, the applicant may backfill the burrows. If passive relocation is used, the applicant will also provide alternate natural or artificial burrows that are beyond 160 feet from the impact area and that are within or contiguous to a minimum of 6.5 acres of foraging habitat for each pair of relocated burrowing owls. One alternate natural or artificial burrow will be provided for each burrow that will be excavated within the project site. Artificial burrow creation, if used, will follow the guidelines in Trulio (1995) and the CDFW *Staff Report on Burrowing Owl Mitigation* (2012). The applicant will be responsible for reporting all observations of burrowing owl to CNDDB within 10 days of the sighting.

**MM BR-1c: Tricolored blackbird**

Adverse effects on nesting tricolored blackbird colonies will be mitigated as follows:

- MID will prepare a habitat management plan and incidental take permit application for submittal to and approval by CDFW prior to any loss of suitable nesting habitat for tricolored blackbird on a project site. The habitat management plan will, at a minimum, include the below provisions.
    a) To avoid and minimize impacts on nesting tricolored blackbird, MID will not initiate grubbing, grading, or other soil/vegetation disturbance within 250 feet of project boundaries during the nesting season (March 15 through July 30). All project soil/vegetation disturbance will occur between August 1 and March 14 to the extent feasible.
    b) Alternatively, if MID initiates project soil/vegetation disturbance between March 15 and July 30, surveys will be conducted for prospecting or nesting tricolored blackbird colonies in all potentially suitable nesting habitats that are within and out to 250 feet from the project boundaries. The surveys will be conducted by a qualified biologist during the season immediately preceding initiation of the project. The surveys will be conducted according to the following schedule: a total of two visits during early March 15 to July 30 with at least 1 month between survey visits.
    c) If nesting colonies are found prior to initiation of project soil/vegetation disturbance in the year of the survey, a no work exclusion zone will be established within 250 feet of each active nesting colony until a qualified biologist determines that the young-of-the-year are no longer reliant upon the nest site.
    d) Alternatively, MID may retain a qualified biologist to conduct daily monitoring of any active nesting colonies that are within 250 feet or less from project soil/vegetation disturbance to

determine if the individuals are exhibiting any behaviors that would suggest that nest failure could occur. If the qualified biologist determines that disturbance is sufficient to cause nest failure, all activities within 250 feet of the nesting colony will be terminated until the young-of-the-year are no longer reliant upon the nest.

e) To compensate for the loss of known nesting habitat for tricolored blackbird on a project site, MID will plant Himalayan blackberry at a minimum 2:1 compensation ratio. The compensation stands of Himalayan blackberry will be sited on the nearest suitable land controlled by MID or on nearby alternative land on which MID has acquired a conservation easement acceptable to CDFW. Compensation sites will be chosen to avoid any loss of existing natural wetland communities. Annual monitoring of the compensation stands will be conducted to determine if tricolored blackbirds are using the compensation habitat. If no evidence of use has been found after 5 years of monitoring, MID will be required to plant additional Himalayan blackberry at a minimum 1:1 compensation ratio on other lands under MID control within Merced County where there is no active episodic human disturbance that would preclude tricolored blackbirds from settling and nesting in the compensation habitat.

**MM BR-1d: Western pond turtle**

Adverse effects on western pond turtle will be mitigated as follows:

- During dewatering of any canal that is suitable for western pond turtle, the applicant shall retain a qualified biologist to monitor the dewatering and salvage any stranded western pond turtles that are observed. Salvage shall be conducted by net, and all individuals will be relocated to a downstream portion of the associated canal at least 500 feet downstream of the nearest boundary of the project site that has at least 300 linear feet of continuous aquatic habitat. Any non-native turtles (e.g., red-eared slider [*Trachemys scripta elegans*]) that is salvaged will not be released to the wild. The applicant will consult with CDFW in regards to the disposition of these latter individuals.
- When removing the top 12 inches of soil from any relatively undisturbed edge habitat on or near the project site (i.e., ungraded road shoulders and field edges that could provide potential egg-laying sites), the applicant will use a qualified biologist as a “spotter” whose responsibility is to watch for western pond turtle eggs or neonates that are overturned during earthmoving. If eggs or neonates are found, all earthmoving activities within 30 feet of the eggs or neonates will be temporarily halted until the eggs or neonates can be salvaged. The eggs or neonates will then be delivered to a nearby qualified wildlife rescue and rehabilitation facility that has been approved by CDFW. The eggs or neonates will be held by the wildlife rescue and rehabilitation facility until they are ready for release into downstream portions of the associated canals (i.e., at least 500 feet downstream from the nearest project boundary). Once the top 12 inches of soil has been removed, no further monitoring for western pond turtle eggs or neonates is required given that western pond turtle nests are shallow (i.e., less than 6 inches in depth).

**MM BR-1e: California tiger salamander and western spadefoot**

Adverse effects on California tiger salamander (CTS) will be mitigated as follows:

- Concentrations of small mammal burrows and other suitable refugia that may support CTS will be avoided to the extent feasible. Prior to ground disturbance, linear routes will be mapped, marked in the field, and surveyed for burrows. Burrows within a vehicle access route that cannot be avoided and are susceptible to being crushed will be temporarily reinforced with polyvinyl chloride (PVC) pipe or by other measures as deemed effective by a qualified biologist prior to allowing vehicle access (dry season only). Any reinforcing materials will be removed immediately after access is completed.

- Prior to any work within a project site with suitable CTS habitat or within 1 mile of suitable CTS habitat (or within 2 miles of known CTS occurrences where there is contiguous suitable habitat between the project and occurrence), a one-way exclusion fence will be established prior to the winter (i.e., prior to October 15) of the planned year of construction around the project site and will remain in place for the duration of the project. A qualified biologist will survey and delineate the fence route and be present during fence installation. Exit funnels or other appropriate exit structures for CTS will be provided no more than 60 feet apart along the entire fence alignment. The exclusion fence will be routinely inspected for repair for the duration of construction. Any damage, such as holes or gaps, will be repaired immediately.
- CTS found within a project site a will be captured by hand, contained in a 2-gallon plastic bucket with lid, and relocated immediately to the outside of the nearest portion of the exclusion fence (in a ground squirrel burrow if available, otherwise under a 2-foot by 2-foot piece of plywood covered with styrofoam insulation).
- Prior to any disturbance of potentially suitable aquatic CTS breeding habitat, a qualified biologist will conduct presence/absence surveys within the habitat in concurrence with the USFWS's *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander October* (2003).
- Prior to the start of work each morning within the CTS exclusion fence, a qualified biologist will check for CTS under equipment and materials that are to be moved that day. The qualified biologist will also check all excavated steep-walled holes or trenches for CTS. CTS will be removed by the qualified biologists and relocated immediately to the outside of the nearest portion of the exclusion fence (in a ground squirrel burrow if available, otherwise under a 2-foot by 2-foot piece of plywood covered with styrofoam insulation).
- A 10-mile-per-hour speed limit will be enforced at all project sites, except on roads with a posted speed limit. On roads with posted speed limits, construction traffic will be limited to the minimum safe speed.
- In the event that dead or injured CTS are found, the qualified biologist will consult with USFWS and CDFW to determine which, if any, additional protection measures will be implemented. These measures may include, but are not limited to, lower traffic threshold, more intensive monitoring, or controlled arrival and departures of construction traffic.
- Implementation of the above measures that address CTS also apply to western spadefoot and will also mitigate/compensate for potential adverse effects to this species within and adjacent to project sites.

**MM BR-1f: Vernal pool invertebrates**

Adverse effects on federally listed and other special-status vernal pool invertebrates will be mitigated through formal consultation with USFWS, with the likely consulting federal agency being USACE. In the event of no federal nexus, the District will coordinate directly with USFWS through Section 10 of the FESA. The USACE's guidelines for formal consultation and mitigation approach include the following (this approach will also be followed as appropriate as part of potential direct coordination with USFWS through the federal Section 10 process):

- The precise location of the project site clearly delineated on either an original or high-quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1 in. = 24,000 in.). The map should include: quad name(s); county name; project name; type of project by category (development or other [specify]); and townships(s), ranges(s), section(s) in which the project is located.

- Detailed map(s) of proposed project site. The map should include: potential habitat of listed vernal pool plants and invertebrates (i.e., vernal pools, swales, and other areas that pond water in winter-spring) onsite and on adjacent property where vernal pool complexes cross property boundary; other special-status species locations/habitats; location(s) of any proposed onsite reserves; location(s) of all proposed project features (buildings, roads, parking lots, bike trails, hiking paths, fences, irrigated and non-native landscaped areas, detention basins, recreation fields, parks, and any other open spaces, etc.; location(s) of existing infrastructure within proposed reserves such as power lines, easements, pipelines or any other underground structures for which access and maintenance privileges exist; spatial buffers between the project features and avoided vernal pool resources; and watershed boundaries of wetlands, both avoided and affected to assist in evaluation of indirect effects.
- Area (in acres) directly and indirectly affected by the proposed project, including: total area of the project; estimated area of listed vernal pool species habitat filled/destroyed, including effects of interrelated and interdependent actions; estimated area of habitat of listed vernal pool invertebrates indirectly affected, estimated size of buffer between the project features and adjacent avoided or preserved area(s); land use of properties adjacent to both affected area(s) and avoided or preserved area(s); and map or discussion describing hydrological relationships of both affected and avoided wetlands with adjacent properties.
- Any conservation plan and/or conservation measures that the applicant proposes. To expedite consultation, such plans and measures should be developed during the informal consultation process with USFWS, prior to initiation of formal consultation and should include the following: specific provisions for endowments for future management, maintenance, and ownership of any vernal pool reserves included in the conservation proposal; specific locations and construction methods for any compensatory wetlands, and monitoring protocols, success criteria, and remediation protocols for any compensatory wetlands.
- A survey is required for any listed vernal pool plants if the proposed project is within the range of such species. If presence of listed invertebrates is not assumed and the proposed project occurs in an area where USFWS does not assume presence of listed invertebrates in the watershed, protocol surveys are necessary.
- In coordination with the requirements of any formal consultation regarding federally listed vernal pool invertebrates, MID will implement measures consistent with the formal consultation and *Draft Vernal Pool Mitigation and Monitoring Guidelines for U.S. Army Corps of Engineers South Pacific Division* (2016) for compensatory mitigation projects involving vernal pool habitats as required for processing of Department of the Army permits under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act.

**MM BR-1g: Merced kangaroo rat and San Joaquin pocket mouse**

Adverse effects on Merced kangaroo rat (MKR) and SJPM will be mitigated as follows:

- MKR and SJPM trapping efforts will be conducted by qualified biologists within all suitable habitat associated with a project. Meandering visual transect surveys for MKR burrow complexes and sign (e.g., tail drags, sand baths, seed caches) will be conducted by two biologists in all suitable habitat within and out to 100 feet from the project boundaries. All burrow complex locations that are found will be recorded using a global positioning system unit, while data on the number of burrows, level of activity, and general suitability for MKR will be recorded in field notes. Information on vegetation type and percent cover also will be recorded.
- Following completion of the visual transect surveys, potential trapping sites will be prioritized based on a combination of the level of MKR activity (as evidenced by burrow density and/or the presence

of other sign, though some areas without obvious sign may also be trapped) and project area coverage. Live trap stations and trap lines then will be established (staked and recorded with a global positioning system unit) at the highest-priority sites.

- Traps (Sherman live traps [Model XLKR: 13 inches by 3.5 inches by 3 inches]) will be set near active burrows, dust baths, or tracks (particularly along evident runways). Ten or more traps (or a number determined by the surveyor) will be set in relatively tight clusters (5-foot trap spacing) at high activity areas. Traps also will be set at 30- to 50-foot intervals (two traps per station) along evident movement corridors. Traps will be baited with a mixture of millet, crimped oats, wild birdseed, or other suitable seed. Bedding (crumpled unbleached paper towel) will be placed at the inside end of each trap and will not be allowed to contact the tripping mechanism. Paper towels will be replaced each time an animal is captured in the trap. Traps will be opened and baited at sunset and checked one to two times per evening as deemed appropriate by the lead biologist. All traps will be closed after they have been checked at dawn. Trapping will be conducted at each trap site for 5 consecutive nights. Trapping will not be conducted during the week of a full moon, unless the sky is overcast and moonlight is substantially reduced. Trapping will not be conducted in December or January or in periods of cold or inclement weather detrimental to MKR.
- Trapped MKR or SJPM from donor sites will be held for no more than 2 days before moving them to a translocation site in 5-gallon plastic buckets with wire mesh tops. The buckets will contain approximately 2 inches of sand and approximately 4 ounces of millet seed.
- Trapped MKR or SJPM will then be translocated to nearby suitable translocation sites. The translocation sites will be chosen based on replicate habitat structure and plant communities, proximity to the donor site (less than three miles), absence of large numbers of kangaroo rats currently occupying the site (density threshold to be determined in consultation with CDFW), and high number of available burrows. To assess the current rodent population on a proposed translocation site before translocation of MKR, 2 nights of small mammal trapping will occur. After this, suitable translocation sites for hard-release of MKR will be prepared for introduction by creating artificial burrows using a soil or hand auger to drill artificial burrows into the ground at a 30º angle to approximately 24 inches in depth. Approximately 3 ounces of seed will be placed inside of each artificial burrow. To avoid any potential aggressive interactions among kangaroo rats, artificial burrows will be placed at least 50 feet apart. MKF will be placed inside of an artificial burrow approximately 1 hour before sunset. The entrance to the burrow will be blocked with a small paper bag filled with soil until after sunset. Upon darkness, the burrow will be unplugged, allowing individuals to exit on their own accord.
- Implementation of the above measures for MKR will also address SJPM.

**MM BR-1h: San Joaquin kit fox and American badger**

Adverse effects on San Joaquin kit fox and American badger will be mitigated as follows:

- If the early evaluation conducted for the proposed project (USFWS, 1999) determines that the project site represents San Joaquin kit fox habitat, the applicant will initiate discussions with CDFW and USFWS to determine appropriate project modifications to protect San Joaquin kit fox, including avoidance, minimization, restoration, preservation, or compensation measures. At a minimum, the applicant will conduct preconstruction surveys for dens, burrows, or other subterranean structures (i.e., potential dens) that could be occupied by the taxon. The preconstruction surveys will be conducted within no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities. Appropriate exclusion zones around potentially occupied subterranean habitat will then be observed where feasible as follows:

    a) Potential den – 50 feet
    b) Atypical den – 50 feet

c) Known den – 100 feet
d) Natal/Pupping den – CDFW and USFWS must be contacted

- Where infeasible to use an exclusion zone, limited destruction of potential dens will be conducted. Destruction of potential dens will be accomplished by careful excavation until it is certain that no San Joaquin kit foxes are inside. The potential dens will be fully excavated, filled with dirt, and compacted to ensure that individuals cannot reenter or use the den during the construction period. If at any point during excavation, an individual is discovered inside the den, the excavation activities will cease immediately, and monitoring of the den will be conducted. Destruction of the den will be completed when in the judgment of the biologist, the individual has escaped, without further disturbance, from the partially destroyed den. Destruction of any known or natal/pupping den requires take authorization from CDFW and USFWS.
- Other applicable mitigation measures that address potential adverse effects on San Joaquin kit fox include the following:

a) Project-related vehicles will observe a daytime speed limit of 20 miles per hour throughout the site in all project areas, except on Merced County roads and State and federal highways. Night-time construction will be minimized to the extent possible. However, if it does occur, the speed limit will be reduced to 10 miles per hour. Off-road traffic outside of designated project areas will be prohibited.

b) To prevent inadvertent entrapment of San Joaquin kit foxes or other animals during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen fill or wooden planks will be installed. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If at any time a trapped or injured San Joaquin kit fox is discovered, CDFW and USFWS will be immediately contacted.

c) All construction pipes, culverts, or similar structures with a diameter of 4 inches or greater that are stored at a construction site for one or more overnight periods will be thoroughly inspected for San Joaquin kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If necessary, and under the direct supervision of a qualified biologist, the pipe may be moved only once to remove it from the path of construction activity, until the individual has escaped.

d) All food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in securely closed containers and removed at least once a week from the project site.

e) No firearms will be allowed on the project site.

f) No pets, such as dogs or cats, will be permitted on the project site to prevent the harassment or mortality of San Joaquin kit foxes, or destruction of the taxon's dens.

g) Use of rodenticides and herbicides in project areas will be restricted. This is necessary to prevent primary or secondary poisoning of individuals and the depletion of prey populations on which they depend. All uses of such compounds will observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and federal legislation, as well as additional project-related restrictions deemed necessary by CDFW and USFWS. If rodent control must be conducted, zinc phosphide will be used because of its proven lower risk to San Joaquin kit fox.

h) A representative will be appointed by the applicant who will be the contact source for any employee or contractor who might inadvertently kill or injure a San Joaquin kit fox or who finds a dead, injured, or entrapped individual. The representative will be identified during the

employee education program, and their name and telephone number will be provided to CDFW and USFWS.

i) An employee education program will be prepared and delivered to all contractors, their employees, applicant personnel, and and/or agency personnel involved in the project. The program will consist of a brief presentation by persons knowledgeable in San Joaquin kit fox biology and legislative protection to explain endangered species concerns. The program, at a minimum, will include the following:

   i. Description of the San Joaquin kit fox and its habitat needs
   ii. Description of known occurrences of San Joaquin kit fox in the project area
   iii. Explanation of the status of the taxon and its protection under the CESA and FESA
   iv. List of measures being taken to reduce adverse effects to the taxon during project construction and implementation
   v. A fact sheet conveying the above information will be prepared for distribution to the previously referenced people and anyone else who may enter the project site

j) Upon completion of the project, all areas subject to temporary ground disturbances including storage and staging areas, temporary roads, and pipeline corridors will be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to temporary disturbance means any area that is disturbed during the project, but after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas will be determined on a site-specific basis in consultation with CDFW and USFWS.

k) In the case of trapped animals, escape ramps or structures will be installed immediately to allow the animal(s) to escape, or CDFW and USFWS will be contacted for guidance.

l) Any contractor, employee, or applicant or agency personnel who is responsible for inadvertently killing or injuring a San Joaquin kit fox shall immediately report the incident to their representative. The representative will contact CDFW immediately in the case of a dead, injured, or entrapped San Joaquin kit fox. The CDFW contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden.

m) The Sacramento Fish and Wildlife Office and CDFW will be notified in writing within 3 working days of the accidental death or injury to a San Joaquin kit fox during project-related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured individual and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species.

n) New sightings of San Joaquin kit fox will be reported to the CNDDB. A copy of the reporting form and a topographic map clearly marked with the location where the San Joaquin kit fox was observed will also be provided to USFWS at the following address: Endangered Species Division, 2800 Cottage Way, Suite W2605, Sacramento, California 95825-1846.

- Implementation of the above measures that address San Joaquin kit fox will also mitigate/compensate for potential adverse effects to American badger within the project site.

**MM BR-1i: Swainson's hawk and white-tailed kite**

Adverse effects on nesting Swainson's hawks and white-tailed kites will be mitigated as follows.

- If active Swainson's hawk or white-tailed kite nests are detected during preconstruction surveys, a no-disturbance buffer zone of 500 feet will be implemented during the nesting season (March 1–September 15) or until August 15 if Management Authorization is provided by Swainson's Hawk

Technical Advisory Committee (2000). Furthermore, a nest monitoring plan will be developed and implemented for all active nests. If monitoring demonstrates that nesting individuals are being adversely affected, the no-disturbance zone will be increased in 100-foot increments until all adverse effects are eliminated.

- Compensation for loss of suitable Swainson's hawk foraging habitat (mostly with reservoir construction) will be conducted as follows: habitat acquisition (through fee title or conservation easement) at a 1:1 ratio for nest sites within 1 mile; 0.75:1 for nest sites within 5 miles, 0.5:1 for nest sites within 10 miles. Note that habitat acquisition can be "stacked" with mitigation for loss of agricultural land as long as the acquired land is planted in a suitable crop for Swainson's hawk foraging in 3 out of every 5 years. Compensation for loss of suitable white-tailed kite foraging habitat will be conducted concurrently with compensation for loss of suitable Swainson's hawk habitat.

**MM BR-1j: Tree-roosting bats**

Adverse effects on tree-roosting bats (i.e., western red bat and hoary bat) will be mitigated as follows:

- A qualified biologist will conduct a survey for tree-roosting bats at all suitable roosting habitat within 120 feet of the project boundaries. The survey will consist of the following: (1) daytime visual searches for individuals roosting in the foliage of onsite or adjacent large trees and (2) evening Anabat or similar bioacoustic equipment surveys to show presence of foraging individuals. The surveys will be conducted on 2 consecutive days/nights during the 7 days prior to construction during months when these species may be present in the project area (i.e., March 1 to October 15).
- If the survey determines that individuals are present in onsite or adjacent roosting habitat (i.e., riparian woodland, orchards, or other nearby mature trees), no construction activities that result in fugitive noise, vibration, light, or dust shall occur within 120 feet of the roost site while it is occupied.
- Ongoing evening surveys will be continued until 2 consecutive nights without any nearby detections have occurred (other than during the pupping season) and will then be terminated. Construction must then start within the next 2 days.
- No additional evening surveys will be required at occupied sites and their 120-foot setback that are found during the pupping season (May 15 to July 15). Construction activities at such site will be avoided until after mid-July. Construction must then start within the next 2 days.
- All project night lighting shall be shielded and directed away from suitable roosting habitat.

**MM BR-1k: Blunt-nosed leopard lizard**

Adverse effects on blunt-nosed leopard lizard must be mitigated through avoidance given that the species is California fully protected, and authorization of "take" is not allowed. As such, adverse effects on blunt-nosed leopard lizards will be mitigated as follows:

- A final clearance survey will be conducted to ensure that no blunt-nosed leopard lizards are present and no burrows have become established within the project site and a 50-foot avoidance buffer.
- All burrows suitable for potential use by blunt-nosed leopard lizard will be avoided by project activities.
- If suitable burrows that may serve as potential refugia for blunt-nosed leopard lizard cannot be avoided within the project site and a minimum 50-foot avoidance buffer cannot be maintained, then additional surveys to detect the species will be completed in accordance with the CDFG's *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard* (2004).

- If no individual blunt-nosed leopard lizards are observed and no burrows are identified within the project site and a 50-foot avoidance buffer during the final clearance survey, then project activities may proceed.
- When possible, conduct project activities when lizards are inactive (generally when temperatures are below 77°F or above 95°F).
- All vehicle operators will check under vehicles and equipment prior to operation, or if left idle.
- If a blunt-nosed leopard lizard is observed during project preconstruction or clearance surveys, USFWS and CDFW will be notified for further guidance.

**MM BR-1l: Valley elderberry longhorn beetle**

Adverse effects on valley elderberry longhorn beetle will be mitigated consistent with the USFWS's *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (*Desmocerus californicus dimorphus*) (2017). Mitigation measures in the framework include the following:

- Avoidance and minimization measures
- Transplanting of elderberries
- Monitoring
- Compensatory mitigation measures

Specific detail and guidance in the implementation of the above mitigation measures is outlined in the USFWS's *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (*Desmocerus californicus dimorphus*) (2017).

**MM BR-1m: Sanford's arrowhead and other special-status plant species**

Adverse effects on Sanford's arrowhead will be mitigated as follows:

- No less than 25 percent of the potentially affected plugs (1 foot by 1 foot by 1 foot), with no fewer than three individual Sanford's arrowhead plants per plug will be transplanted to an unlined portion of the occupied canal(s) located immediately downstream from the project boundaries. The plug source locations shall be selected randomly to assure the greatest potential genetic diversity of the plants.
- The transplantation program shall not be bound by any survivorship monitoring standards given that it is expected that some of the source population will be unaffected by the project. However, the applicant will monitor the transplanted Sanford's arrowhead to evaluate the efficacy of such transplantation as it relates to future mitigation efforts for this species.
- Monitoring shall occur for 3 consecutive years after transplantation and a final report submitted to CDFW by October of the final year of monitoring.

Adverse effects on other special-status plants will be mitigated as follows:

- Mitigation will be consistent with the *Policy on Mitigation Guidelines Regarding Impacts to Rare, Threatened, and Endangered Plants* and will be accomplished through conference and coordination with CNPS. CNPS endorses the following measures:
  - Avoiding the impact altogether by not taking a certain action
  - Minimizing the impact by limiting the degree or magnitude of the action
  - 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 project
  - Compensating for the impact by replacing or providing substitute resources or environments elsewhere

Note that multiple measures may be necessary to effectively mitigate adverse effects to a given plant species but will always be at the discretion of MID as long as the effects can be reasonably expected to avoid, minimize, or compensate for the anticipated effects.

**MM BR-2: Freshwater marsh and other aquatic habitats**

The following shall be implemented to mitigate for anticipated impacts on freshwater marsh and aquatic habitats (including vernal pools) that may be affected by the Proposed Program:

**Avoid and Minimize Impacts on Freshwater Marsh and Aquatic Habitats**. Prior to Program implementation, an aquatic resource (wetland) delineation will be conducted to demarcate the boundaries of aquatic resources, including wetlands, and other regulated habitats in the Program Area. The delineation results will inform the final design such that all regulated habitats will be avoided to the extent feasible while still meeting engineering criteria for the Proposed Program.

**Reduce Indirect Wetland Impacts**. Best management practices associated with the Program's stormwater pollution prevention plan (see Subsection 2.5, Environmental Commitments) shall be implemented to reduce potential for indirect impact on freshwater wetland and aquatic habitats.

**Revegetate Upslope Areas**. Disturbed soils upslope of freshwater wetlands and aquatic habitats (e.g., levee slopes and other disturbed areas) will be revegetated to minimize the transport of eroded soils into downslope wetlands. Revegetation work will comply with protocols described in the Program's stormwater pollution prevention plan.

**Compensatory Mitigation**. Implementation of the Proposed Program could result in the temporary and permanent loss of wetland habitat (including vernal pools). The Section 404 permitting process will determine the appropriate compensatory habitat mitigation (a minimum of 1:1 replacement), as necessary. Compensatory mitigation could include, but is not limited to, the following:

- The purchase of credits at an approved mitigation bank for mitigation proposed for impacts on vernal pools at an approved mitigation bank that services the impact area. Mitigation credits may also be used to satisfy mitigation requirements for other resources, such as those associated with special-status amphibians.
- Where permanent freshwater wetland impacts cannot be avoided and mitigation banks are not considered a viable options, freshwater wetlands will be mitigated onsite with wetland enhancement and restoration and/or creation at a minimum ratio of 1:1 that will ensure no net loss of habitat functions and values. Restored and/or created wetlands would become fully functional in a period of 2 to 3 years from completed restoration/creation. For onsite mitigation to occur, the Program will create a wetland mitigation and monitoring plan prior to construction. The mitigation and monitoring plan will be prepared in accordance with the 2008 Mitigation Rule and 2015 Regional Compensatory Mitigation and Monitoring Guidelines (or current USACE and Central Valley Regional Water Quality Control Board guidelines) for compliance with Clean Water Act Sections 404 and 401 and will establish required replacement ratios, success criteria, and monitoring protocols.

# 3.5 Cultural, Paleontological, and Tribal Cultural Resources

This section describes the regulatory and environmental setting of cultural, paleontological, and tribal cultural resources in the Program Area, and evaluates potential impacts that could result from implementation of the Proposed Program. For the purposes of this section, the Study Area comprises lands within the Program Area where projects are proposed.

## 3.5.1 Regulatory Setting

This section describes the applicable guidelines and regulations for evaluating potential environmental cultural, paleontological, and tribal cultural resources impacts and mitigation.

### 3.5.1.1 Federal – National Register of Historic Places

The protection of historic properties is governed by several federal laws and regulations including the National Historic Preservation Act (NHPA) (1966). Section 106 of the NHPA states that federal agencies must take into account the effect of the undertaking on any district, site, building, structure, or object that is included in, or eligible for, inclusion in the National Register of Historic Places (NRHP).

Under Section 106 of the NHPA, there is an adverse effect when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects may also include reasonably foreseeable effects caused by the undertaking that may occur later, be further removed in distance, or are cumulative.

The preservation of historic properties became national policy first with the passage of the Antiquities Act of 1906. The Historic Sites Act of 1935 continued the goal of preserving historic properties, with the NHPA being passed in 1966. The NRHP was established as part of the NHPA.

Cultural resources include prehistoric and historic archaeological sites, districts, and objects; standing historic structures, buildings, districts, and objects; locations of important historic events; and sites of traditional or cultural importance to Native Americans, tribal cultural resources are described further below. 36 *Code of Federal Regulations* (CFR) 800 defines a historic property as any prehistoric or historic district, site, building, structure, or object listed in, or eligible for listing in, the NRHP. The criteria used to evaluate properties for the NRHP are provided in 36 CFR 60 and listed in the following bullets. A resource must meet one or more of the following criteria to be considered for eligibility:

- Be associated with events that have made a significant contribution to the broad patterns of history (Criterion A)
- Be associated with the lives of persons significant to our past (Criterion B)
- Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components might lack individual distinction (Criterion C)
- Have yielded, or have the potential to yield, information important to prehistory or history (Criterion D)

Generally, properties must be 50 years old to be eligible for the NRHP, but those that have achieved significance within the past 50 years may be eligible under Criteria Consideration G, which states that a property achieving significance within the last 50 years can be eligible if it is of exceptional importance.

In addition to meeting one or more of these criteria, a resource must retain integrity to be considered a historic property. Integrity is the authenticity of the physical identity, as evidenced by the survival of characteristics that existed during the resource's period of significance. Historic properties must retain enough of their historic character or appearance to be recognizable and to convey the reasons for their

significance. The seven aspects of integrity presented in 36 CFR 60 are location, design, setting, materials, workmanship, feeling, and association. A resource that has lost its historic character or appearance and is not eligible for the NRHP still might have sufficient integrity for the California Register of Historic Resources (CRHR) if it maintains the potential to yield significant scientific or historic information or specific data.

#### 3.5.1.2 State

**California Environmental Quality Act Guidelines**

A historical resource is a resource listed in, or determined to be eligible for listing in, the CRHR. Historical resources, as defined in Section 4020.1(k) and included as such in a local register or deemed significant pursuant to criteria set forth in Section 5024.1(g), are presumed to be historically or culturally significant for purposes of this section, unless the preponderance of the evidence demonstrates that the resource is not historically or culturally significant. The fact that a resource is not listed in or determined to be eligible for listing in the CRHR, not included in a local register, or not deemed significant pursuant to criteria set forth in Section 5024.1(g) shall not preclude a lead agency from determining whether the resource may be a historical resource.

**Section 7052 of the Health and Safety Code**

This code establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives. Penal Code Section 622.5 provides misdemeanor penalties for injuring or destroying objects of historical or archaeological interest located on public or private lands, but specifically excludes the landowner. California Public Resources Code (PRC) Section 5097.5 defines as a misdemeanor the unauthorized disturbance or removal of archaeological, historical, or paleontological resources located on public lands.

**California Assembly Bill 52**

With the introduction to California Assembly Bill 52 (AB 52), on September 27, 2016, the California Environmental Quality Act (CEQA) adopted modifications to Appendix G to address tribal cultural resources. According to AB 52, any project with an effect that may cause a substantial adverse change in the significance of tribal cultural resources, as defined below, is a project that may have a significant effect on the environment.

Tribal cultural resources are defined as follows:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either determined to be eligible for inclusion in the CRHR or are included in a local register of historical resources, as defined in Section 5020.1(k) and PRC Section 21074.
- A resource determined by the lead agency, at its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in Section 5024.1(c). These would be a cultural landscape that meets the criteria of subdivision is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape, a historical resource, a unique archaeological resource, or a “non-unique” archaeological resource, as defined in Section 21084.1 and Section 21083.2.

In addition, AB 52 provides specific guidelines regarding tribal consultation and states the lead agencies shall:

- Provide information to Tribal governments early in the project planning process, to identify and address potential adverse impacts on tribal cultural resources.

- Conduct consultation with any California Native American tribe that requests consultation and is culturally and traditionally affiliated with the geographic area of a proposed project. According to PRC Section 21080.3.1, this consultation shall occur prior to the determination of whether a negative declaration, mitigated negative declaration, or environmental impact report is required for a project.
- Recognize that Native American prehistory, history, archaeology, cultural, and sacred places are essential elements in tribal traditions, heritages, and identities.
- Establish mitigation measures for tribal cultural resources that uphold to mitigation measures for historical and archaeological resources of preservation in place, if feasible.
- Recognize that Native Americans may have expertise regarding their tribal history and practices that concern the tribal cultural resources with which they are traditionally and culturally affiliated.

**California Register of Historical Resources**

As provided in PRC Section 5020.4, the California Legislature established the CRHR in 1992. The CRHR is used as a guide by State and local agencies, private groups, and citizens to identify State historical resources and to include properties that are to be protected, to the extent prudent and feasible, from substantial adverse change. The CRHR, as instituted by the PRC, automatically includes all California properties already listed in the NRHP; it also includes those properties formally determined to be eligible for listing in the NRHP (Categories 1 and 2 in the State Inventory of Historical Resources), specific listings of the State Historical Landmarks and State Inventory of Historical Resources, and specific listings of State Historical Landmarks and State Points of Historical Interest. The CRHR may also include various other types of historical resources that meet the criteria for eligibility, including the following:

- Individual historic resources
- Resources that contribute to a historic district
- Resources identified as significant in historic resource surveys
- Resources with a significance rating of Category 3 through Category 5 in the State Inventory (Categories 3 and 4 refer to potential eligibility for the NRHP; Category 5 indicates a property with local significance)

The CRHR follows the lead of the NRHP in using a 50-year threshold. A resource is usually considered for its historical significance after it reaches the age of 50 years. This threshold is not absolute, but was selected as a reasonable period after which a professional evaluation of historical value and importance can be made.

**California Public Resources Code**

PRC Section 5097.5 protects paleontological resources, which prohibits “knowing and willful” excavation, removal, destruction, injury, and defacement of any paleontological feature on public lands (lands under state, county, city, district, or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted permission.

#### 3.5.1.3 Local – 2030 Merced County General Plan

The *2030 Merced County General Plan* recognizes the importance of cultural resources on lands over which it has jurisdiction and outlines goals, policies, and procedures for managing these resources. The *2030 Merced County General Plan’s* Recreation and Cultural Resources Element states that “archaeological, historical, architectural, paleontological, and Native American cultural resources and values must be considered in all phases of planning subsequent development project, including design, permitting, construction and long term maintenance” (Merced County, 2013: RCR-4). The goal and

associated policies included in the General Plan regarding cultural, archaeological, and historic resources that are relevant to the Proposed Program are as follows:

**Goal RCR-2**

Protect and preserve the cultural, archaeological, and historic resources of the County in order to maintain its unique character.

- **Policy RCR-2.1: Archeological Site and Artifact Protection** - Require development projects that affect archeological sites and artifacts to avoid disturbance or damage to these sites.
- **Policy RCR-2.2: Historical Area Preservation** - Support the preservation of historical structures and areas, particularly those listed on the National Registrar of Historic Places and California Registrar of Historic Places.
- **Policy RCR-2.3: Architectural Character Preservation** - Require that the original architectural character of significant State- and federally-listed historic structures be maintained in compliance with preservation standards and regulations.
- **Policy RCR-2.5: Human Remains Discovery** - Require that, in the event of the discovery of human remains on any project construction site, all work in the vicinity of the find will cease and the County Coroner and Native American Heritage Commission will be notified.
- **Policy RCR-2.9: Historical and Cultural Resources Investigation, Assessment, and Mitigation Guidelines** - Establish and adopt mandatory guidelines for use during the environmental review processes for private and public projects to identify and protect historical, cultural, archaeological, and paleontological resources, and unique geological features.

## 3.5.2 Environmental Setting

Merced County (County) is a generally rural, agricultural county with a relatively low population density of 132.2 people per square mile, well below the state average of 249 inhabitants per square mile (U.S. Census Bureau, 2017). Most of the County is designated for agricultural uses.

The Program Area is in a predominantly agricultural setting with a few residences, where existing natural habitats have been largely displaced by agricultural and associated activities, such as row crops and orchards. As depicted on historic maps, flood events have caused changes in the terrain and in the courses of streams, creeks, and other waterways. The Proposed Program is located within the San Joaquin Valley portion of the Great Valley Geomorphic Province, which is a northwest-trending valley bordered by the Sierra Nevada Mountains to the east and south, the Coast Ranges to the west, and the Klamath Mountains to the north (EDAW, 2009). This province consists of a deep, sediment-filled, asymmetric structural trough that extends over 400 miles from north to south and averages 50 to 80 miles wide. The trough has been filled with a thick sequence of predominantly alluvial sediments ranging in age from Jurassic to Recent (Sacramento Area Council of Governments, 2012). The San Joaquin Valley makes up the southern part of the Great Valley, drained ultimately by the San Joaquin River flowing toward the California Delta.

Geologic units in the Merced Groundwater Subbasin include mainly unconsolidated continental deposits, with some indurated rocks along the eastern boundary. The unconsolidated continental deposits in the Program Area include recent alluvium (Holocene age), the Modesto Formation (Pleistocene age), and Riverbank Formation (Pleistocene age). The indurated rocks include the Valley Springs (Miocene age) and Mehrten (Pliocene age) Formations (Wagner et al., 1991). The mapped geologic formation boundaries in the Program Area and surrounding vicinity are shown on Figure 3.6-1 (presented in Section 3.6, Geology and Soils).

Soils in the Program Area consist mainly of alluvial fan and terrace deposits of fine sand and silt, with a minor amount of gravel and clay. Near-surface sediments are primarily floodplain deposits from the rivers and creeks originating from heterogeneous, metamorphic, sedimentary, and volcanic rocks of the Sierra Nevada Mountains (Marchand and Allwardt, 1978).

#### 3.5.2.1 Cultural Context

In Central California, cultural resources minimally represent 12,000 years of prehistory. Archaeologists have reconstructed general trends of prehistory in the Central Valley of California, which extends to the Siskiyou Mountains in the north and as far south as the Tehachapi Mountains (Rosenthal et al., 2007). Since the first inquiry regarding Native American cultural groups, numerous classifications and chronological models have been created for California. For Central California, the classification for three cultural horizons for this region was incorporated as part of the Central California Taxonomic System. Below is a brief summary of the cultural periods for the Merced Irrigation District (MID or District) region.

**Prehistoric Background**

The earliest sites in Central California are Fluted Point Tradition and Western Pluvial Lakes Tradition sites at Tracy, Tulare, and Buena Vista Lakes. These sites are few in number and remain undated by scientific means, but the assemblage types indicate probable ages of 11,500 to 7,500 years (Moratto, 2004). For the entire Central Valley region, there exists to date only three known sites from the early Paleoindian Period (California Energy Commission, 2010). Overall, evidence for Paleoindian occupation in the Central Valley is currently limited and has many gaps. The archaeological record requires additional data to better understand this chronological sequence.

**Ethnographic Background**

The Proposed Program is in the territory associated with the ethnographic Yokuts (Kroeber, 1925; Wallace, 1978, who are unique among Native Californians in that they were divided into true tribes. Each tribe had a unique name, a distinctly different dialect, and a defined territory (Kroeber, 1925). The Yokuts' language is a member of the California Penutian stock that includes four other groups found in Central California: Miwok, Costanoan, Maiduan, and Wintuan. Yokuts were divided into three groups: Southern Valley Yokuts, Northern Valley Yokuts, and Foothill Yokuts. Specifically, the Proposed Program is situated within the traditional lands of the Northern Valley Yokuts, of whom the least is known. Once Europeans reached the area, the Northern Valley Yokuts rapidly disappeared as a result of disease, missionization, and, most significantly, the gold rush.

The Yokuts comprised some 60 or more tribal groups that lived throughout interior Central California and traded with each other and other groups west of the Coast Ranges and east of the Sierra Nevada crest. Economic subsistence was based on the acorn, with substantial dependency on gathering and processing wild seeds and other vegetable foods. The rivers, streams, and sloughs that formed a maze within the Valley provided abundant food resources such as fish, shellfish, and turtles. Large game, waterfowl, and small mammals were trapped and hunted to provide protein in the diet.

Settlements and major villages were situated near waterways that provided reliable water supplies and substantial food sources. Houses varied in size and shape (Latta, 1949; Kroeber, 1925), with most constructed from the readily available tules found in the extensive marshes of the low-lying valley areas. Housepit depressions, still extant in the protected areas of the San Joaquin Valley, range in diameter from about 10 to 60 feet. Depression depths reach 2 feet below ground surface.

**Historic Background**

Recorded history in Central California divides into three periods: the Spanish Period (1769–1821), the Mexican Period (1821–1848), and the American Period (1848–present).

### *Spanish Period*

The Spanish Period Spans 1769 to 1822, beginning with the founding of the first mission, the Mission San Diego de Alcala, in 1769. The first recorded exploration of the southern San Joaquin Valley was in 1772, by Pedro Fages, whose written record describes the Valley as "a labyrinth of lakes and tulares in the middle of a great plain" (Wedel, 1941).

Population shifts, prompted by the eastward retreat of Indians closer to the missions, forced adjustments in territorial boundaries with concomitant movement into the eastern foothills. By the early 1820s, mission expansion in California ended as a result of Mexico's independence from Spain. It was also during this time that fur trappers discovered the California interior and began their forays into the San Joaquin Valley. Jedediah Smith might have been the first to enter the Central Valley during a fur trapping expedition in 1827. Smith's adventures included friendly encounters with the Southern Yokuts near the Kings River, and trapping and camping along the San Joaquin River.

### *Mexican Period*

Spanish colonial occupation of Alta California ended with the 1821 Mexican takeover. Between 1833 and 1845, the Mexican government began awarding large land grants in the Sacramento-San Joaquin Valley region. By the mid-1840s, several large land grants were made, encompassing most all of the lands bordering the San Joaquin River from Stockton to Fresno (Beck and Haase, 1974).

A review of Mexican land grant information resulted in four documented grants within present-day Merced County. Ranchos Orestimba y Las Garzas, Panoche de San Juan y Los Carrisolitos, San Luis Gonzaga, and Sanjon de Santa Rita were land grants given within the Mexican Period in the region (Outcalt, 1925). *Review of the Grants of Land in California Made by Spanish or Mexican Authorities* (State Lands Commission, 1982) did not reveal any land grants within the Program Area. Increasingly bad relations between the United States and Mexico led to the Mexican-American War of 1847, which resulted in Mexico releasing California to the United States under the 1848 Treaty of Guadalupe Hidalgo.

### *American Period*

John Marshall's gold discovery in January 1848 triggered the migration boom of thousands of eastern United States and European settlers coming to California. During the 1850s, people began settling in the Central Valley after realizing that they could make a better living supplying mining camps with meat, horses, and other products, rather than by mining. The Spanish Anza Expedition of 1775 gave the name to Lake Merced under the Spanish moniker *Nuestra Señora de la Merced*.

The San Joaquin Valley developed into a significant farming and ranching region, and by 1850, it was a major agricultural producer within the new state of California. The Homestead Act was passed by Congress in 1862, and it involved the transfer of 160 acres of open public land to any American that filed for a land patent and satisfied the act's requirements. These requirements consisted of the applicant being head of household, over 21 years old, making land improvements, occupying the property for 5 consecutive years, and paying $1.25 per acre. This act further encouraged western expansion and settlement in the valley.

In 1855, Merced County was formed, and it kept its Spanish name. As controlled irrigation developed in the Central Valley, the former land grants were broken up into many small farms. Agriculture became increasingly efficient with the advent of improved farm equipment. By 1872, railroads provided access to distant markets. Intensive agriculture depended on flood control and irrigation; impounding Sierra Nevada snowpack-melt water behind dams was critical in this regard (Hohenthal, 1972). The move toward organized irrigation systems began in 1871.

Initially, crops grown in the region included potatoes, beans, and onions. Later, farmers diversified and began growing wheat, oats, barley, and fruit trees. By the 1910s, the San Joaquin Valley was producing approximately two-thirds of California's potato, asparagus, bean, onion, and celery crops (Hulaniski,

1917). In the valley, dairy farming became a major industry, and it experienced a boom as California had a high demand for its products. Agriculture and dairy farming remains an important industry in Central California.

***Merced County***

In 1855, Merced County was formed and kept its Spanish name (Gudde, 1969). The first substantial explorations of the San Joaquin Valley and Program Area were led by Gabriel Moraga in 1806. Additional explorations by Moraga occurred in 1808 and 1810, which failed to procure a suitable mission site (Cook, 1960). The mining boom of the 1850s drove prospectors through the area as a travel corridor to the Sierra Nevada Mountains (Arrington, 2009). Although some settlers remained in the region, with small communities springing up alongside waterways, constant floods punctuated with droughts prevented sustained continued occupation. Because of flood damage and destruction, the Program Area does not appear to have maintained long periods of agricultural or farm use.

***City of Merced***

The City of Merced was founded in 1872 as a result of the Gold Rush boom and agribusiness, and continued to grow because of its proximity to the Central Pacific Railroad. Merced replaced Snelling as the County seat, and a courthouse was built in 1875 (Outcalt, 1925).

Early land uses in the region had been entirely farming and ranching, specifically in corn and other grains, and hog raising. Irrigation works developed slowly in the valley, and the first to be introduced were in Tulare County in the mid-1850s. The predominant farming in Merced continued to be dry grain farming well into the 1870s, because landowners did not invest time or money in water conveyances (Herbert, 2002). In 1873, William G. Collier, a civil engineer and surveyor, constructed canals on Bear Creek and applied for water rights (Herbert, 2002). On May 30, 1873, the Farmers Canal Company was founded.

***Merced Irrigation District***

Hot, dry summers and over-cultivated lands made wheat-growing decreasingly prosperous as the nineteenth century drew to a close. In 1887, the Wright Bill proposed creating irrigation districts in California and was signed into law by Governor Washington Bartlett. MID began with the Robla Canal Company, which was acquired by the Famers Canal Company in 1873, and later was purchased by banker and railroad magnets C.H. Huffman and Charles F. Crocker, who founded the Merced Canal and Irrigation Company in 1888 (MID, 2017). Losses in profitability led to the eventual sale of this system. With the Merced County Farm Bureau taking point, the campaign to form an irrigation district began, and MID was founded in 1919 (MID, 2017). MID purchased the water conveyance system and water rights of the Merced Canal and Irrigation Company soon thereafter.

Irrigation allowed the planting of orchards, vineyards, and row crops. These were better suited to farmers able to devote a few acres and put considerable effort into them rather than putting effort into large grain fields that were planted and harvested by transient workers. Small farms meant more people, more towns, and more trade. This vision of irrigation propelled the local movement for the Wright Act and became a part of the national reclamation movement for a federal irrigation program.

The MID system began a revolution in the region's agricultural economy. The irrigation system formed the basis for new industries and caused a reduction in landholding sizes. Large ranches from the late 1800s were divided into small parcels for dairies, orchards, and row crops. New settlers in the area first planted alfalfa, raised a few dairy cows, and sold cream to the nearest creamery. Others raised poultry and pigs.

The District quickly expanded past Huffman and Crocker's holdings, and by 1921, planning was underway on the original Exchequer Dam (eventually replaced by 1967 with the current New Exchequer Dam). The original dam was completed in 1926, and President Calvin Coolidge celebrated the event by

presenting MID with a pressed ceremonial key. Following World War II, the District rapidly expanded its water and power holdings, leading to an increased network of canals and ditches, and new and renovated dams and lakes including the McSwain Dam, Lake McClure, and Yosemite Lake (McSwain, 1978).

A report, *Section 106 Cultural Resources Assessment for the Garibaldi Lateral and McCoy Lateral Project, Merced Irrigation District, County of Merced, California* (Dice, 2011), concluded that the "MID is a historic property eligible for inclusion on the NRHP" under Criteria A and D. The period of significance in regards to cultural resources and NRHP eligibility is 1919 through 1939; however, formal nomination has not been completed (Dice, 2010).

#### 3.5.2.2 Known Cultural Resources

**Literature Search**

A cultural resources records search was conducted by the Central California Information Center (CCIC) of the California Historical Resource Information System (CHRIS). The CCIC houses all records of known cultural resources in Merced, Alpine, Stanislaus, San Joaquin, Calaveras, and Tuolumne Counties, as well as records of National Historical Landmarks, California Historical Landmarks, General Land Office plats, the NRHP, CRHR, and other historical archives and information. The area of the records search covered all or parts of 19 U.S. Geological Survey (USGS) 7.5-foot topographic quadrangles: Arena, Atwater, Bliss Ranch, Cressey, El Nido, Gustine, Le Grand, Merced Falls, Planada, Sandy Mush, Santa Rita Bridge, Snelling, Stevinson, Turlock, Turlock Lake, Turner, Ranch, Winton, and Yosemite.

A total of six previously recorded historic-period resources are within the Program Area; site records were provided for all recorded cultural resources. Table 3.5-1 summarizes the resources located within the Program Area and NRHP/CRHR eligibility recommendations by previous cultural resources investigators.

Table 3.5-1. Cultural Sites within the Program Area
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Site Number | Site Type | Site Description | Evaluation CRHR/ NRHP Year |
|---|---|---|---|
| P-24-000697 | Historic | Yamato Colony | Eligible/1980 |
| P-24-001882 | Historic | The Merced Lateral | Not eligible/2000 |
| P-24-001883 | Historic | Robinson Lateral | Not eligible/2000 |
| P-24-001887 | Historic | Le Grand Canal | Not eligible/2000 |
| P-24-001895 | Historic | Lake Yosemite Regional Park | Eligible/2009 |
| P-24-001909 | Historic | Merced Irrigation District | Proposed eligible/2010 |

Source: CHRIS CCIC, 2017.

Fourteen previous cultural resources investigations have been conducted covering approximately 10 percent of the Program Area. Of these studies, only three have been conducted within the last 10 years, making the other investigations no longer sound and warranting new study. This review has resulted in a finding that most of the Program Area has not yet been subjected to intensive, systematic cultural resources surveys. Therefore, many additional unidentified cultural resources, including prehistoric and historic archaeological sites, historic buildings and structures, and other cultural properties and historical districts, are undoubtedly present. Other known cultural resources might not have been incorporated into the CCIC database.

The CCIC also noted that many canals, laterals, and other historic features shown on the CCIC site record maps have not yet been recorded or evaluated.

**Historic Map Review**

General Land Office survey plat for 1854 of the Program Area was provided by CCIC. The plat depicts land surveys resulting in USGS sections; however, little to no land development had yet to be established (GLO, 1854). The significance of General Land Office plats to modern cultural resources management in California is that the plats, which often date to the earliest years of the Gold Rush, record many historical sites and features that were existent in those times; and they often identify the owner of such sites and features. These sites and features might still be discernible by a professional archaeologist, which potentially enables archaeologists and historians to correlate archaeological features and structures to specific people, dates, and events in history.

Based on this review, it was surmised that prior to extensive development of the irrigation system, the general area was an inundated wetland; and maps indicate the presence and ubiquity of unnamed creeks throughout the Program Area and its vicinity (GLO, 1854; USGS, 1914; USGS, 1918). The 1914 historic Merced and 1918 historic Planada USGS maps are the first to show land use in the form of private property, roads (historic Merced and Snelling Roads), Merced Hospital, utilities, railroads, schools, Bellevue Ranch, canals, pipelines, and other elements of the Merced and Planada communities.

**Reconnaissance Survey**

A reconnaissance survey was conducted on June 13 and 14, 2018, that consisted primarily of a built environment “windshield” field review. This reconnaissance visit was conducted to characterize the range and distribution of MID-related built environment resources within the Program Area constructed more than 45 years ago, as well as the general setting of the resources and environs. A technical memorandum describing the survey and literature search is provided in Appendix E.

The primary land use was observed to be agricultural in nature within the southeastern, southwestern, and northwestern quadrants of the Program Area; the northeastern quadrant appeared to be dominated by ranching and secondarily by recreation. The northeastern quadrant, near the community of Snelling, contained visible abandoned mining activities as well as railroad features, also no longer in use. Evidence of homesteading and older ranching activities were observed in the immediate vicinity of the Program Area.

In addition, numerous historic-era irrigation and power-related resources were identified within the Proposed Program area that are associated with MID. These resources included a variety of irrigation property types constructed throughout the early to mid-twentieth century. Ultimately, they can be categorized as major and minor features, as listed below.

**Major Features**

- Concrete-lined and unlined canals, laterals, drains, and ditches (e.g., El Nido, Edendale, Northside, and Main Canals; Henderson and Bradley Laterals; Six Mile Drain)
- Dams and powerhouses (e.g., McSwain, Crocker-Huffman, and New Exchequer Dams)
- Lakes and control towers (e.g., Yosemite Lake, Lake McClure)
- Water tunnels (e.g., Main Canal Tunnel No. 1)
- Flumes (e.g., Northside Canal Flume)
- Pipelines

**Minor Features**

- Flow control devices
- Pumping structures
- Gates
- Weirs
- Headboxes and intake structures

Although much of the Program Area is within agricultural, residential, and other use areas, areas remain that have not been subject to development or disturbance. All of Merced County contains a large network of artificial and natural waterways marking the region rich for natural resources, of specific importance to prehistoric land use for Native Americans.

**Native American Consultation**

The Native American Heritage Commission (NAHC) was contacted on June 28, 2017, to request a Sacred Land File Search identifying information about traditional cultural properties, such as cemeteries and sacred places, as applicable, in the Program Area. A request for Native American Tribal contacts was also included on this form. The NAHC responded on July 27, 2017, with a list of Native Americans interested in consulting on development projects. Each individual and group was contacted on August 7, 2017, with follow-up calls on September 27, 2017, in compliance with AB 52 (PRC Section 21080.3.1). To date, no comments have been received; the closing date for requesting participation to consult was September 15, 2017.

Upon review for inclusion in a study, it was discovered Sacred Land File Search results were not clearly included in the NAHC response on July 27, 2017. The NAHC was again contacted to ask for clarification on April 9, 2018. The NAHC furnished the Sacred Land File Search results on April 18, 2018, with the statement that sacred sites were identified in the township of Gustine, adjacent to the Program Area in the west, and provided an additional party to contact for project consultation. Chairman Neil Payron, of the Tule River Indian Tribe, was sent a project letter on May 8, 2018. No comments have been received to date. The closing date for requesting participation to consult was July 13, 2018.

#### 3.5.2.3 Paleontological Context

As identified above, the Program Area is located on the southeastern side of the Great (Central) Valley Physiographic Province. The Great Valley is a relatively flat alluvial plain approximately 400 miles long and 50 miles wide that trends northwest to southeast (Fenneman, 1931). It is a structural trough that evolved from the late Jurassic Period to the Paleocene (150 to 40 million years ago [mya]) from amalgamated terrains that can be grouped into the Great Valley Complex. The basin filled with thousands of feet of marine sediment up to the early Miocene Period (approximately 20 mya) when a change in the motion between the Pacific and North American plates resulted in the gradual uplift of the Coast Ranges and the eventual isolation of the basin from the ocean. Subsequently, sediments were derived from the neighboring Coast Ranges and the Sierra Nevada Mountains. By the late Pliocene (2 to 3 mya), subaerial depositional conditions prevailed, and Sierra Nevada-derived sediments were deposited in the basin east of the valley axis. The size and elevation of the Sierra Nevada Mountains relative to the Coast Ranges dictate that the alluvial fans from the Sierra are vastly larger than those from the Coast Ranges; therefore, they dominate the geology of the Great Valley.

The surficial geologic units within the Program Area were evaluated for paleontological sensitivity; these geological units are discussed below.

**Holocene Alluvium (Hal)** – Sediment considered to be recent in geological terms, generally less than 10,000 years old. Holocene alluvium consists of sand, silt, and gravel associated with floodplains and low terraces. The University of California, Museum of Paleontology has only two records of fossils found in sediment labeled recent or Holocene sediment in Merced County (UCMP, 2018). The location of one is

not specified in the record; the other fossil site is near Snelling, approximately 10 miles north of the Proposed Program. Because there are few fossil records on recent or Holocene sediment in Merced County, Holocene alluvium in the Program Area is considered to have low paleontological sensitivity at shallow depths.

**Modesto Formation (Qm) –** This Pleistocene Epoch Formation is divided into three subunits in the Program Area:

1. Lower Member: alluvial sand, silt, and gravel of channels, terraces, and upper fans
2. Upper Member Coarse Alluvium: coarse alluvium, alluvial sand, silt, and gravel
3. Upper Member Fine Alluvium: fine alluvium, alluvial sand, silt, clay of interdistributary areas, lower fans, and floodbasins

No records of fossils in Modesto Formation sediment were found in Merced County. However, vertebrate fossils from the Rancholabrean land mammal age that include camelops (camel), bison, megalonyx (ground sloth), and mammuthus (mammoth) were found in Modesto Formation sediment approximately 30 miles northwest of the Proposed Program site, at the Walnut Energy Center in the city of Turlock and at two other unidentified locations in neighboring Stanislaus and Fresno Counties (UCMP, 2018; PaleoBiology Database, 2018). Although fossils have been found within at least 30 miles of the Program Area in Modesto Formation sediment, the Modesto Formation is considered to be of low paleontological sensitivity in the Program Area at shallow depths. The Modesto Formation is widespread in the Central Valley. Fossils in the Modesto Formation tend to occur more frequently close to major rivers and higher order streams, which tend to occur farther west in the Central Valley than at the Program site.

**Riverbank Formation (Qr) –** This Pleistocene Epoch Formation is divided into two subunits in the Program Area:

1. Upper Unit, alluvium (r3): alluvial sand, silt, and gravel
2. Upper Unit, lag gravel deposits (Rg): gravel derived from regrading of older gravels

A single fossil site is recorded in Riverbank Formation sediment in Merced County; two sites are recorded in neighboring Fresno County (UCMP, 2018; PaleoBiology Database, 2018). Most Riverbank Formation fossils have been found in the Sacramento area where there are five fossil sites around the city of Sacramento. Few significant fossil finds have been found in the Riverbank Formation near the Program Area; however, this may be related to a lack of research in this region more than to a paucity of fossils in the formation. Given the variability of the Riverbank Formation, it is considered unknown paleontological sensitivity. Ancient alluvial fan deposits are considered to be of low paleontological sensitivity, and deposits of ancient rivers are considered to be of high paleontological sensitivity.

**Turlock Lake Formation (Qtl) –** This is a Pleistocene Epoch Formation. The subunit of this formation in the Program Area consists of arkosic alluvium and granitic sand, with minor amounts of gravel. A major paleontological find occurred in this formation at Fairmead Landfill in the city of Chowchilla, approximately 20 miles southwest of the Program site (Dundas et al., 1996). The Fairmead Landfill yielded more than 200 fossils from the Irvingtonian Period, which is a period that is not well represented in the fossil record. A museum was built adjacent to house the fossils. This formation is considered to have high paleontological sensitivity in the Program Area.

**North Merced Gravel (QTnm) –** This is a Pliocene/Pleistocene Epoch Formation. The subunit of this formation in the Program Area consists of lag gravel deposits, which are a thin, locally derived pediment veneer of cobble gravel. No records were found of any fossils having been found in North Merced Gravel in the Program Area. This formation is considered to be of low paleontological sensitivity.

**Laguna Formation (Tl) –** This is a Pliocene Formation composed of granitic alluvial sands, gravel, silts, and clays deposited between those of the Mehrten Formation and the North Merced Gravels

(Clinkenbeard, 1999; Marchand and Allwardt, 1981). No records were found of any fossils having been found within this formation (UCMP, 2018; PaleoBiology Database, 2018), with the exception of evidence of rodent burrows throughout portions of the formation (Marchand and Allwardt, 1981). This formation is considered to be of low paleontological sensitivity.

**Mehrten Formation (Tm) –** This Late Miocene and early Pliocene Period Formation consists of andesitic fluvial sand and silt with minor amounts of gravel. These deposits are presumably reworked volcanic mudflow deposits that are moderately indurated. Vertebrate fossils of Hemphillian land mammal age were found in the Mehrten Formation on Black Rascal Creek. A new species of ground sloth, *Megalonyx mathisi*, was discovered on Black Rascal Creek (Hirschfeld and Webb, 1968). Other fossils found in 1967 in the Program vicinity along Black Rascal Creek include *Pliohippus coalingensis* (horse), *Camelidae* (camel), and *Sciuridae* (squirrel), although the exact locations are unknown (UCMP, 2016). More than 100 Hemphillian fossil specimens have been recovered from various locations in neighboring Stanislaus and Tuolumne Counties. The Mehrten Formation is considered to be of high paleontological sensitivity.

**Valley Springs Formation (Tvs) –** This is a Miocene to Pliocene Formation, consisting of andesitic conglomerates, sandstone, siltstone, and claystones (Clinkenbeard, 1999). This formation appears to have been deposited predominantly in paleotopographic lows within the underlying Ione Formation (Bartow, 1992). It likely represents ephemeral stream and lake deposits within an alluvial plain (Bartow, 1992). No records were found of any fossils having been found within this formation (UCMP, 2018; PaleoBiology Database, 2018); therefore, this unit has a low paleontological sensitivity.

**Ione Formation (Ti) –** The Ione Formation is the oldest member of the nonmarine Tertiary clastic deposits flanking the Sierra Nevada in the Great Valley, and is composed of primarily light-brown, tan, and gray to pinkish or yellowish quartz sandstones with interbedded clay (Marchand and Allwardt, 1981). Generally the formation is light in color, either white or near-white (Creely and Force, 2007). There is evidence that this formation underwent deep chemical decay as it was deposited; this is speculated as the cause for a paucity of fossils in this formation (Creely and Force, 2007). Marine fossils can rarely be found in the coarse upper portions of the sandstone (Marchand and Allwardt, 1981) and are exclusively marine invertebrates or trace fossils (Creely and Force, 2007). This unit, therefore, has a moderate to (locally) high paleontological potential.

**Igneous and Metamorphic Basement Rocks (Jm) –** Igneous and metamorphic rocks, such as form the bedrock of the Program Area, generally do not preserve fossils and, therefore, are of low paleontological sensitivity. However, small-scale caves may preserve much more recent (Holocene to Late Pleistocene) Neotoma middens, which are considered to be of high paleontological sensitivity because of the wealth of information these middens can provide about ancient paleoclimate.

## 3.5.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to cultural, paleontological, and tribal cultural resources. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

### 3.5.3.1 Thresholds of Significance

The thresholds that were used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and listed below. Impacts on cultural, paleontological, or tribal cultural resources are considered significant if the Proposed Program would result in any of the following:

- Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.

- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
- Disturb any human remains, including those interred outside of formal cemeteries.
- Listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k).
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in PRC Section 5024.1(c). In applying the criteria set forth in PRC Section 5024.1(c), the lead agency shall consider the significance of the resource to a California Native American Tribe.

Preparation of this PEIR began prior to issuance of the 2019 CEQA Guidelines, Appendix G, which has now reassigned the topic of paleontological resources under the geology and soils section. For the purposes of this PEIR, paleontological resources remain a topic of this section and is analyzed below.

#### 3.5.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to existing conditions and the No Program Alternative for each resource area as applicable. The No Program Alternative is considered functionally the same as the Existing Conditions related to cultural resources given no substantial changes to the cultural, paleontological, or tribal cultural resources that exist within the Program Area are anticipated in the future. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes a Capital Improvement Plan with projects that have been grouped into Capital Improvement Plan components based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3. To avoid repetitive text, where an impact analysis applies to more than one project category, the analysis is presented as a single discussion with the relevant components specified.

Cultural resources include prehistoric and historic archaeological sites; districts and objects; standing historic structures, buildings, districts, and objects; locations of important historic events; sites of traditional and cultural importance to various groups; and, sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe. The Program Area has not been subject to a cultural resources inventory. As described above, a preliminary cultural resources assessment included a literature search with data obtained from the CCIC of the CHRIS at California State University, Stanislaus and a Sacred Land File Search with the NAHC.

It is recognized that additional study could be required for proposed improvements included as part of the Proposed Program. During the planning and design phase for infrastructure improvements and prior to ground-disturbing activities within previously undisturbed areas, MID would have a qualified archaeologist and architectural historian conduct a cultural resources inventory of the project locations of a particular facility or group of facilities (if adequate cultural resource inventories have not occurred within the past 5 years) and make evaluations for cultural resources as determined necessary. The archaeological and architectural resources surveys would include intensive pedestrian surveys to assess potential impacts to cultural resources as determined necessary.

To assess paleontological resources, the entire Program Area was assessed without regard to where specific projects are proposed. This is substantively in agreement with standard paleontological procedures, which require a Program Area to include the project area plus a buffer of 1 mile around the project area. To determine the sensitivity of the Program Area for paleontological resources, various maps were consulted, including geological maps (Marchand and Allwardt, 1978), 7.5-minute USGS topographic maps, and Google Earth imagery. In addition, scientific literature was reviewed, and online

databases were queried to identify previous paleontological finds in the project vicinity (Marchand and Allwardt, 1981; UCMP, 2016; Jefferson, 1991; PaleoBiology Database, 2016).

According to the Society of Vertebrate Paleontology, significant paleontological resources are those that are identifiable vertebrate fossils (large or small); uncommon invertebrate, plant, and trace fossils; or provide new taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, or biochronologic information (SVP, 2010). Table 3.5-2 provides SVP's recommendations for paleontological resources by sensitivity category.

Table 3.5-2. Society of Vertebrate Paleontology's Recommendations for Paleontological Resources by Sensitivity Category
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Category | Description | Recommendations |
|---|---|---|
| High Potential (High Sensitivity) | Areas underlain by geologic units from which vertebrate or significant invertebrate fossils or plant fossils have been recovered. | • Preliminary survey and surface salvage (if applicable) before construction begins.<br>• Monitoring and salvage during construction.<br>• Specimen preparation; identification, cataloging, curation, and storage of materials recovered.<br>• Preparation of final report describing finds and discussing their significance.<br>• All work should be supervised by a professional paleontologist who maintains the necessary collecting permits and repository agreements. |
| Undetermined Potential (Undetermined Sensitivity) | Areas underlain by geologic units for which little information is available. | • Preliminary field surveys by a qualified vertebrate paleontologist to assess a project area's sensitivity.<br>• Design and implementation of mitigation if needed, based on results of field survey. |
| Low Potential (Low Sensitivity) | Areas underlain by geologic units that are not known to have produced a substantial body of significant paleontological material. | • Protection and salvage are generally not required. However, a qualified paleontologist should be contacted if fossils are discovered during construction to salvage finds and assess the need for further mitigation. |

Source: SVP, 2010.

### 3.5.3.3 Impacts Associated with the Proposed Program

**Impacts CUL-1, CUL-2, and CUL-4: Substantial adverse change in the significance of a historical resource, archaeological resource, tribal cultural resources, or disturb human remains.**

The individual project sites associated with capital improvements proposed as part of the Proposed Program have not been subject to formal cultural pedestrian surveys. Review of the literature search results provided by the CCIC indicate that less than 10 percent of the Program Area has been subject to previous cultural resources investigations; only three of these studies have been conducted within the last 10 years, making the remaining studies no longer sound and warranting resurvey. Review of the archival materials and historic maps indicates a high potential for historic-period archaeological resources. Reviews of the records search results, previous work in the Program Area and vicinity, and a historical map check indicate that cultural resources within the Program Area that are likely to be encountered are mining, railroad, historic structures and buildings related to farming, irrigation, agriculture, and residential activities. Geological review indicates there is a moderate to high sensitivity for buried archaeological resources. The Sacred Land File Search completed by NAHC identified sacred sites in the township of Gustine, adjacent to the Program Area in the west, which indicates there is moderate to high potential to encounter tribal cultural resources. ***Therefore, construction of the proposed capital improvements is anticipated to potentially affect significant historic-period archaeological resources, tribal cultural resources, and/or human remains; and thus, construction***

***impacts on historical, archaeological, and tribal cultural resources, as well as human remains, could be significant.***

Operations of the Proposed Program would not involve earthmoving activities, facility removals and upgrades, and other demolition. Regular maintenance activities would be completed as part of the operation of the Proposed Program and may include activities such as vegetation clearance or facility repairs. Such activities are expected to be limited to previously disturbed areas; therefore, operation of the Proposed Program is not expected to affect significant historic-period archaeological resources, tribal cultural resources, and/or human remains. ***Operations and maintenance impacts on historical, archaeological, and tribal cultural resources, as well as human remains, would be less than significant.***

**Impact CUL-3: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.**

Construction of Options 1, 2, and 3 of the Main Canal Improvements at Tunnel No. 1 Project and the proposed regulating reservoirs, canal rebuilding/relining, table topping dead-end facilities, canal automation, siphon modification, and intertie projects would involve excavation. Option 4 of the Main Canal Improvements at Tunnel No. 1 Project would be limited to excavation inside the tunnel if the tunnel capacity is increased. Options 1, 2, and 3 may exhibit excavations up to 70 feet deep and 50 feet wide at the bottom. Projects including pipelines and large structures may see excavations up to 20 feet deep and widths ranging from 10 to 40 feet depending on the type of structure. Projects involving open-channel facilities excavations may have excavations ranging from 3 to 8 feet deep and be 40 feet in width. According to Marchand and Allwardt (1978), Holocene Alluvium (Hal), Modesto Formation (m1 and m2), and Riverbank Formation (r3) sediment occurs within the Program Area. As previously discussed, none of these formations are considered to be sensitive in the vicinity of the Proposed Program at shallow depths. The maximum excavation depth of 20 feet for all projects except the Main Canal Improvements at Tunnel No. 1 Project is generally considered to be shallow with respect to paleontological resources. However, multiple formations within the Program Area have high, moderate, or unknown paleontological sensitivity. ***Because project-related excavations may affect these potentially sensitive formations, impacts on paleontological resources could be significant.***

***Operations of the Proposed Program would not involve earthmoving activities at depths that could affect paleontological resources; therefore, there would be no impact.***

## 3.5.4 Mitigation Measures

The following mitigation measures (MMs) would be implemented to lessen potential impacts on cultural or paleontological resources and human remains (Impacts CUL-1, -2, -3, and -4) discovered during construction to a less than significant level.

**MM CUL-1: Conduct cultural resources inventory.**

The Proposed Program could cause an adverse effect on cultural resources as defined in CEQA Guidelines Section 15064.5. During the planning and design phase for capital improvements and prior to ground-disturbing activities, MID will appoint a qualified Cultural Resources Specialist (CRS) to conduct an inventory of the project locations of a particular facility or group of facilities and make evaluations for cultural resources. The archaeological and architectural resources surveys will consist of intensive pedestrian surveys to assess impacts on cultural resources as necessary. The surveys will be completed in areas where ground disturbance will occur within previously undisturbed areas or in areas that have not been adequately surveyed within the past 5 years. The CRS will meet the U.S. Secretary of the Interior's Professional Qualifications Standards, as published in 36 CFR 61.

Potential impacts will be assessed prior to any project construction taking place, in accordance with CEQA regulations.

**MM CUL-2: Monitoring Plan.**

A qualified CRS will complete a construction monitoring program to be implemented according to recommendations. Monitoring and mitigation comprise a number of required activities that may prescribe measures to ensure avoidance of resources, or compensate for the loss of significant cultural resources due to unavoidable impacts resulting from the exigencies of a project's construction. The objectives of monitoring are to protect extant historical resources and unique archaeological resources, to identify at the time of discovery any archaeological materials exposed during ground disturbance, and to protect such resources from damage until recommendations of eligibility for the CRHR can be made.

**MM CUL-3: Conduct cultural resources awareness training.**

A qualified CRS will prepare the cultural resources portion of the Worker Environmental Awareness Program; worker environmental awareness training will be required for all personnel before working at proposed construction sites. The training will emphasize and educate workers regarding sensitivity for cultural resources on the site and procedures should cultural resources be encountered.

**MM CUL-4: Protect resources upon discovery.**

If cultural resources are discovered during ground-disturbing activities, construction and maintenance work near the discovery would cease, and the area would be protected by a 50-foot buffer until the find could be evaluated by a qualified archaeologist. Mitigation measures recommended by the archaeologist will be implemented; cultural resource mitigation measures will be consistent with guidance and standards in Section 15126.4 of the CEQA Guidelines.

**MM CUL-5: Protect human remains upon discovery.**

If human remains are discovered, the discovery would be treated in accordance with the requirements of Section 750.5(b) of the California Health and Safety Code. Pursuant to Section 7050.5(c) of the California Health and Safety Code, if the coroner determines that the human remains are of Native American origin, Merced County would ensure that the discovery is treated in accordance with the provisions of PRC Section 5097.98(a)–(d).

**MM CUL-6: Conduct paleontological resources awareness training.**

Prior to working at the site, all personnel involved in earthmoving activities will receive Paleontological Resources Awareness Training. Workers will be informed that fossils of scientific importance may be encountered during deeper excavations and must be reported immediately if encountered. The training will provide information about the appearance of fossils, their scientific importance, and proper notification procedures. This training will also give specific information on potentially high-sensitivity sediments within the formations that may be encountered.

**MM CUL-7: Paleontological Resources Monitoring and Mitigation Plan.**

Prior to construction, a Paleontological Resources Monitoring and Mitigation Plan will be drafted as necessary. This plan will identify the need for monitoring of construction-related excavations in areas underlain by geologic units of moderate, high, or unknown paleontological sensitivity. This report will also identify a Paleontological Resources Specialist to lead the monitoring and mitigation activities, and Paleontological Resources Monitors as necessary to conduct the monitoring and mitigation.

# 3.6 Geology and Soils

This section describes the regulatory and environmental setting related to topography, geology, seismicity, and other geologic hazards, soils, and geomorphology, and evaluates potential impacts on geologic resources and soils associated with implementation of the Proposed Program. For the purposes of this section, the Study Area is the Program Area.

## 3.6.1 Regulatory Setting

This section identifies and describes guidelines and regulations relevant to the evaluation of potential geology and soils impacts. There are no specific federal regulations applicable to the Proposed Program with respect to geology and soils associated with construction or operation activities in the Program Area.

### 3.6.1.1 State

**Alquist-Priolo Earthquake Fault Zoning Act**

The Alquist-Priolo Earthquake Fault Zoning Act became law in 1972. The law prohibits structures for human occupancy from being located across the trace of an active fault and requires the State geologist to delineate earthquake fault zones along faults that are “sufficiently active” and “well defined.” Development permits cannot be issued for sites located in an earthquake fault zone until geologic investigations demonstrate that the site is not at risk for surface displacement from future faulting.

**Seismic Hazard Mapping Act**

Seismic hazards occur as a result of effects of strong ground shaking, liquefaction, landslides, ground failure, or other earthquake-related hazards. Under the Seismic Hazard Mapping Act, these hazards are to be identified and mapped to assist local governments in land use planning. Seismic hazard zones in the eastern portion of Merced County (County) have not yet been mapped by the California Geologic Survey, but general ground motions in the Program Area are expected to be small because of the distance from active faults (DOC, 2007).

### 3.6.1.2 Local

The *2030 Merced County General Plan* (Merced County, 2013) identifies one goal and associated policies under the health and safety goals listed in the General Plan pertaining to geologic and seismic hazards:

- **Goal HS-1:** Minimize the loss of life, injury, and property damage of County residents due to seismic and geologic hazards.

The following identified policies support this goal:

- **Policy HS-1.3: Dam Inundation Areas** – Require all new structures located within dam inundation areas to conform to standards of dam safety as required by the State Division of Safety of Dams.
- **Policy HS-1.4: Ensure Earthquake Resistant Design** – Require earthquake-resistant design for proposed critical structures such as hospitals, fire stations, emergency communication centers, private schools, high-occupancy buildings, bridges and freeway overpasses, and dams that are subject to County permitting requirements.
- **Policy HS-1.9: Unstable Soils** – Require and enforce all standards contained in the International Building Code related to construction on unstable soils.

## 3.6.2 Environmental Setting

### 3.6.2.1 Topography

The Program Area is located on the southwestward-sloping San Joaquin Valley floor adjacent to the foothills of the Sierra Nevada Mountains. The ground surface ranges in elevation from approximately 100 feet above mean sea level at the western extent up to approximately 280 feet above mean sea level at the eastern extent. The region consists of agriculturally productive land on the valley floor, bounded by the gentle, rolling hills of the Sierra Nevada foothills to the east. The region and the Merced River drain toward the southwest to the San Joaquin River.

### 3.6.2.2 Geology

Merced Irrigation District (MID or District) and Merced County are located in the Great Valley Geomorphic Province, a large northwest-trending valley encompassing California's Central Valley bordered by the Sierra Nevada Mountains to the east and south, the Coast Ranges to the west, and the Klamath Mountains to the north. The province consists of a deep sediment-filled, asymmetric structural trough that extends more than 400 miles from north to south and averages 50 to 80 miles wide. The trough has been filled with a thick sequence of predominantly alluvial sediments ranging in age from Jurassic to Recent (Bailey, 1966). The San Joaquin Valley makes up the southern part of the Great Valley, drained ultimately by the San Joaquin River flowing toward the California Delta.

Geologic units in the Merced Groundwater Subbasin include mainly unconsolidated continental deposits, with some indurated rocks along the eastern boundary. The unconsolidated continental deposits in the Program Area include recent alluvium (Holocene age), the Modesto Formation (Pleistocene age), and Riverbank Formation (Pleistocene age). The indurated rocks include the Valley Springs (Miocene age) and Mehrten (Pliocene age) Formations (Wagner et al., 1991). The mapped geologic formation boundaries in the Program Area and surrounding vicinity are shown on Figure 3.6-1.

Soil in the Program Area consists mainly of alluvial fan and terrace deposits of fine sand and silt, with a minor amount of gravel and clay. Near-surface sediments are primarily floodplain deposits from the rivers and creeks originating from heterogeneous, metamorphic, sedimentary, and volcanic rocks of the Sierra Nevada Mountains (Marchand and Allwardt, 1978).

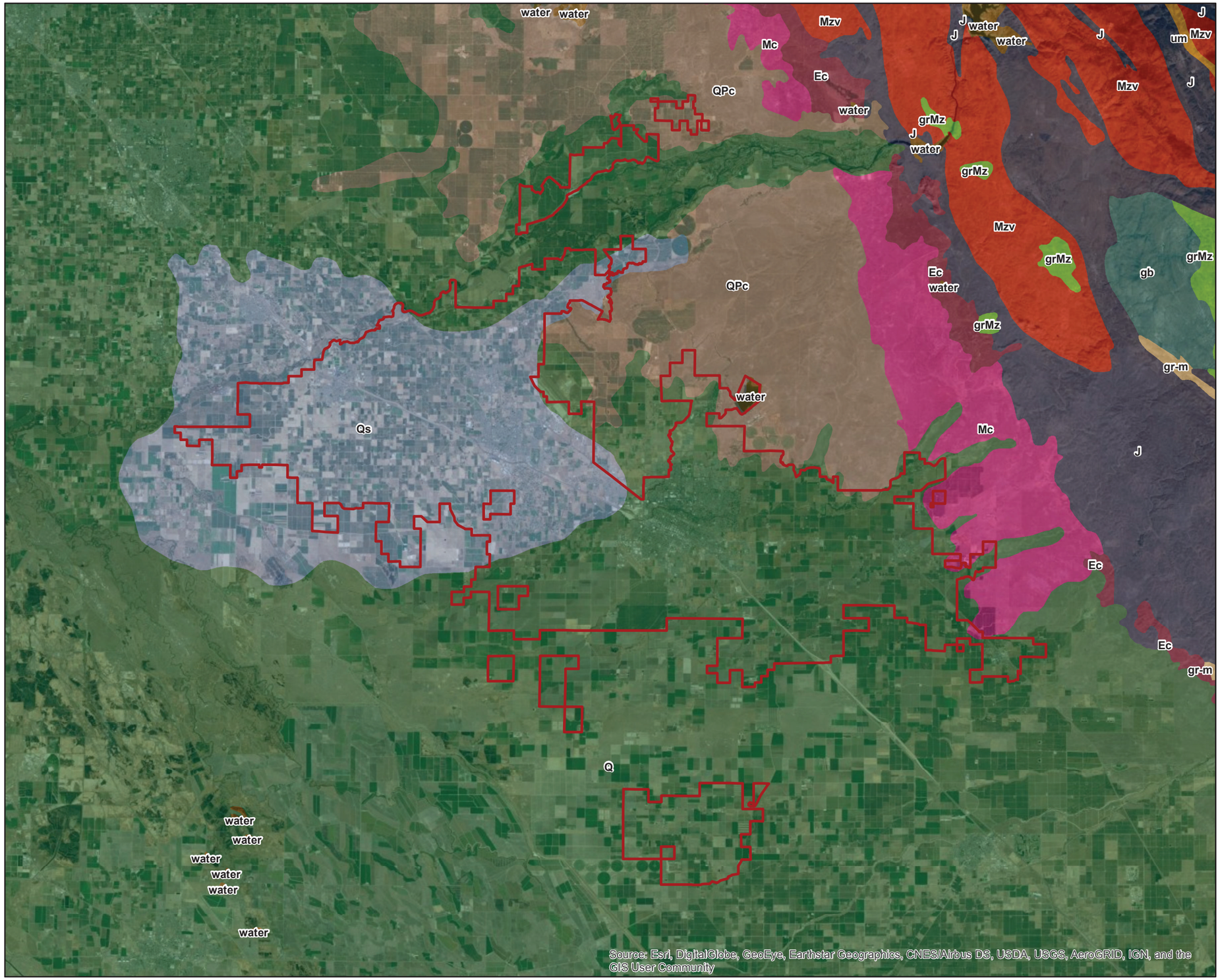
### 3.6.2.3 Seismicity

Earthquakes occur along faults, earth fractures, or zones of fracture along which the rocks on one side have been displaced in relation to those on the other side. The seismicity of a region is described by the distribution, recurrence, and intensity of ground shaking associated with earthquakes over a period of time. No Alquist-Priolo Fault Rupture Hazard Zones are within the Program Area. Such zones highlight active earthquake faults that have a potential for ground-surface rupture (Bryant and Hart, 2007).

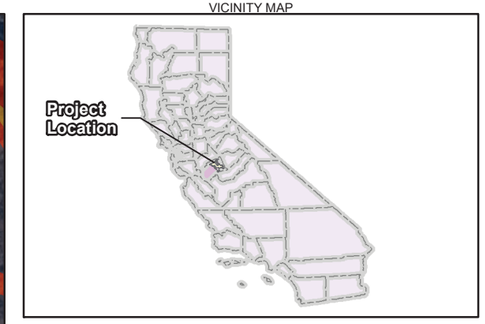
The fault and fold database (U.S. Geological Survey and California Geological Survey, 2006) indicates that no active faults, or faults that show evidence of rupture during the last 11,000 years, are known to pass within approximately 26 miles of the Program Area. The nearest active and significant faults are the Ortigalita Fault and the San Andreas Fault.

The Ortigalita Fault is located along the western quarter of Merced County, within the Coast Range Mountains approximately 26 miles southwest of the Program Area. It is the only active fault identified in the County by the Alquist-Priolo Earthquake Fault Zoning Act. The Ortigalita Fault has not shown evidence of activity within historical times (1,800 before present [BP] to present). However, surface rupture has been documented within the Holocene period (11,000 BP) (Merced County, 2013).

The San Andreas Fault has ruptured in several locations during recorded history, and is capable of generating a magnitude 7.9 earthquake, but is of sufficient distance (approximately 52 miles) to limit the potential contribution to seismic hazard for the Program Area.




VICINITY MAP




LEGEND

Merced Irrigation District

Geology Map Unit

- Ec - Eocene nonmarine rocks, unit 1 (Northern and Central California)
- J - Jurassic marine rocks, unit 1 (Western Sierra Nevada and Western Klamath Mountains)
- gb - Mesozoic gabbroic rocks, unit 1 (Trinity Ophiolite)
- grMz - Mesozoic granitic rocks, unit 1 (Salinian Block)
- Mzv - Mesozoic volcanic rocks, unit 1 (Coast Ranges)
- Mc - Miocene nonmarine rocks
- QPc - Plio-Pleistocene and Pliocene loosely consolidated deposits
- Q - Quaternary alluvium and marine
- Qs - Quaternary sand deposits, unit 1
- um - Ultramafic rocks, chiefly Mesozoic, unit 1 (Trinity Ophiolite)
- gr-m - pre-Cenozoic granitic and metamorphic rocks undivided
- water - water

Source: Geology Map Unit, https://mrdata.usgs.gov, Downloaded July 2017

N

0 2 4
Miles

**FIGURE 3.6-1 GEOLOGIC MAP UNITS IN PROGRAM AREA AND VICINITY**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

During the last 100 years, the area within approximately 50 miles of MID has had approximately 36 earthquakes greater than magnitude 5. The nearest earthquake larger than magnitude 5 occurred in 1866 approximately 40 miles west of the Program Area.

#### 3.6.2.4 Other Geologic Constraints and Hazards

Seismic Hazard Zone maps show areas of land that could be prone to landslides and liquefaction. A probabilistic seismic hazard map is a map that shows the hazard from earthquakes that geologists and seismologists agree could occur in California. The maps are typically expressed in terms of probability of exceeding a certain ground motion. Potential strong ground motion in the Program Area was estimated using probabilistic data from the national seismic hazard maps (USGS, 2008). The maps indicate that the peak ground acceleration with a 10 percent probability of exceedance in 50 years varies between 0.16 g (gravity) and 0.25 g in the Program Area. This probability corresponds to a return period of about 475 years.

The Program Area is gently sloped agricultural land, and has a low potential for landslides. The Program Area has been subject to subsidence from groundwater extraction during recorded history. Recent surveys indicate the current subsidence rate is between 0 and 0.15 foot (NRCS, 2016).

#### 3.6.2.5 Soils

The general soil types present within the Program Area are described below, grouped by the landform in which they can be found. Landforms within the Program Area include the following:

- Recent alluvial floodplains
- Basin lands
- Young alluvial fans
- Low alluvial terraces and moderately old fans
- High alluvial terraces, partially eroded to rolling hills

The soil materials are derived from a mix of igneous, metamorphic, and sedimentary rocks from the Sierra Nevada Mountains (NRCS, 2016). The following provides a brief summary of soils present within each of the five landforms within the Program Area.

**Soils of the Recent Alluvial Floodplains**

These soils include floodplains of the major rivers, including the San Joaquin, Tuolumne, and Stanislaus. Historically, these rivers were subject to flooding; however, dams and other impoundment structures have greatly reduced the frequency of flooding. Because of historical and less frequent recent flooding, soils of the floodplains are generally mottled and high in organic matter. They are nearly level and are used for producing numerous irrigated crops.

**Soils of the Basin Lands**

The Basin Lands are poorly drained soils that lie east of the San Joaquin River floodplain. Their texture ranges from fine sandy loam to clay loam. The distinctive feature of these soils is their saline-alkali condition that precludes their use for cultivated crops unless soil amendments such as gypsum, improved drainage, and large leaching fractions are employed.

**Soils of the Young Alluvial Fans**

These sandy and generally fertile soils are formed on broad, gently sloping alluvial fans consisting of granitic alluvium. They lie east of the San Joaquin River, above the floodplain; and almost all of them are intensively cultivated to produce a wide range of irrigated crops. Some of these soils are among the most productive in California, and produce high yields of orchard, vineyard, field, forage, and truck crops. These soils vary in their drainage from well drained to imperfectly drained.

**Soils of the Low Alluvial Terraces and Moderately Old Fans**

The parent material of these soils is eroded rocks from the Sierra Nevada Mountains. The alluvial fans have been eroded into gently undulating relief. Alluvial terraces are visible along the rivers in some areas. The soils on the fans have a distinct hardpan, and soils on the terraces lack a hardpan and have a sandy clay loam subsoil instead.

**Soils of the High Alluvial Terraces, Partially Eroded to Rolling Hills**

Rolling or conical hills make up most of this landform, but some nearly level remnants of old alluvial terraces and fans are also scattered throughout. The older, level to gently undulating areas contain dense clay or a hardpan in the subsoil. The newer soils on the hillsides lack the increase in clay in the subsoil. The soil associations included in this group are moderately fertile and are subject to erosion.

**Upland Soils of the Sierra Nevada Foothills**

Soils in the foothills are generally shallow because of naturally occurring erosion. Rock outcrops and gravelly areas are common among a groundcover of grass and blue oak. The relief of the foothills in the area ranges from rolling to steep. The parent materials of these soils include hard metamorphic rock, softer sedimentary rock, and volcanic lava. Most of these upland soils are used for range pasture.

## 3.6.3 Environmental Impacts

This section includes the approach to and results of the environmental impact analysis with respect to geology and soils. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

### 3.6.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines and listed below. Impacts on geology and soils are be considered significant if the Proposed Program would result in any of the following:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42.
  - Strong seismic ground shaking.
  - Seismic-related ground failure, including liquefaction.
  - Landslides.
- Substantial soil erosion or the loss of topsoil.
- Location on a geologic unit or soil that is unstable, or that will become unstable as a result of the Proposed Program, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Location on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.
- Location on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

As the Proposed Program does not include septic tanks or alternative wastewater disposal systems, impacts related to the last threshold in the list above are not evaluated in the following analysis.

#### 3.6.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area, as applicable. The No Program Alternative is functionally the same as Existing Conditions as related to geology and soils because there are no known physical processes that would result in appreciable changes to geology or soils throughout the Program Area in the near future condition assumed as part of the No Program Alternative when compared to current conditions. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into project categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified. In the context of geology and soils, Proposed Program activities reviewed included the extent of earthworks and excavations such as for excavation/cut/fill associated with constructing the proposed regulating reservoirs, drilling wells, and digging trenches for conveyance pipelines and disturbance areas for construction. The potential for the Proposed Program to affect geology and soils resources is limited to the following categories: construction of regulating reservoirs, construction of tunnels and conveyance pipeline, and drilling of stilling wells. Although precise well locations are not known at this time and were not considered individually in this analysis, potential impacts are identified in general. Implementation of best management practices to prevent soil erosion as prescribed in a stormwater pollution prevention plan, as required by the Construction General Permit Order issued by the State Water Resources Control Board (see Subsection 3.9, Hydrology and Water Quality) would include the following:

- Filter fences and catch basins would be placed below construction activities to intercept sediment before it reaches the waterway.
- Sediment control measures would be in place prior to the onset of the rainy season, and would be monitored and maintained in good working condition until disturbed areas have been stabilized.
- When construction is complete, stabilizers, such as weed-free mulch, would be applied to disturbed areas.

Available data, published reports, and professional experience were used to evaluate the alternatives for potential impacts related to geology and soils. Data and publications (both printed and web-based) from the California Geologic Society, U.S. Geological Survey, and other sources as applicable were used, as appropriate.

As described in Section 2.5, Environmental Commitments, Proposed Program facilities, such as the impoundment facilities associated with the proposed regulating reservoirs, would be designed and constructed to withstand the effects of anticipated earthquake loading for the Program Area, based on the site-specific detailed geotechnical analysis of each project site.

#### 3.6.3.3 Impacts Associated with the Proposed Program

**Impact GEO-1: Seismic-related ground failure, including liquefaction that would directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death.**

***Given the distance from known active faults and unlikelihood that ground shaking would occur during construction of the various Proposed Program facilities, construction impacts from seismic-related ground failure would be less than significant.***

Similar to much of the Central Valley, the Program Area has and will continue to be subject to occasional ground shaking generated by activity on local and regional faults, as previously described. Proposed Program features would not include habitable structures or bridges. Proposed Program facilities, such as the impoundment facilities associated with the proposed regulating reservoirs, would be designed and constructed to withstand the effects of anticipated earthquake loading for the Program Area, based on the site-specific detailed geotechnical analysis of each project site. ***Therefore, impacts from seismic-related ground failure during operation of the Proposed Program would be less than significant.***

**Impact GEO-2: Substantial soil erosion or loss of topsoil.**

During construction, the Proposed Program would involve earth-moving activities including excavation/cut/fill associated with constructing the proposed regulating reservoirs, drilling wells, and digging trenches for conveyance pipelines. Depending on the particular project and associated features, construction activities would result in a range of ground disturbance and movement, and could result in localized soil erosion, sedimentation, and inadvertent permanent soil loss within the Program Area. During construction, best management practices would be implemented to prevent soil erosion as prescribed in a stormwater pollution prevention plan, as required by the Construction General Permit Order issued by State Water Resources Control Board. ***Therefore, soil erosion-related impacts during construction would be less than significant.***

During operation, most Proposed Program facilities would not be prone to soil erosion and, in general, would be operated and maintained in a manner that would not increase the potential for soil erosion. ***Soil erosion-related impacts during operation of the Proposed Program would be less than significant.***

**Impact GEO-3: Unstable geologic unit, or would become unstable as a result of the Proposed Program, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.**

The Program Area is not in an area identified as unstable, and landslides are unlikely because of the relatively level topography. Subsurface investigations would be performed to verify that the foundation can support the proposed embankments for any hazards of liquefaction that may be identified. During construction, implementation of the Proposed Program would involve earth-moving activities, including excavation/cut/fill associated with constructing the proposed regulating reservoirs, drilling wells, and digging trenches for conveyance pipelines. As described above, the Program Area generally does not contain unstable soils; and the potential for the Proposed Program to induce or be affected by landslides, lateral spreading, or subsidence (see also Subsection 3.8, Groundwater Resources) is highly unlikely. ***Therefore, construction and operation impacts related to unstable geology would be less than significant.***

**Impact GEO-4: Substantial direct or indirect risks to life or property from expansive soil.**

Soil materials within the Program Area have a low to medium potential for shrink/swell behavior. Geotechnical investigations would be performed for gate and levee structures to evaluate and determine design and construction criteria to limit the risk of adverse effects caused by expansive soils. ***If a hazard is identified, measures may include water infiltration management, structural stiffening, an increase in foundation embedment, or over excavation and replacement with suitable material; therefore, impacts related to expansive soil would be less than significant.***

## 3.6.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant impacts on geology and soils; therefore, mitigation is not required or recommended.

# 3.7 Greenhouse Gases

This section describes the regulatory and environmental setting related to greenhouse gases (GHGs) and evaluates potential GHG and related climate change impacts associated with implementation of the Proposed Program. For the purposes of this section, the Study Area is the Program Area.

## 3.7.1 Regulatory Setting

This section describes guidelines and regulations for evaluating potential impacts and mitigation related to GHGs. GHGs include both naturally occurring and anthropogenic gases, such as carbon dioxide ($CO_2$), methane, nitrous oxide, hydro-chlorofluorocarbons, perfluorocarbons, and sulfur hexafluoride. GHGs absorb infrared radiation, trap the energy from the sun, and help maintain the temperature of Earth's surface, creating a process known as the greenhouse effect. The accumulation of GHGs in the atmosphere influences the long-term range of average atmospheric temperatures. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce economic and social consequences across the globe.

### 3.7.1.1 Federal

Climate change and its associated effects are being addressed at the federal level to improve fuel economy and energy efficiency, such as Executive Order (EO) 13693 – Planning for Federal Sustainability in the Next Decade, signed on March 19, 2015. EO 13693 sets a goal of 40 percent reduction in GHG emissions by implementing more efficient federal agency operations. It focuses on reducing GHGs internally in federal agency missions, programs, and operations.

U.S. Environmental Protection Authority's (EPA's) authority to regulate GHG emissions stems from the U.S. Supreme Court decision in Massachusetts versus EPA (2007). The Supreme Court ruled that GHGs meet the definition of air pollutants under the existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the court's ruling, EPA finalized an endangerment finding in December 2009. Based on scientific evidence, EPA found that six GHGs constitute a threat to public health and welfare. The Supreme Court's interpretation of the existing Clean Air Act and EPA's assessment of the scientific evidence form the basis for EPA's regulatory actions.

EPA and the National Highway Traffic Safety Administration (NHTSA) have taken coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These steps developed the first GHG regulations for heavy-duty engines and vehicles, as well as additional GHG regulations for light-duty vehicles.

The final combined standards that compose the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards implemented by this program are expected to reduce GHG emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012 through 2016).

On August 28, 2012, EPA and NHTSA issued a joint final rulemaking to extend the national program for fuel economy standards to model year 2017 through 2025 passenger vehicles. Over the lifetime of the model year 2017 through 2025 standards, this program is projected to save approximately 4 billion barrels of oil and 2 billion metric tons of GHG emissions. The complementary EPA and NHTSA standards that compose the Heavy-Duty National Program apply to combination tractors (semitrucks), heavy-duty pickup trucks and vans, and vocational vehicles (including buses and refuse or utility trucks). Together, these standards would cut GHG emissions and domestic oil use significantly. This program responds to former President Obama's 2010 request to jointly establish GHG emissions and fuel efficiency standards

for the medium- and heavy-duty highway vehicle sector. The agencies estimate the combined standards would reduce $CO_2$ emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of model year 2014 to 2018 heavy-duty vehicles (EPA, 2017).

In March 2013, EPA proposed Tier 3 Motor Vehicle Emission and Fuel Standards to reduce air pollution from passenger cars and trucks to set new vehicle emissions standards and lower the sulfur content of gasoline, considering the vehicle and its fuel as an integrated system**.**

#### 3.7.1.2 State

With the passage of legislation and EOs, California launched an innovative and proactive approach to address GHG emissions and potential climate change-related impacts:

- Assembly Bill (AB) 1493, Vehicular Emissions: Greenhouse Gases, 2002: This bill requires California Air Resources Board (ARB) to develop and implement regulations to reduce automobile and light-duty truck GHG emissions. These stricter emissions standards apply to automobiles and light-duty trucks beginning with the 2009 model year.
- EO S-3-05 (June 1, 2005): The goal of this EO is to reduce California's GHG emissions to (1) 2000 levels by 2010, (2) 1990 levels by 2020, and (3) 80 percent below 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of AB 32 in 2006 and SB 32 in 2016.
- AB 32, the Global Warming Solutions Act of 2006: AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." In December 2008, ARB approved the initial scoping plan, which included measures to further reduce GHG emissions. Key elements of the initial scoping plan include the following:
  - Expand and strengthen energy efficiency programs, including building and appliance standards.
  - Increase electricity generation from renewable resources to at least 33 percent of the statewide electricity mix by 2020.
  - Establish targets for passenger vehicle-related GHG emissions in regions throughout California and pursue policies and incentives to achieve those targets. Included with this strategy is support for the development and implementation of a high-speed rail system to expand mobility choices and reduce GHG emissions.
  - Adopt and implement measures pursuant to existing State laws and policies, including California's clean car standards and the low carbon fuel standard.
  - Develop a cap-and-trade program so that the target is met while providing flexibility to California businesses to reduce emissions at low cost.

  In May 2014, ARB approved the *First Update to the Climate Change Scoping Plan* (ARB, 2014). The update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals defined in the initial scoping plan. It also evaluates how to align longer-term GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use.
- EO S-20-06 (October 18, 2006): This EO establishes the responsibilities and roles of the Secretary of the California EPA and State agencies with regard to climate change.
- EO S-01-07 (January 18, 2007): This EO sets forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020. ARB re-adopted the low carbon fuel standard in September 2015, and the

changes went into effect on January 1, 2016. The program promotes the low-carbon fuel adoption necessary to achieve the Governor's 2030 and 2050 GHG reduction goals.

- Senate Bill (SB) 97, Chapter 185, 2007, Greenhouse Gas Emissions: SB 97 requires the Governor's Office of Planning and Research to develop recommended amendments to the California Environmental Quality Act (CEQA) Guidelines for addressing GHG emissions. The amendments became effective March 18, 2010.
- SB 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires ARB to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization for each region must then develop a Sustainable Communities Strategy that integrates transportation, land use, and housing policies to achieve the emissions target for its region.
- SB 391, Chapter 585, 2009 California Transportation Plan: This bill requires the State's long-range transportation plan to meet California's climate change goals under AB 32.
- Renewables Portfolio Standard (RPS): Established in 2002 under SB 1078, accelerated in 2006 under SB 107, and expanded in 2011 under SB 2, California's RPS is one of the most ambitious renewable energy standards in the United States. The RPS requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020.
- California EO B-30-15, 2015: California EO B-30-15, which was signed by Governor Brown in April 2015, requires a California GHG reduction target of 40 percent below 1990 levels by 2030. This is the most aggressive GHG emissions reduction goal in North America.
- SB 32 (California Global Warming Solutions Action of 2006: Emissions Limit) and AB 197 (State Air Resources Board: Greenhouse Gases: Regulations), 2016: SB 32 (Chapter 249, 2016) establishes a new target for GHG emissions reductions in the state at 40 percent of 1990 levels by 2030. This new target passed 10 years after AB 32, which required ARB to reduce statewide GHG emissions to 1990 levels by 2020. Tied to SB 32, AB 197 (Chapter 250, 2016) increases legislative oversight of ARB, creating a Joint Legislative Committee on Climate Change Policies to ascertain facts and make recommendations to the Legislature concerning the State's programs, policies, and investments related to climate change. The bills became effective on January 1, 2017.

In November 2017, ARB released *California's 2017 Climate Change Scoping Plan: The strategy for achieving California's 2030 greenhouse gas target* (ARB, 2017). The proposed framework includes the following elements:

- 50 percent renewable energy
- 50 percent reduction in statewide vehicular petroleum use
- Doubling of energy efficiency in existing buildings
- Carbon sequestration in California's land base
- Aggressive reductions in short-lived climate pollutants, such as black carbon, fluorinated gases, and methane
- Climate adaptation strategy

#### 3.7.1.3 Local and Regional

The Proposed Program is within Merced County (County), under the jurisdiction of San Joaquin Valley Air Pollution Control District (SJVAPCD). SJVAPCD is taking initiatives to address GHG emissions and climate change. In August 2008, the SJVAPCD Governing Board adopted the *Climate Change Action Plan* (SJVAPCD, 2008). The *Climate Change Action Plan* directs the District Air Pollution Control Officer to

develop guidance to assist lead agencies, project proponents, permit applicants, and interested parties in assessing and reducing the impacts of project specific GHG emissions on global climate change.

Adopted in 2013, the *2030 Merced County General Plan* (Merced County, 2013) was designed to meet the requirements of AB 32 (the Global Warming Solutions Act of 2006), in particular the requirement for local jurisdictions to address sustainability, GHG emissions reduction, and climate change adaptation. SJVAPCD adopted best management practices and emission reduction targets that its jurisdictions, including Merced County, need to meet. The policies included in the General Plan require energy conservation, GHG emission reduction, and global and local climate change adaptation.

The City of Merced's Climate Action Plan (CAP) (City of Merced, 2012), adopted in October 2012, was designed to meet the requirements of AB 32 and the *2030 Merced County General Plan* Policy SD-1.7 to "Develop and Implement a Climate Action Plan for the City." The CAP's goal is to reduce GHG emissions through actions that would reduce waste, improve energy use, enhance mobility choices, and create healthy and livable communities. The City of Merced is also developing the Programmatic Climate Action Plan to help implement the CAP.

## 3.7.2 Environmental Setting

In the United States, the main source of GHG emissions is transportation, followed by electricity production (EPA, 2018). In California, however, transportation sources (passenger cars, light-duty trucks, other trucks, buses, and motorcycles) compose the largest category of GHG-emitting sources (ARB, 2016). In 2016, the annual California statewide GHG emissions were 429 million metric tons of $CO_2$-equivalent ($CO_2e$) (ARB, 2018). The transportation sector accounts for about 41 percent of the statewide GHG emissions inventory. Industrial and the electric power sectors account for 23 and 16 percent, respectively, of the total statewide GHG emissions inventory (ARB, 2018). The dominant GHG emitted is $CO_2$, primarily from fossil fuel combustion.

In Merced County, GHG emissions in 2010 were 3.651 million metric tons of $CO_2e$ from unincorporated areas and 6.036 million metric tons of $CO_2e$ emitted within all of Merced County. The greatest contributor to Merced County's unincorporated and total GHG emissions was agriculture. Transportation emissions were the second greatest contributor for both unincorporated area and total GHG emissions in Merced County (Merced County, 2012).

## 3.7.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to GHG emissions and climate change. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

### 3.7.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and listed below. Impacts related to GHG are considered significant if the Proposed Program would result in any of the following:

- Generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

Currently, there are no quantitative GHG emission thresholds applicable to Merced County in the context of CEQA. On December 17, 2009, SJVAPCD adopted the *Guidance for Valley Land-Use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* (SJVAPCD, 2009). According to the guidance, projects complying with an approved GHG emission reduction plan or GHG mitigation

program would be determined to have a less than significant individual and cumulative impact with respect to GHG emissions and climate change. For other projects, the guidance relies on the use of performance-based standards, known as Best Performance Standards (BPS), to assess significance of project-specific GHG emissions on global climate change. Otherwise, a project needs to demonstrate a 29 percent reduction in GHG emissions from business-as-usual conditions to conclude that a project would have a less than significant impact. The determination is based on the principle that projects that have reduced or mitigated emissions consistent with AB 32, the Global Warming Solutions Act of 2006, should be considered to have a less than significant impact.

While SJVAPCD's guidance recommends approaches for evaluating the significance of GHG impacts, the guidance does not limit a lead agency's authority to establish its own process and guidance for determining significance (SJVAPCD, 2009). However, there is no applicable local GHG reduction plan. Therefore, the first criterion in SJVAPCD's GHG guidance does not apply. The SJVAPCD publishes a list of BPS for land development projects, and each BPS has a corresponding GHG reduction percentage that can be applied to Program emissions to meet the 29 percent emission reduction criterion. However, the current BPS focus on measures to reduce GHG emissions from residential or commercial development projects with long-term GHG operational emissions. There are no applicable BPS for short-term construction activities. Because most of the Proposed Program's emissions would occur over short-term construction periods and would have negligible long-term operational GHG emissions, the criteria requiring use of BPS, demonstration of 29 percent GHG emission reduction, or both, are not applicable. As the SJVAPCD recommended guidance and significance criteria are not applicable to the Proposed Program, impacts of the GHG emissions that would result from the Proposed Program were evaluated based on whether the GHG emissions associated with proposed construction would hinder or delay California's ability to meet the statewide GHG reduction targets set in AB 32 and SB 32.

#### 3.7.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to existing conditions and the No Program Alternative for each resource area as applicable. The No Program Alternative is functionally the same as the Existing Conditions as related to GHG emissions because both represent a condition without emissions generated by proposed construction activities. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

During any given year, multiple projects would be constructed simultaneously over the anticipated 30-year project implementation period. Construction emissions were evaluated to determine anticipated emissions including years projected to have the highest emissions. As identified in Section 2, Program Description and Alternatives, and Subsection 3.3, Air Quality, construction emissions were calculated for a range of years based on assuming a high and low anticipated construction activity year. Based on current District projections, 2021 and 2023 were identified as the high and low year types, respectively, to identify potential air quality impacts. As also discussed in Subsection 3.3, proposed activities are projected to likely be the same in many of the years in the implementation schedule. $CO_2e$ emissions from construction equipment and vehicles were estimated using the methodologies and emission factors obtained from California Emission Estimator Model (CalEEMod) User's Guide (CAPCOA, 2017) and ARB EMission FACtors model (EMFAC2017), with project-specific phasing, equipment usage, and vehicle miles traveled. GHG projected emissions are summarized in Table 3.7-1. Detailed

assumptions regarding project schedule, construction equipment and vehicles, and yearly emission calculations by project category for 2021 and 2023 are provided in Appendix C. As listed in Subsection 2.5, Environmental Commitments, implementation of the Proposed Program would minimize unnecessary construction vehicle trips and idling time, which would reduce GHG emissions.

Table 3.7-1. Total Greenhouse Gas Emissions of Potential Overlapping Projects
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| | **$CO_2e$ Emissions (metric tons per year)** | |
|---|---|---|
| **Project** | **2021** | **2023** |
| Main Canal Improvements at Tunnel No. 1 Option 1 | 1,492.44 | 0.00 |
| Main Canal Improvements at Tunnel No. 1 Option 2[a] | 1,442.44 | 0.00 |
| Main Canal Improvements at Tunnel No. 1 Option 3 | 842.14 | 0.00 |
| Main Canal Improvements at Tunnel No. 1 Option 4 | 671.14 | |
| Canal Rebuilding/Relining | 426.54 | 418.34 |
| Table Topping Dead-end Facilities | 91.22 | 89.39 |
| Canal Automation | 447.26 | 440.36 |
| Flow Measurement | 1.49 | 1.37 |
| Siphon Demolition/Modifications | 665.12 | 657.26 |
| Intertie | 286.69 | 280.19 |
| Reservoirs and Recharge Basins | 1,061.25 | 1036.25 |
| Highlands | 0.00 | 0.00 |
| Owens Creek Diversion Channel | 0.00 | 0.00 |
| Black Rascal Creek Diversion Channel | 0.00 | 0.00 |
| Merced River Water Recovery | 0.00 | 0.00 |
| Le Grand Canal near Black Rascal Automation | 273.88 | 0.00 |
| Northside Canal Flumes | 0.00 | 0.00 |
| **Total Emissions of Potential Overlapping Projects in Analysis Year** | **4,745.89** | **2,923.15** |

Source: CAPCOA, 2017

[a] Emissions associated with Option 2 are reflected in the total emissions for the year as they are greater than the emissions under Options 1, 3, and 4.

### 3.7.3.3 Impacts Associated with the Proposed Program

**Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.**

Global climate change is influenced by ongoing factors including the construction and operation of projects throughout the world. A project may contribute to a potential impact through its *incremental* change in emissions when combined with the contributions of other sources of GHGs.[8] In assessing such

[8] This approach is supported by the Association of Environmental Professionals (AEP, 2007), the Sacramento Metropolitan Air Quality Management District (SMAQMD, 2011), and the U.S. Forest Service (USFS, 2009).

impacts, it must be determined whether a project's incremental effect is "cumulatively considerable" [CEQA Guidelines Sections 15064(h)(1) and 15130]. To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of past, current, and future projects to make this determination is a difficult, if not impossible, task.

GHG emissions would occur during Program construction and would include emissions from fuel combustion as part of the operation of construction equipment, haul trucks, and worker commute vehicles. GHG emissions from construction would be temporary and would vary each year because construction locations, times, and emissions would vary over the 30-year implementation period of the Proposed Program. GHG emissions are proposed to be minimized during construction through limiting unnecessary construction vehicle trips and idling times. Table 3.7-1 provides $CO_2e$ emissions estimates for a range of years based on assuming high and low anticipated construction activity. Estimated $CO_2e$ emissions are 2970.42 metric tons in 2023 to 4927.19 metric tons in 2021. As described in Subsection 3.7.2, Environmental Setting, in Merced County, GHG emissions in 2010 were 3.651 million metric tons of $CO_2e$ from unincorporated areas and 6.036 million metric tons of $CO_2e$ emitted within all of Merced County. Therefore, Proposed Program emissions represent less than 1 percent of Merced County's typical total annual GHG emissions and would not hinder or delay California's ability to meet the statewide GHG reduction targets set in AB 32 and SB 32. ***Impacts during construction of the Proposed Program would be less than significant***.

Operations and maintenance of the Proposed Program would require similar equipment and vehicle trips as current operations, and GHG emissions resulting from operational use associated with operation of the Proposed Program would not be expected to increase beyond existing conditions. ***As such, impacts during operation of the Proposed Program would be less than significant.***

**Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.**

EO S-3-05 and AB 32 set the goals of reducing GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and 80 percent below 1990 levels by 2050. To meet the GHG reduction goals, ARB prepared the AB 32 scoping plan and provided updates to the plan in 2014 to provide guidelines on statewide GHG reduction strategies.

The *2017 Climate Change Scoping Plan Update* (ARB, 2017) represents the primary plan to reduce GHG emissions throughout California. This plan is designed to reduce statewide GHG emissions in California by 40 percent as compared to the 1990 levels by 2030. The Proposed Program elements are consistent with the *Merced County General Plan*, which includes the goal of ensuring a reliable water supply to meet the existing and future needs of Merced County (Merced County, 2013). Implementation of the Proposed Program is also consistent with the ARB policy of improving the resilience of infrastructure to climate change because the proposed capital improvements would replace aging infrastructure and modernize the water delivery system, allowing for greater operational flexibility. Therefore, the Proposed Program would not hinder or otherwise conflict with AB 32 or the AB 32 scoping plan or plan updates for reducing GHG emissions***.***

Although the scoping plan and updates identify a long-term vision and near-term activities to help California achieve its interim and 2050 emissions reduction goals, many factors influence California's ability to attain the goals, including changes in regulatory standards; fuel, transportation, and power generation technologies; growth in population; land use development patterns; and other factors that cannot presently be known. Because determining a conclusion about the Proposed Program's effect on compliance with the 2050 target identified in EO S-3-05 and AB 32 would require speculation, the potential impact of the Proposed Program with regard to this goal cannot be determined. In all other respects, the Proposed Program would not hinder or delay California's ability to meet the GHG

reduction targets in AB 32 and the scoping plan and updates. ***Therefore, impacts from construction and operation of the Proposed Program would be considered less than significant.***

### 3.7.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant impacts with respect to GHG emissions and climate change; therefore, mitigation is not required or recommended.

# 3.8 Groundwater Resources

For the purposes of this section, the Study Area comprises lands within the Merced Groundwater Subbasin. Water supply needs in the Merced Groundwater Subbasin are met by both surface water and groundwater. The primary source of surface water in the basin is the Merced River. Bear Creek provides an ancillary supply of surface water to a portion of the basin. Surface water storage facilities have been constructed on both rivers by the Merced Irrigation District (MID); Lake McClure on the Merced River and Bear Reservoir on Bear Creek. The water supply provided by these two surface water sources is not sufficient to meet water demands in the basin. Surface water has historically been supplemented by groundwater to meet the agricultural and urban water demands within the basin during dry years. Municipal and industrial water demands within the basin are met solely by groundwater. Due to limited available surface water supplies, groundwater sustainability has long been a concern within the basin, and the Merced Groundwater Subbasin was recently identified as a "critically overdrafted" basin by the California Department of Water Resources (DWR, 2016). One of the key objectives of the Proposed Program is to support the region's agricultural economy while maintaining sustainable management practices of its groundwater resources. The purpose of this section is to document the existing conditions of the groundwater resources available to MID, describe the characteristics of the aquifer system beneath MID and adjacent areas, and to discuss ongoing regional groundwater-related planning activities. This section describes the regulatory and environmental setting related to groundwater resources.

## 3.8.1 Regulatory Setting

This section describes federal, State, regional, and local laws and regulations relevant to the evaluation of the Proposed Program's impacts on groundwater resources.

### 3.8.1.1 Federal

**Clean Water Act.** The Clean Water Act (United States Code, Title 33, Section 1251 et seq.) is the primary federal law governing surface water quality. The goal of the Clean Water Act is to restore and maintain the physical, chemical, and biological integrity of the waters of the United States.

### 3.8.1.2 State

Senate Bill 1938, Water Code Section 10753.7, requires local agencies seeking State funds for groundwater-related construction projects or groundwater-quality improvement projects to have the following:

- A developed and implemented groundwater management plan that includes basin management objectives and addresses the monitoring and management of groundwater levels, groundwater quality degradation, inelastic land subsidence, and surface water/groundwater interaction
- A plan addressing cooperation and working relationships with other public entities
- A map showing the groundwater subbasin the project is in, neighboring local agencies, and the area subject to the groundwater management plan
- Protocols for monitoring groundwater levels, groundwater quality, inelastic land subsidence, and groundwater/surface water interaction
- Groundwater management plans with the components listed above for local agencies outside the delineated Bulletin 118 groundwater subbasins

**Sustainable Groundwater Management Act.** The Sustainable Groundwater Management Act of 2014 (SGMA) became law on January 1, 2015, and applies to all groundwater basins in the state (Water Code Section 10720.3). By enacting SGMA, the legislature intended to provide local agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater

within their jurisdiction (Water Code Section 10720.1). Pursuant to SGMA, any local agency that has water supply, water management, or land use responsibilities within a groundwater basin may elect to be a "groundwater sustainability agency" for that basin (Water Code Section 10723).

The SGMA requires DWR to categorize each groundwater basin in the state as high, medium, low, or very low priority (Water Code Sections 10720.7, 10722.4). The law also requires local and regional entities in the medium- and high-priority groundwater basins to form local Groundwater Sustainability Agencies to oversee the development and implementation of groundwater sustainability plans that comply with Water Code Section 10727 et seq. The Merced Groundwater Subbasin has been designated by DWR as critically overdrafted and a high-priority basin.

**Porter-Cologne Water Quality Control Act.** The 1969 Porter-Cologne Water Quality Control Act protects the beneficial uses of surface water and groundwater in California, with a focus on water quality. This act is regulated by the State Water Resources Control Board and the nine Regional Water Quality Control Boards, which regulate all pollutant or nuisance discharges that may affect surface water or groundwater quality.

#### 3.8.1.3 Local

**AB3616 Water Management Plan (WMP).** MID voluntarily prepared a WMP according to a Memorandum of Understanding (MOU) finalized on November 13, 1996, by the advisory committee for AB3616, which established the Agricultural Water Management Council (AWMC). As a signatory of the MOU since 1999, MID documented its performance with the Efficient Water Management Practices established by the Agricultural Water Suppliers as California outlined in the MOU. The WMP was adopted by the MID Board of Directors and submitted to the AWMC. The plan was further reviewed by DWR staff before its adoption by the AWMC. As part of this WMP, MID committed to implementing all applicable Efficient Water Management Practices related to surface water and groundwater use within the District (AWMP, 2013).

**Merced Water Supply Plan.** In 1993, MID entered a cooperative program with the City of Merced to develop strategies for meeting future water demands within the region. Completed in 1995 and updated in 2001, the Merced Water Supply Plan was founded on the conclusion that, through planned conjunctive management of MID's water resources, the region's future agricultural and municipal and industrial demands, including select environmental water demands, could be satisfied. Based on these findings, MID embarked on an aggressive program to restore and expand its conjunctive water management capability. Emphasis was placed on programs and facilities that would increase surface water use within MID by expanding service to lands previously served only by groundwater and by re-engaging groundwater users who were previously District customers but who more recently converted to groundwater-based supplies (AWMP, 2013). This plan was used in part to support the development of the Proposed Program.

**Merced Area Groundwater Pool Interests (MAGPI).** MAGPI's mission was to develop technical data and management strategies to improve the health of the Merced Groundwater Subbasin, which has generally been in overdraft since 1997. MAGPI's vision is to maximize conjunctive water management in the basin to develop more reliable local, regional, and statewide water supply. MAGPI's vision is to (1) expand the in-basin use of surface water; (2) expand groundwater production capability; (3) continue water conservation efforts; (4) monitor groundwater conditions within the basin with the goal of establishing a "live updatable water budget," developing protocols for tracking basin "health," and establishing a basin Joint Powers Authority (AWMP, 2013).

**Merced Integrated Regional Water Management Plan (MIRWMP) (2013).** In 2012, MAGPI transferred responsibility for development of the MIRWMP to the interim Regional Water Management Group, which comprises MID, the Merced County, and the City of Merced. The Regional Water Management Group is advised by a Regional Advisory Committee on regional water management issues; to identify regional water management needs; to establish basinwide goals, objectives, plans, and projects; and to

secure future funding and governance (AWMP, 2013). The Proposed Program would be implemented to be consistent with the goals and objectives of the MIRWMP as appropriate.

## 3.8.2 Environmental Setting

This section describes the location, geology, aquifer characteristics, major recharge and discharge processes, groundwater quality, and groundwater use in the MID area.

### 3.8.2.1 Basin Characteristics

The DWR Bulletin 118-03 (DWR, 2004) identifies the Merced Groundwater Subbasin as a subbasin of the San Joaquin Valley Groundwater Basin. The Merced Groundwater Subbasin underlies approximately 491,000 acres. Consolidated rocks, including the Ione Formation, the Valley Springs Formation, and the Mehrten Formation, bound the subbasin with generally low-permeability units. In the eastern portion of the subbasin, the consolidated rocks generally yield small quantities of water except for the Mehrten Formation, which serves as an important aquifer in the subbasin. The subbasin is bounded by the Merced River to the north, the Chowchilla River to the south, the San Joaquin River to the west, and by the outcrop of the low-permeability Valley Springs Formation in the foothills of the Sierra Nevada to the east (Figure 3.8-1). Groundwater in the Program Area is found in three relatively distinct aquifers known as the shallow, intermediate, and confined aquifers. The shallow aquifer is generally considered to extend from the ground surface to a depth of approximately 100 feet below ground surface (bgs). The intermediate aquifer generally extends from about 100 feet bgs to the top of the E-Clay (typically ranging from 50 to 900 feet bgs) where present, and up to 700 feet bgs in the western portion of the basin. The confined aquifer is overlain by the low-permeability E-Clay, sometimes called the Corcoran Clay, and is a relatively productive aquifer extending from the base of the E-Clay to the top of saline water in the basin (1,000 feet deep or more). The three aquifer units described above are primarily composed of unconsolidated sediments dipping gently to the west across the Program Area getting both deeper and thicker to the west.

### 3.8.2.2 Groundwater Flow

Natural groundwater flow in the Merced Groundwater Subbasin is generally from northeast to southwest. However, cones of depression caused by pumping, and groundwater mounds resulting from agricultural irrigation influence groundwater levels and flow directions in local areas, causing overall flow patterns to change over time.

Figure 3.8-2 depicts a map with groundwater contours generated by DWR. This map indicates several major cones of depression visible between 1995 and 2010. One cone is centered approximately 13 miles southeast of Merced in the Le Grand/Athlone Water District. A second major cone is centered about 13 miles southwest of Merced just north of the San Joaquin River. The third major cone is 17 miles northwest of the city of Merced and lies north of the District in the Turlock Groundwater Basin.

### 3.8.2.3 Groundwater Levels

The trend of decreasing groundwater levels and reduction in groundwater storage has been a concern in the Merced Groundwater Subbasin for many years. According to the 2008 Groundwater Management Plan Update, groundwater elevations in the Merced Groundwater Subbasin have been monitored by DWR, MID, and other entities since the 1950s. These monitoring data demonstrate that since 1980, average groundwater levels beneath the Merced Groundwater Subbasin have declined on average, approximately 14 feet, with most of this decline occurring between 1980 and 1996. As such, the Merced Groundwater Subbasin is considered to be in a state of long-term groundwater level decline (RMC, 2013). Figure 3.8-3 shows a graph of historical groundwater levels for MID wells since 1970. The red lines indicate dry or critically dry years. These data clearly show that groundwater levels have declined during dry periods and failed to recover in subsequent wet years, leading to a continuous decline in groundwater levels across the subbasin.

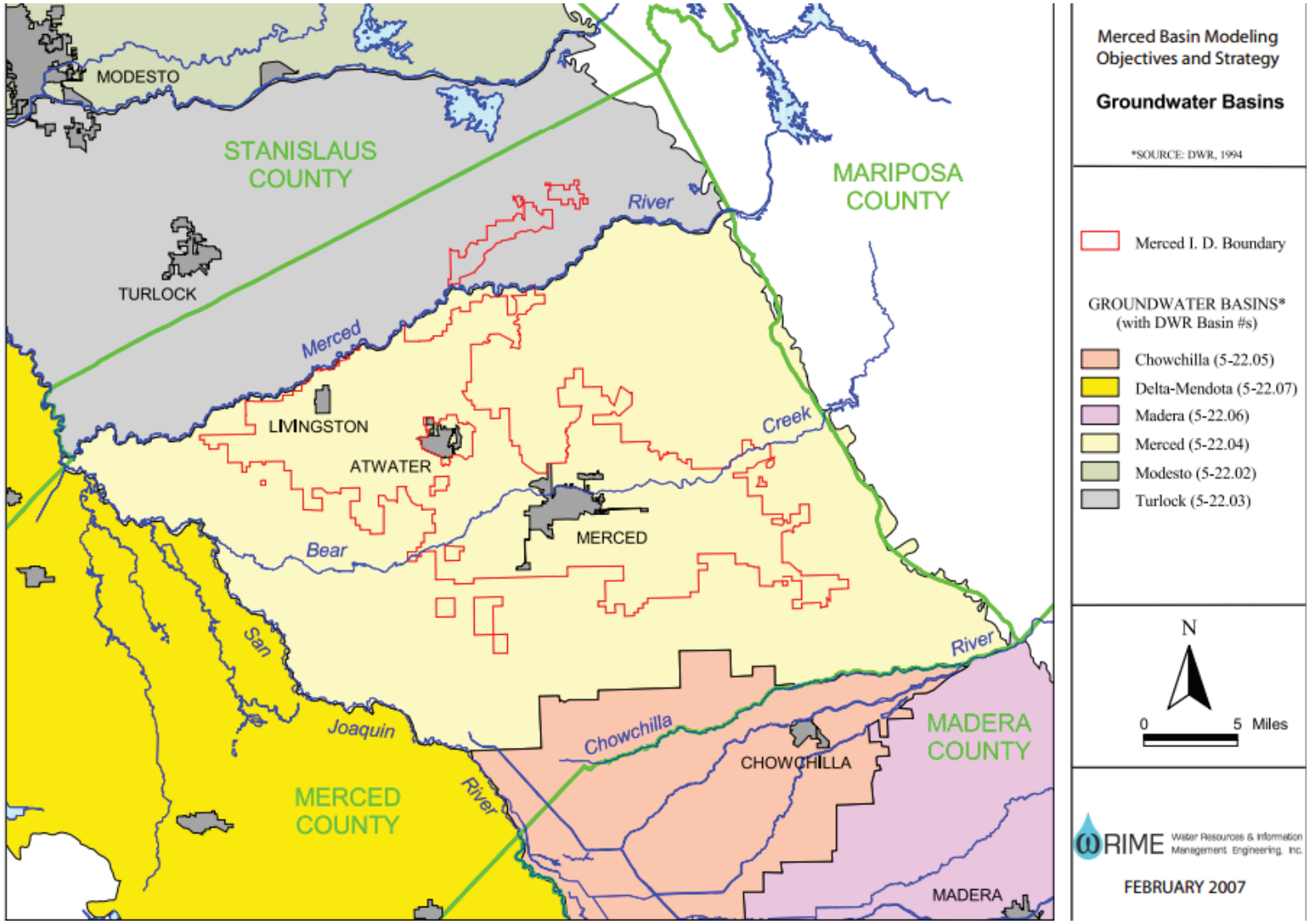



**FIGURE 3.8-1 MERCED GROUNDWATER SUBBASIN**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

Source: WRIME, 2007

ch2m

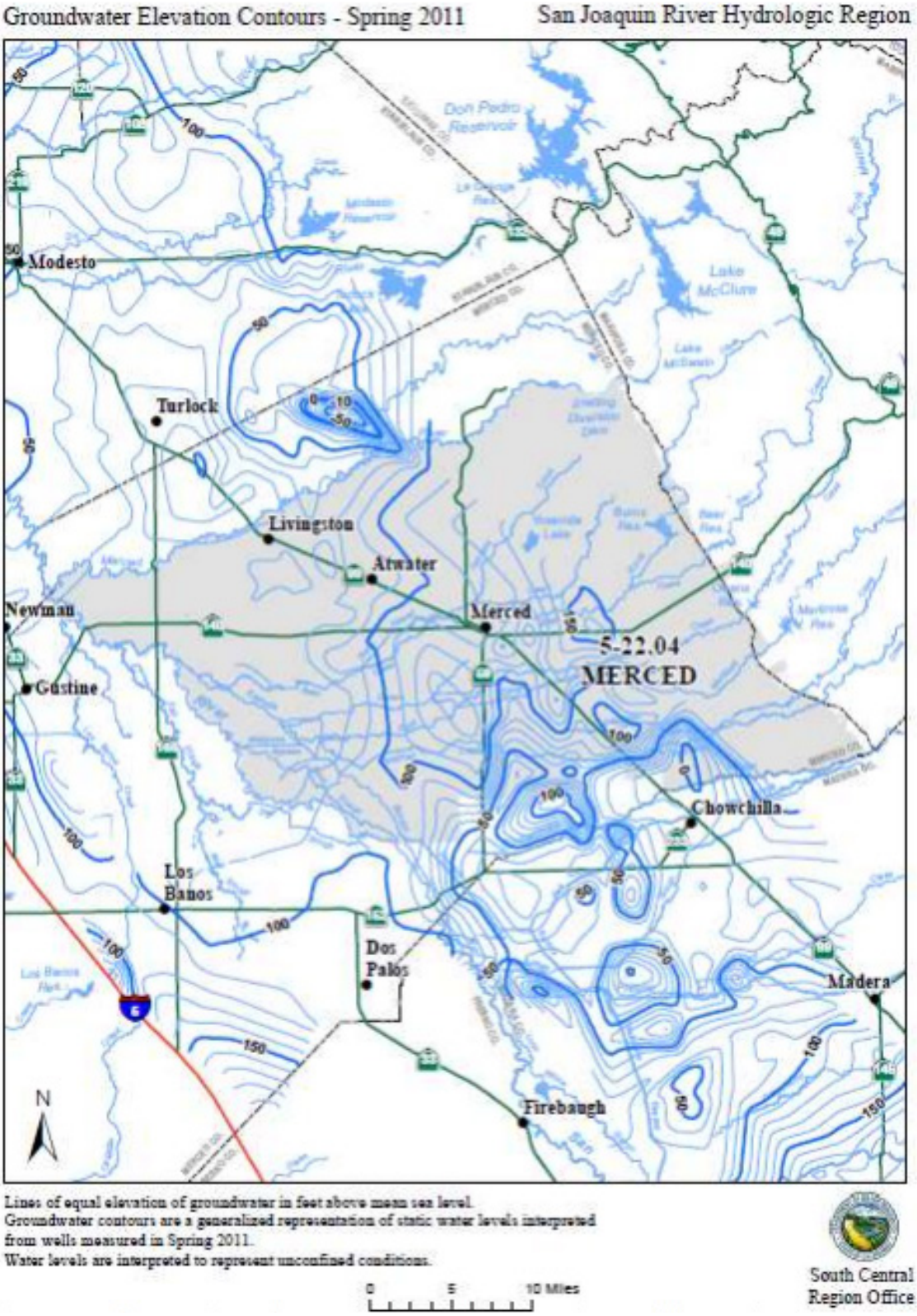



**FIGURE 3.8-2 GROUNDWATER ELEVATION CONTOURS – SPRING 2011**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

Source: AGWM, 2016

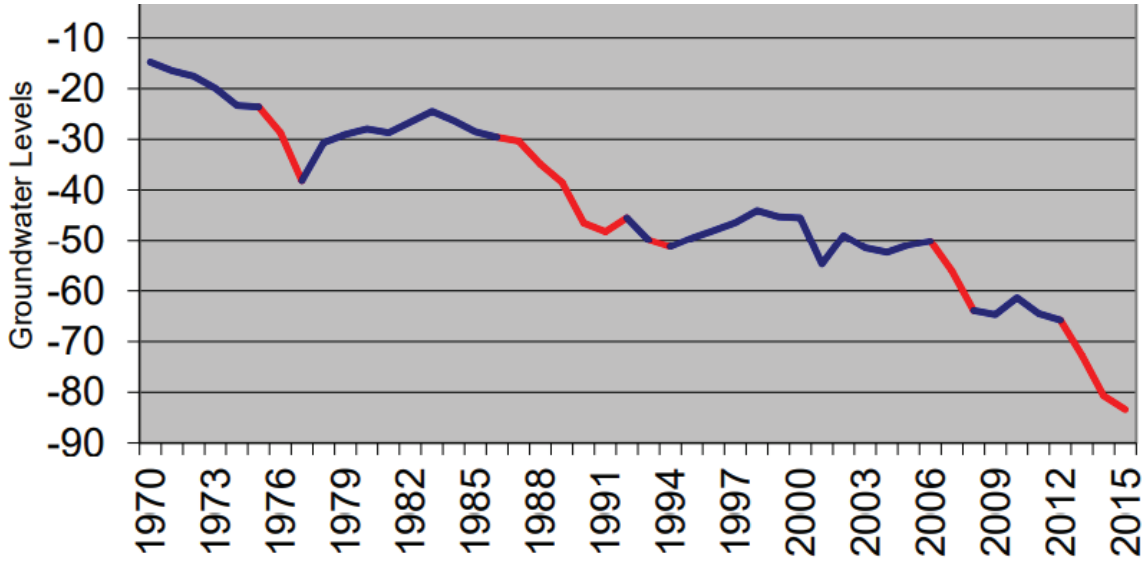



**FIGURE 3.8-3 MID STATIC GROUNDWATER LEVELS, DECEMBER AVERAGE**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

Source: AWMP, 2016

ch2m

Observed water level data were obtained from DWR for the Merced Groundwater Subbasin. Average depth to water for the year 2000 through 2018 was calculated for wells containing water level measurements for this period. Figure 3.8-4 presents the average depth to water across the MID Lateral Service Area (LSA) regions. Average depth to water for the MID LSA regions containing observed water level data are summarized as follows:

- Le Grand: average depth to water ranged from 30.4 to 130.7 feet
- El Nido: average depth to water ranged from 52.8 to 125 feet
- Escaladian: average depth to water ranged from 57 to 128 feet
- Livingston: average depth to water ranged from 21.6 to 105.2 feet
- Crocker Dam: average depth to water ranged from 12.4 to 121.9 feet
- Henderson-Fahren: average depth to water ranged from 38.1 to 93.6 feet
- Fairfield: average depth to water ranged from 38.7 to 98.2 feet

#### 3.8.2.4 Groundwater Storage

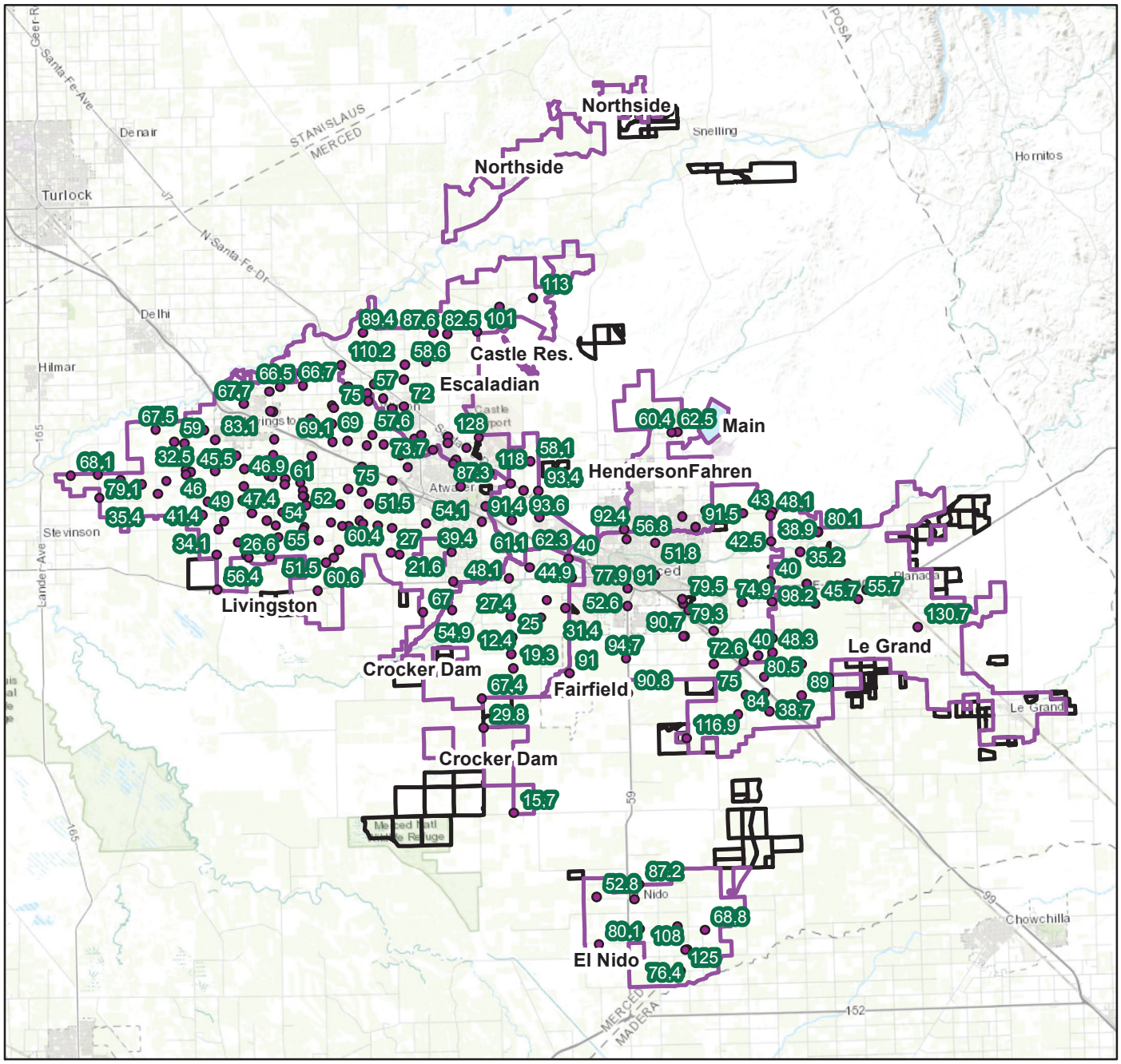
The total storage capacity of the Merced Groundwater Subbasin is estimated to be 21.1 million acre-feet (AF) to a depth of 300 feet, and 47.6 million AF to the base of fresh groundwater (DWR, 2004). On average, the Merced Groundwater Subbasin water levels have declined nearly 30 feet from 1970 through 2000 (DWR, 2004). From 2000 to 2014, the groundwater levels have declined an additional 30 feet (MAGPI, 2016). Due to these long-term declines in groundwater levels over the past 4 decades, within the past year DWR has classified the Merced Groundwater Subbasin as critically overdrafted (DWR, 2016).

#### 3.8.2.5 Groundwater Recharge

Groundwater recharge in the Program Area is primarily driven by deep percolation of precipitation, deep percolation of applied water on irrigated lands, and District canal and water conveyance/storage facility seepage. MID prepared a revised water balance as part of the District's Water Resources Management Plan, which was calibrated to 2010 and 2013 measured flows and estimated water balance terms by LSA. This model was subsequently used with monthly measured flows and climate data to characterize the MID water balance for 2010 through 2015 (MID, 2015). As reported by MID (2015), the combined deep percolation from applied water on grower's fields and canal seepage varied between 134,000 AF and 313,000 during the 2010 through 2015 period, with 2015 being the minimum recharge year due to drought and limited surface water supply. During the full water supply years of 2010 through 2012, recharge from canal seepage varied between 144,000 and 181,000 AF. During the critical drought years of 2013 through 2015, recharge from canal seepage varied between 21,000 and 122,000 AF due to reduced irrigation delivery periods. The variability in groundwater recharge is dependent on hydrology and surface water availability, length of growing season, and the efficiency of irrigation methods.

Direct groundwater recharge rates are expected to decline somewhat in the future, but with in-lieu recharge offsets provided by the Proposed Program. Deep percolation rates per acre are expected to continue to decrease due to the current trend where permanent crops are replacing row crops, as permanent crops are typically irrigated by applying low volume, pressurized irrigation methods with lower percolation rates. Canal seepage rates are also expected to be reduced somewhat due to canal lining projects, but this will reduce water conveyance losses, thereby increasing MID's water availability for customer deliveries and reducing MID customer reliance on supplemental private groundwater supplies.

In dry years, the District relies on pumping groundwater from aquifer storage to supplement surface water deliveries and drawing upon water that recharges the aquifer from canal seepage and deep percolation of applied water during non-critical years.




LEGEND

**Observation_Wells**

- Avg Depth to Water (ft)

MID LSAs

SOIs - Out of District

VICINITY MAP


**FIGURE 3.8-4 OBSERVED DEPTH TO GROUNDWATER, 2000–2018 AVERAGE**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

N

0 2.5 5
Miles

Currently, MID manages two dedicated groundwater recharge basins within its boundaries, one in the northwest portion of the District and one in the southern portion. The northerly basin is referred to as the Cressey Groundwater Recharge Basin, located where the Cressey lateral delivers into the North and South Bloom laterals, north of the town of Winton. This area is characterized by relatively sandy soils and, thus, provides the potential for comparatively higher recharge rates. The Cressey Groundwater Recharge Basin was completed in 2011; the project began in 2000 with seed funding from DWR for investigative studies, followed by an MID-funded pilot testing program. The basin was recently expanded from 8 to 13 acres and can recharge up to 21 AF per day, for about 4,500 AF per irrigation season (MID, 2015).

The southerly recharge basin is referred to as the El Nido Recharge Basin. The El Nido Recharge Basin was constructed by the former El Nido Irrigation District in the 1970s and receives flow under an existing license dedicated to recharge in the El Nido area. This El Nido area is characterized by moderately drained soils and, thus, recharge rates are typically lower than those observed in the vicinity of the Cressey Recharge Basin. This 21-acre basin has about 18 acres of effective infiltration area and can recharge an average of about 5 cubic feet per second or 10 AF per day, for up to 3,750 AF annually (2,950 AF during the irrigation season and 800 AF outside of the irrigation season).

#### 3.8.2.6 Groundwater Quality

Generally, groundwater quality in the MID area is adequate for beneficial uses in the Merced Groundwater Subbasin, but some groundwater quality issues exist. For example, relatively higher levels of salinity (measured as total dissolved solids [TDS]) exist generally at depths between 400 and 800 feet bgs. TDS concentrations tend to increase from east to west and toward the south (Chowchilla River), with the eastern two thirds of the subbasin having TDS concentrations less than 500 milligrams per liter(mg/L) (RMC, 2013). TDS concentrations have been measured to range between 90 and greater than 1,250 mg/L. High-salinity groundwater is present at depths from about 400 feet in the western portion of the subbasin to over 800 feet in the eastern portion (MAGPI, 2008). Deep marine deposits are thought to be the source of elevated salinity in these zones. This saltier water tends to migrate upwards into the shallower zone due to natural pressure gradients, but the upward migration might also be exacerbated by groundwater pumping. In addition, some groundwater production wells are screened across multiple aquifers, resulting in hydraulic connectivity between the shallow and deep zones, which results in mixing of groundwater from different aquifer layers. In areas where the Corcoran Clay persists, the confining layer acts as a natural impediment to the migration of high TDS groundwater into the shallower aquifer. However, wells screened above and below the Corcoran Clay can create high-permeability pathways through the confining unit, from which high TDS groundwater can be transported to shallower depths.

The shallow aquifer is the most vulnerable to groundwater contamination by constituents introduced at the surface (such as fertilizers and pesticides). Nitrate, which can be found naturally in some sedimentary rocks, is mostly introduced through human-related sources and occurs in high concentrations in many areas of the San Joaquin Valley. High nitrate concentrations create a concern for drinking water supplies, although nitrate is of less concern for agricultural supplies, since the added nitrate in the water is usually beneficial for crops. Sources of nitrate in groundwater include agricultural fertilizers, sewage effluent, septic tank effluent, and animal wastes. High nitrate concentrations are a concern in portions of the Merced Groundwater Subbasin. The average nitrate concentration between 2007 and 2012 in the Merced area groundwater is reported to be generally less than 20 mg/L as nitrate (which is below half the maximum contaminant level of 45 mg/L). However, in some areas, nitrate concentrations were measured as high as 330 mg/L, which may be associated with animal confinement facilities (RMC, 2013).

Other groundwater quality impacts are due to high concentrations of iron and manganese, as well as groundwater contamination from MTBE (methyl tert butyl ether), DBCP (dibromochloropropane), and other contaminant sources. Additional reported constituents of concern include chloride in some parts of the basin (often associated with high salinity levels); iron and manganese in the shallow groundwater

of some areas; and slightly elevated concentrations of hexavalent chromium, perchlorate, and some types of pesticides in limited areas (RMC, 2013).

#### 3.8.2.7 Groundwater Use

As of 2015, MID owned 235 groundwater production wells. Wells within the District typically range in depth from approximately 50 to 650 feet bgs. Water pumped from MID's wells is typically discharged into the MID water distribution system to supplement surface water deliveries. A portion of MID groundwater pumping is operated to provide groundwater to areas without access to surface water (high ground areas), and the remainder of groundwater pumping is operated to supplement surface water supplies in years of diminished supply. Over the 2010 through 2015 period, MID groundwater pumping ranged from 4,000 to 7,000 AF in 2010 and 2011 up to a high of 57,000 AF in 2013 as needed during drought conditions to supplement surface water supplies (MID, 2015).

MID historically delivered approximately 8,000 AF of pumped groundwater to the high ground areas that do not have access to surface water supplies (approximately 1,764 acres) on an average annual basis. However, the gradual replacement of deep well usage by irrigation booster pumps has allowed for the delivery of surface water supply to these high grounds, decreasing the amount of groundwater pumped on an annual basis during years of adequate surface water supply. In 2011, only 4,112 AF of groundwater was pumped to supply these high grounds, with the remainder being met by surface water supply.

The MID covers a service area of approximately 166,000 acres, with a current customer base of approximately 133,500 acres. District customers on MID-irrigated and standby lands use private groundwater pumping wells to supplement surface water supplies as needed. On average, during the "full water supply" years of 2010 through 2012, 127,000 acre-feet per year (AFY) of private groundwater was pumped by MID customers. This increased to an estimated 277,000 AFY during the critical drought years of 2013 through 2015. Within the Merced Groundwater Subbasin, including areas outside of MID, private agricultural groundwater pumping is estimated to be 484,000 AFY, urban municipal groundwater pumping is approximately 44,000 AFY, and private residential groundwater pumping was approximately 78,000 AFY on average for the 1996 through 2015 period (Woodard & Curan, 2019).

Urban water demands in the city of Merced form the largest single component of the municipal and industrial demand category. Urban areas occupy approximately 18,200 acres within MID. The Merced Subbasin Groundwater Management Plan reported a total of approximately 43,700 AF of urban groundwater use in 2014. This total includes both groundwater pumped by urban utilities and groundwater produced by small, private residential water systems, commercial businesses, and industrial plants not served by the major utilities. Figure 3.8-5 shows areas receiving MID water supplies in green, and areas that depend solely on private groundwater pumping are shown in blue.

#### 3.8.2.8 Conjunctive Water Resources Management

MID is a conjunctively managed district that has rights to surface water supplies and overlies a sizeable groundwater basin that readily receives and yields water. The City of Merced and MID, along with several other water agencies, formed the Merced Area Groundwater Pool Interests in 1997 to promote conjunctive groundwater management throughout the Merced Groundwater Subbasin (MID, 2016). MID's normal operating objective is to maximize surface water use subject to availability to preserve groundwater for use in years when surface supplies are limited. Thus, the proportions of surface water use and groundwater use vary from year to year depending primarily on surface water availability and, to some extent, on cropping patterns and weather conditions. During an average wet year, 99 percent of MID's water supply comes from surface water sources compared to 92 percent from surface water in an average dry year (this can be as low as 79 percent in certain dry years, such as 2008). The remainder of the supply comes from groundwater. The majority of the District's wells are typically left on standby to be operated for irrigation during years of inadequate surface water supply. Some wells are operated annually to serve high-ground parcels (MID, 2016).

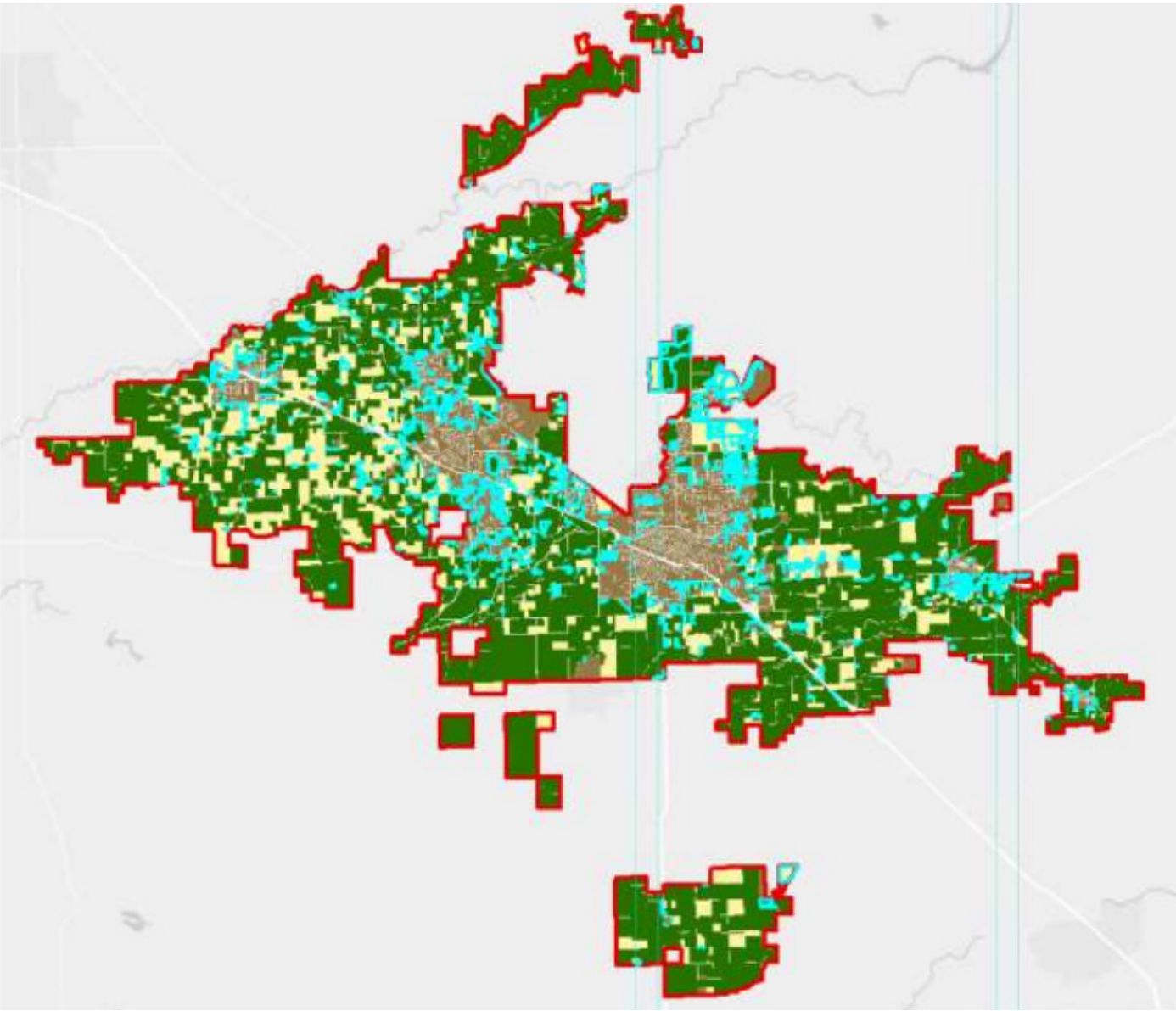


**FIGURE 3.8-5 2013 DISTRIBUTION OF RECEIVING MID WATER AND THOSE THAT RELY EXCLUSIVELY ON PRIVATE GROUNDWATER PUMPING**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

Source: AWMP, 2016

Complimentary to its conjunctive management operations is MID's focus on water conservation and enhanced system efficiency. A major emphasis of its capital improvement program is to improve the distribution system to reduce or redirect operational spills such that they can be put to beneficial use, leading to improved water conservation. MID also possesses several smaller reservoirs (i.e., regulating basins) monitored and controlled by a supervisory control and data acquisition (SCADA) network that are used for regulating flows and balancing the supplies and demands of the system (MID, 2016). These activities lead to increased conveyance system efficiencies.

Certain canals have been designated by MID for raw water supply for future surface water treatment plant(s) at each of the three major cities within MID's designated place of use, as well as certain unincorporated areas. This designation restricts canal inflows to surface water from the Merced River or pumped groundwater from MID's wells. Preserving the sanitary status of these canals allows for their use in conveyance of raw water for treatment during the anticipated future shift of urban supply from groundwater to surface water. This shift is anticipated to occur once the groundwater basin reaches a certain threshold, with regards to quality and groundwater levels, and require the cities to begin using treated surface water for municipal supply (currently all cities and communities within MID's place of use rely on groundwater for all their water needs) (MID, 2013).

## 3.8.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential impacts on groundwater resources. The thresholds used to evaluate potential groundwater resources impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

### 3.8.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and listed below. Impacts on groundwater resources are considered significant if the Proposed Program would result in any of the following:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Proposed Program may impede sustainable groundwater management of the basin.
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Potential impacts on surface water quality and water quality control plans are analyzed in Subsection 3.9, Hydrology and Water Quality, and are not discussed further in this section.

### 3.8.3.2 Impact Assessment Assumptions and Methodology

As described in Subsection 2.1, three elements of the Proposed Program are evaluated in this PEIR, including (1) system improvements, (2) opportunity for Class II to Class I conversion, and (3) water transfers. Potential impacts related to each of these elements are addressed in the impact analyses below. The system improvements element of the Proposed Program includes projects that have been grouped into project categories based on common features. To avoid repetitive text, where an impact analysis applies to more than one project category, the analysis is presented as a single discussion with the relevant categories specified. Similarly, if anticipated effects are similar across impact type, potential effects are referenced across impact type, as appropriate.

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each environmental resource

area, as applicable. The Proposed Program and No Program Alternative would result in appreciably different groundwater extraction scenarios, and analyses of impacts on groundwater resources associated with the Proposed Program when compared to Existing Conditions and when compared to the No Program Alternative are provided.

Potential impacts on groundwater resources associated with the implementation of the Proposed Program within the Merced Groundwater Subbasin were evaluated using the California Central Valley Groundwater-Surface Water Simulation Model Fine Grid (C2VSim-FG). For this evaluation, the C2VSim-FG models were run in a "superposition" analysis mode to identify potential changes in groundwater elevations from the implementation of the Proposed Program. Use of these models allows for comparison to estimate the net change in groundwater conditions between two alternatives, and results should not be interpreted as absolute values of groundwater fluxes resulting from implementation of a particular alternative. With this assumption and constraint, the modified model configuration conforms to the accepted "superposition" approach analysis suitable for evaluating net changes in groundwater elevations between alternatives.

Deep percolation and seepage estimates from the District's Water Balance Model (WBM) developed as part of the Water Resources Management Plan were applied to C2VSim-FG Model Layer 1 (simulated as unconfined) within each District LSA and applicable canal areas. Deep percolation and seepage estimates were distributed evenly across model elements within each LSA other than where the Main Canal and Castle Reservoir LSA timeseries data from the WBM directly represent changes in seepage due to canal lining construction projects proposed as part of the Proposed Program. Seepage estimates for Main Canal and Castle Reservoir LSAs were distributed evenly across the length of the associated canals and reservoirs in those LSAs. Portions of canals currently categorized by the District as in "failed" or "poor" condition were assumed to leak water at rates equivalent to an unlined canal, and other portions in better condition were assumed to operate as an intact lined canal with respect to potential seepage.

Groundwater pumping estimates from the WBM were applied to C2VSim-FG in both Model Layers 1 and 2, as represented by the original fractional pumping for each layer, specified in the C2VSim pumping specifications input file. Accounting for that the majority of the groundwater pumping occurs in the deeper Model Layer 2 (simulated as confined), pumping was also distributed over evenly to each model element within the LSA, as provided by the WBM. In-basin, out-of-District water transfers to sphere of influence (SOI) regions were accounted for under the Proposed Program by evenly distributing the WBM timeseries to SOI areas/parcels that have historically received water transfers from the District. As such, provision of water to a wider area within the SOI would be anticipated to result in a more dispersed increase in groundwater levels. A more detailed discussion on input data and modeling methodology assumptions are presented in Appendix F.

The Merced Water Resources Model, which is an existing regional groundwater flow model currently in development for use under the ongoing Merced Groundwater Sustainability Plan, was not used given its ongoing development status.

#### 3.8.3.3 Impacts Associated with the Proposed Program and No Program Alternative

**Impact GW-1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade groundwater quality.**

As described in Section 2, Program Description and Alternatives, construction of the Proposed Program would include a variety of activities requiring the use of heavy equipment. It is possible that the operations and maintenance of construction equipment could result in hazardous materials spills if materials are misused or improperly handled and stored. Leaks and spills could enter the soil and potentially contaminate groundwater. As listed under Subsection 2.5, Environmental Commitments, the District would implement a stormwater pollution prevention plan (SWPPP), as required by the

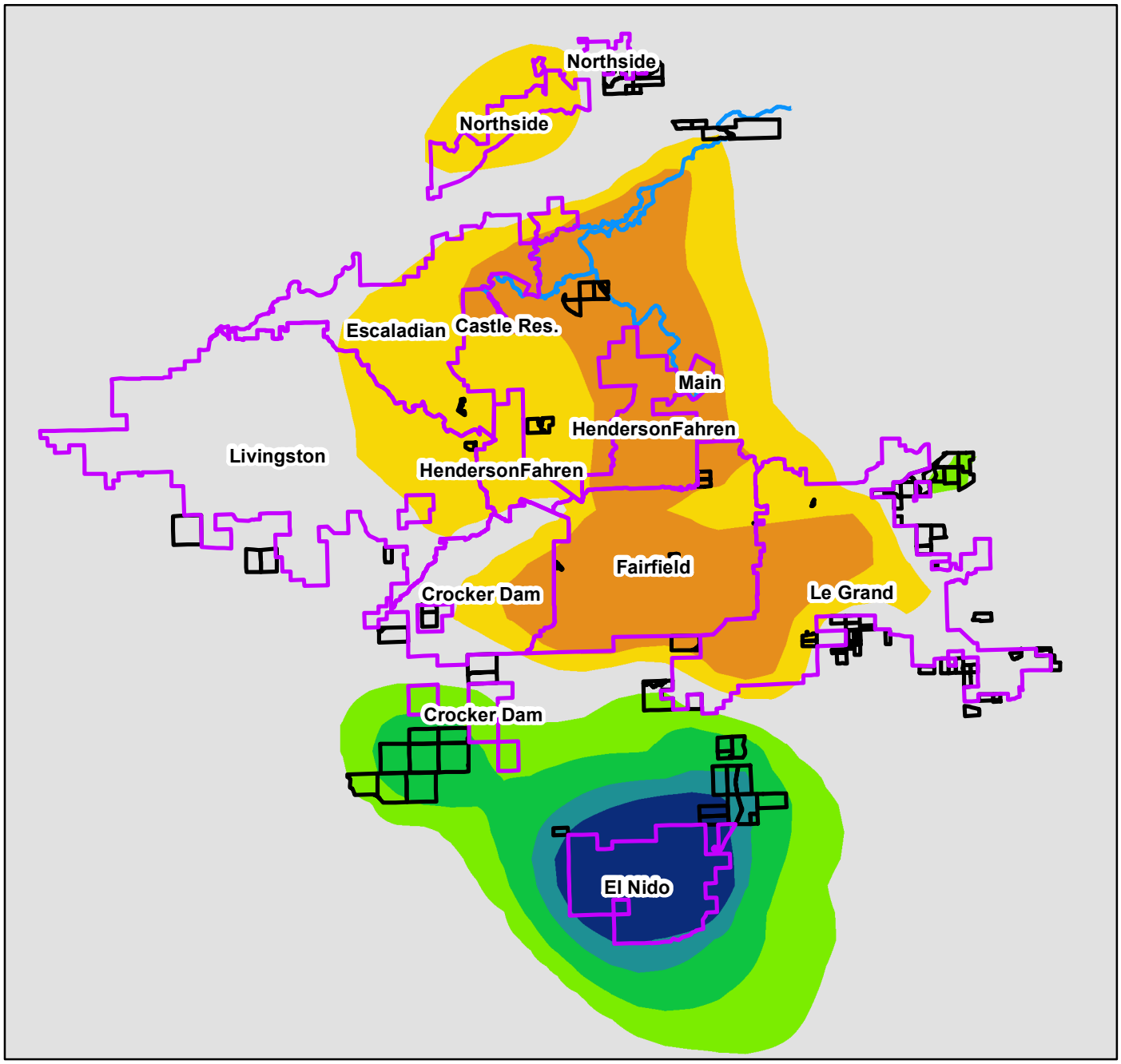
Construction General Permit. The construction contractor(s) would prepare and implement a SWPPP consistent with the guidance provided in the most recent edition of the California Stormwater Quality Association Best Management Practice Handbook or similar resource. The SWPPP would emphasize proper hazardous materials storage and handling procedures; would outline spill containment, cleanup, and reporting procedures; and would limit refueling and other hazardous activities to designated areas. Signs prohibiting refueling would be posted in sensitive areas. Equipment would be inspected prior to use each day to ensure that hydraulic hoses are tight and in good condition. Other appropriate best management practices (BMPs), such as use of concrete washout basins and proper waste management and securely locating and maintaining portable toilets, would be used to prevent discharge of possible contaminants and chemicals associated with construction activities. ***With implementation of the SWPPP and BMPs, Program construction would not violate water quality standards or waste discharge requirements; and impacts would be less than significant***.

Operations and maintenance activities during operation of the Proposed Program would be consistent with existing operations and maintenance activities. The measures outlined in the SWPPP and BMPs would be incorporated into routine maintenance activities, as applicable, to prevent the release of water pollutants during Program operation. As such, Program operation would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade groundwater quality. ***Groundwater quality impacts associated with Program operation would be less than significant***.

**Impact GW-2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Proposed Program may impede sustainable groundwater management of the basin.**

As described in Section 2, Program Description and Alternatives, system improvement projects are proposed throughout the District and would be implemented over approximately 30 years. Construction of facilities would be limited to surface activity and excavation above current groundwater levels; and accordingly***, no construction-related impacts on groundwater supplies would occur.***

Under the Proposed Program, water users in the El Nido region would have a one-time opportunity to convert from Class II to Class I for a fee and receive District surface water supplies. As a result, a reduction in groundwater pumping of 17,000 AFY on average associated with the availability of surface water supplies is expected for the El Nido area under the Proposed Program as compared to Existing Conditions and the No Program Alternative. Projected groundwater levels in the El Nido area would increase by more than 15 feet in comparison to Existing Conditions and the No Program Alternative (Figures 3.8-6 through 3.8-9). As previously discussed, depth to groundwater in the El Nido region is approximately 53 to 125 feet bgs; therefore, the projected increase in groundwater levels in the El Nido region would be a beneficial impact. ***Class II to Class I water user conversion would result in a reduction in pumping for the El Nido region, which would in turn be a beneficial impact with respect to increasing aquifer water levels and improving groundwater supplies. Accordingly, no adverse impacts on groundwater supplies would occur in response to a possible Class II to Class I conversion.***




LEGEND

- MID LSAs
- SOIs - Out of District
- Castle Reservoir and Main Canal

**Simulated Water Level Change (ft)**

- -9 - -4
- -4 - -2
- -2 - 2
- 2 - 5
- 5 - 10
- 10 - 15
- 15 - 34

VICINITY MAP

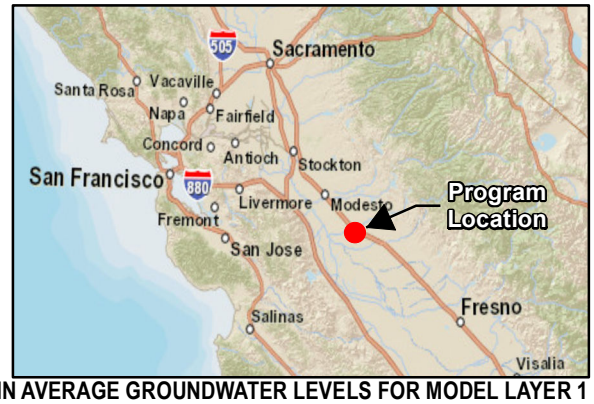
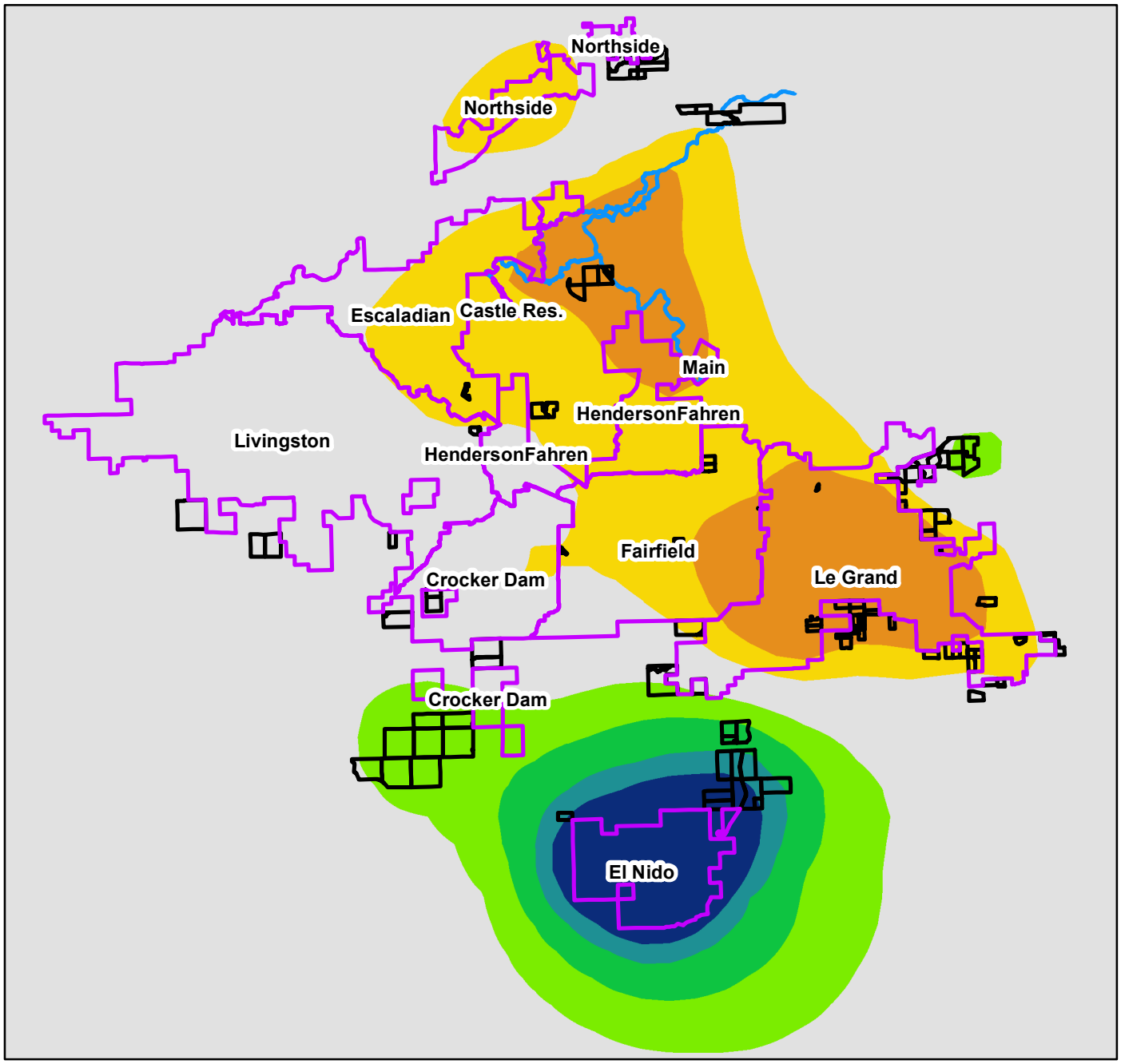



**FIGURE 3.8-6 SIMULATED CHANGE IN AVERAGE GROUNDWATER LEVELS FOR MODEL LAYER 1 WHEN COMPARING THE PROPOSED PROGRAM TO EXISTING CONDITIONS**

N

0 2.5 5
Miles

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA




LEGEND

- MID LSAs
- SOIs - Out of District
- Castle Reservoir and Main Canal

**Simulated Water Level Change (ft)**

- -9 - -4
- -4 - -2
- -2 - 2
- 2 - 5
- 5 - 10
- 10 - 15
- 15 - 34

VICINITY MAP

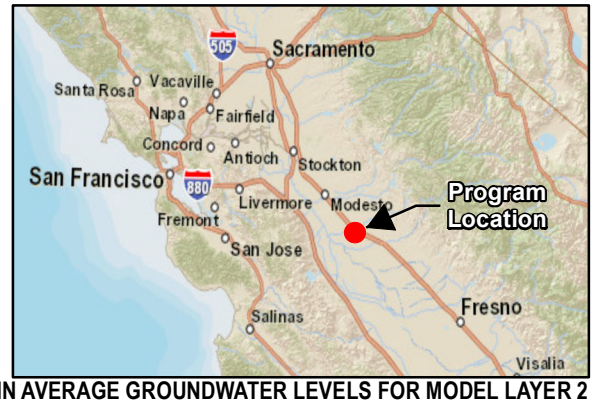



**FIGURE 3.8-7 SIMULATED CHANGE IN AVERAGE GROUNDWATER LEVELS FOR MODEL LAYER 2 WHEN COMPARING THE PROPOSED PROGRAM TO EXISTING CONDITIONS**

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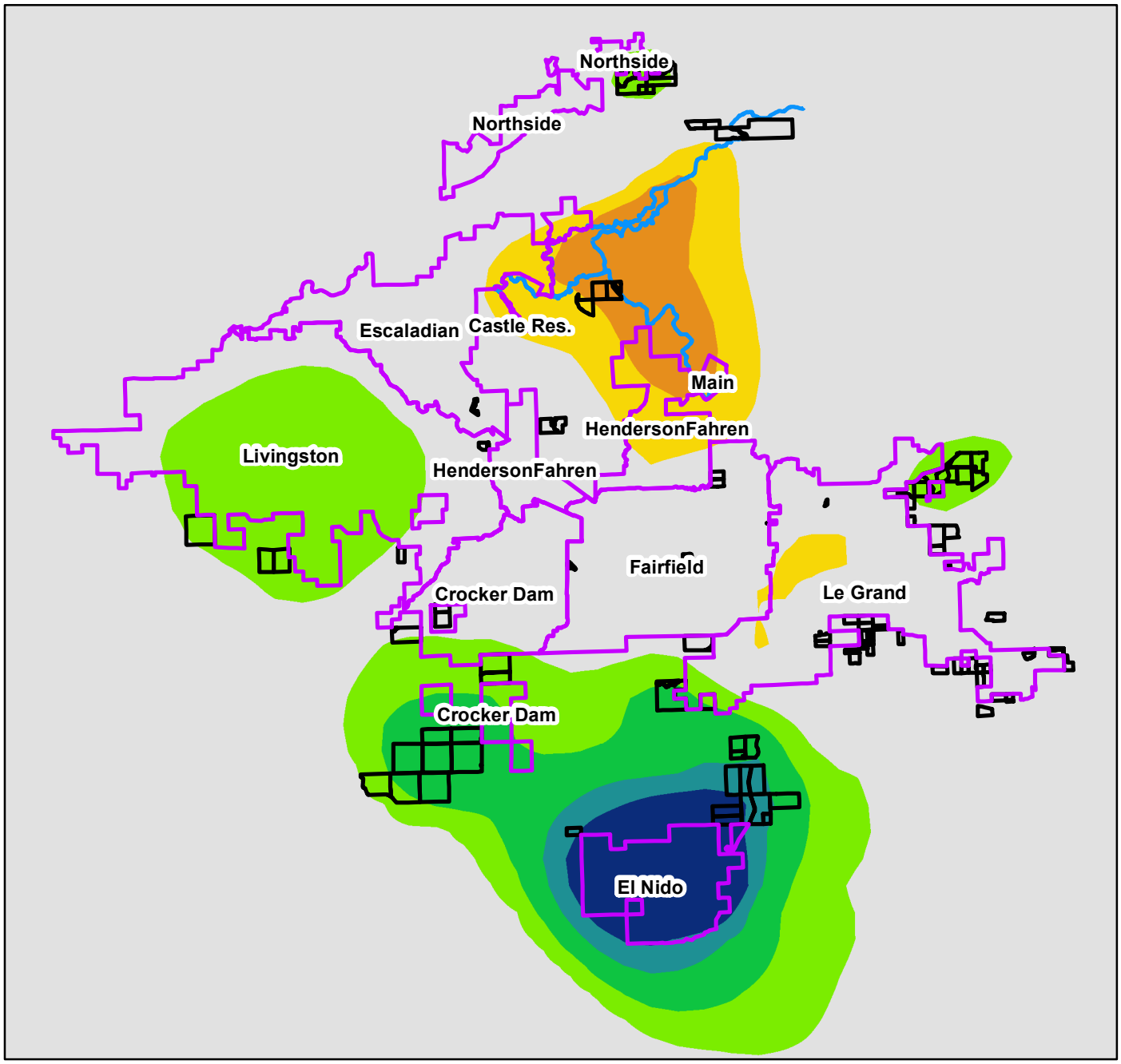
Miles

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA




LEGEND

- MID LSAs
- SOIs - Out of District
- Castle Reservoir and Main Canal

**Simulated Water Level Change (ft)**

- -6 - -4
- -4 - -2
- -2 - 2
- 2 - 5
- 5 - 10
- 10 - 15
- 15 - 34

VICINITY MAP

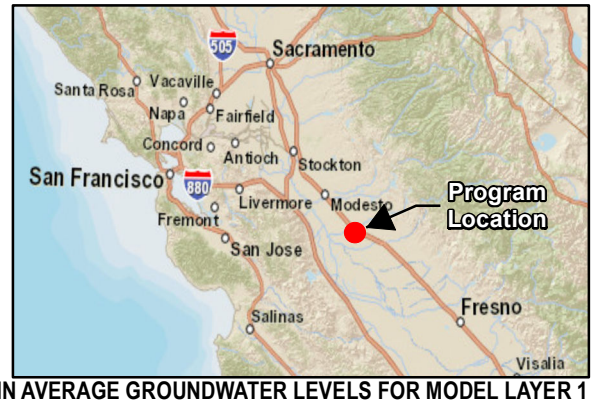



**FIGURE 3.8-8 SIMULATED CHANGE IN AVERAGE GROUNDWATER LEVELS FOR MODEL LAYER 1 WHEN COMPARING THE PROPOSED PROGRAM TO THE NO PROGRAM ALTERNATIVE**

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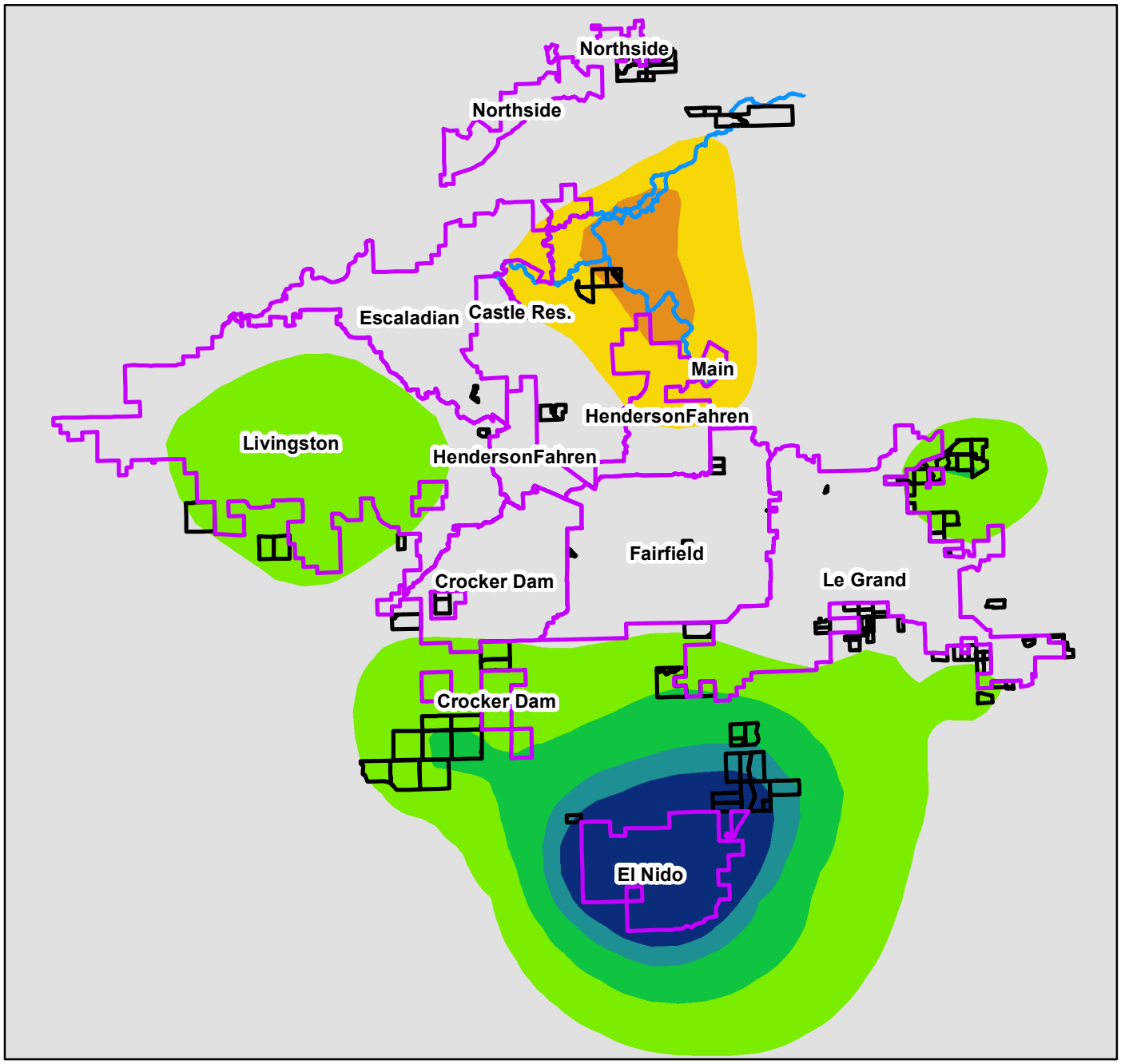
Miles

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA




LEGEND

- MID LSAs
- SOIs - Out of District
- Castle Reservoir and Main Canal

**Simulated Water Level Change (ft)**

- -6 - -4
- -4 - -2
- -2 - 2
- 2 - 5
- 5 - 10
- 10 - 15
- 15 - 34

VICINITY MAP

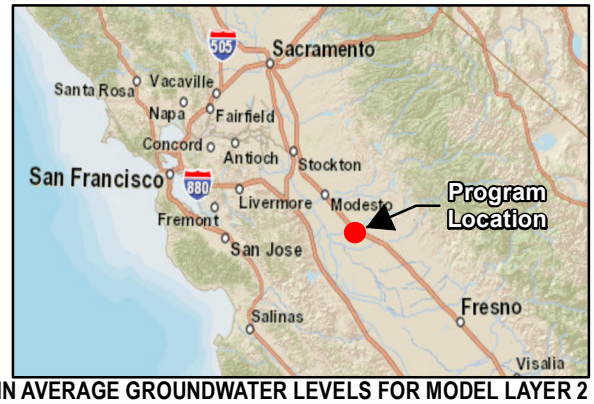



**FIGURE 3.8-9 SIMULATED CHANGE IN AVERAGE GROUNDWATER LEVELS FOR MODEL LAYER 2 WHEN COMPARING THE PROPOSED PROGRAM TO THE NO PROGRAM ALTERNATIVE**

N

0 2.5 5
Miles

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

As part of the Proposed Program, District modernization efforts would also increase water conveyance and water use efficiency throughout the District allowing for more surface water availability for delivery to District standby water users. This would be accomplished through projects that reduce operational spills, reduce canal seepage losses, and improve water delivery responsiveness to water user needs. As a result of these modernization efforts, an increase in deliveries to MID customers and reduction in private groundwater pumping is expected within the Escaladian, Henderson-Fahrens, Fairfield, and Livingston LSA areas. Most notably, a reduction in groundwater pumping of approximately 6,500 AFY to meet irrigation demand would be anticipated to occur in the Livingston LSA, resulting in an increase in groundwater levels of up to 5 feet in comparison to the No Program Alternative (Figures 3.8-8 and 3.8-9). Conversely, decreases in groundwater levels up to 6 feet are projected adjacent and along portions of the Main Canal that are proposed to be lined to reduce erosion and improve structural stability as well as reduce localized leakage through canal banks (Figures 3.8-8 and 3.8-9). ***District modernization would result in a reduction in groundwater pumping for LSA regions throughout the District, resulting in the beneficial impact of increased groundwater levels; and accordingly, no adverse impacts on groundwater supplies would occur. In localized areas along the Main Canal where groundwater levels may be lowered, any impacts would be less than significant.***

The Proposed Program would also enhance the District's ability to deliver water throughout the subbasin to lands outside of the District within the Merced Groundwater Subbasin, including those within MID's SOI. As previously discussed, impacts associated with in-basin water transfers would be assumed to occur within lands outside of the District but within the Merced Groundwater Subbasin, including those within MID's SOI; actual final locations of transfer end-users are not known. Regardless of end-user location, in-basin surface water transfers are anticipated to correspondingly decrease the need for groundwater pumping to meet a portion of irrigation demand. Projected groundwater levels under the Proposed Program would be expected to increase up to 5 feet in out-of-District areas near Crocker Dam, North Side, and East of the Le Grand LSA (Figures 3.8-6 through 3.8-9) in comparison to Existing Conditions and the No Program Alternative. ***Out-of-District in-basin water transfers would result in a beneficial increase in recharge to SOI areas; and accordingly, no adverse impacts on groundwater supplies would occur.***

Out-of-basin water transfers are also proposed under the Proposed Program to help maximize the District use of its water rights and resources. Such transfers would be made so as not to affect the ability to provide surface supplies to existing in-District customers. ***Impacts from proposed out-of-basin water transfers would be less than significant.***

Under operation of the Proposed Program, groundwater levels are projected to decrease less than 9 feet in comparison to Existing Conditions, and less than 6 feet in comparison to the No Program Alternative in localized areas across the District (Figures 3.8-6 through 3.8-9). Decreases in water levels are associated with areas where canal lining projects and changes to deep percolation are simulated to occur, primarily along the Main and Castle Reservoir canal systems, and throughout LSA regions. These relatively minor decreases in groundwater levels would be generally localized to areas adjacent to the canals to be lined and would not affect typical groundwater availability and pumping given existing wells are screened from 50 to 550 feet bgs. In other areas, groundwater levels would increase up to 5 feet in response to water delivery system improvements and increased deliveries to lands outside the District within the Merced Groundwater Subbasin. Increases in groundwater levels of over 15 feet are projected in response to a possible Class II to Class I conversion. ***The long-term net effect of operating improvement projects under the Proposed Program would not substantially decrease groundwater levels and would increase groundwater levels in some areas; and impacts on groundwater supplies would be less than significant.***

**Impact GW-3: Conflict with or obstruct implementation of a sustainable groundwater management plan.**

Under the Proposed Program, when considering the cumulative effects on recharge and groundwater pumping within the Merced Groundwater Subbasin, the net recharge to the groundwater basin would be reduced by approximately 1,000 AF per year on average in comparison to Existing Conditions. The No Program Alternative, however, would reduce overall net recharge by approximately 25,000 AFY on average. The change in net recharge under the Proposed Program would result in impacts that would be less than significant compared to Existing Conditions and would result in an increase in net recharge compared to the No Program Alternative. Additional environmental review of out-of-basin transfers would be conducted as necessary depending on term transfer volume(s), timing, and transferee. ***While the Groundwater Sustainability Plan for the Merced Groundwater Subbasin is in development, the Proposed Program is not anticipated to conflict with or obstruct implementation of the plan, and impacts would be less than significant***.

## 3.8.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant impacts on groundwater resources; therefore, mitigation is not required or recommended.

# 3.9 Hydrology and Water Quality

This section describes the regulatory and environmental setting related to surface water resources and evaluates potential surface water resources/water quality impacts associated with the implementation of the Proposed Program. For the purposes of this section, the Study Area is the San Joaquin River Basin.

## 3.9.1 Regulatory Setting

This section describes guidelines and regulations for evaluating potential impacts and mitigation related to surface water resources.

### 3.9.1.1 Federal

**Clean Water Act**

The Clean Water Act (CWA) (United States Code, Title 33, Section 1251 et seq.) is the primary federal law governing surface water quality. The goal of the CWA is to restore and maintain the physical, chemical, and biological integrity of the waters of the United States (U.S.). The CWA guides restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters.

CWA Section 401, 402, and 404 requirements specifically apply to construction projects that might affect jurisdictional wetlands and waters of the U.S. If a project discharges into waters of the U.S., Section 401 specifies that a Regional Water Quality Control Board (RWQCB) certification must be obtained verifying that the project complies with the CWA and State water quality standards.

Section 402 established the National Pollutant Discharge Elimination System, which regulates permits to discharge a pollutant (except dredge or fill material) into waters of the U.S. Construction projects with disturbance areas greater than 1 acre require coverage under the State's Construction General Permit (CAS0000001, Order 2009-0009-DWQ as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ). The permit requires development and implementation of a site-specific stormwater pollution prevention plan (SWPPP), which must include best management practices (BMPs) to provide an effective combination of erosion and sediment controls. In Merced County (County), the Central Valley RWQCB is the Section 401 and 402 permitting authority in the Program Area.

Section 404 of the CWA established the U.S. Army Corps of Engineers (USACE) permit program regulating the discharge of dredged or fill material into jurisdictional wetlands and waters of the U.S. The USACE's dredge and fill regulations are in 33 *Code of Federal Regulations* (CFR) Parts 320 through 330. Implementation of dredge and fill permitting follows the Section 404 (b)(1) Guidelines, which were jointly developed by U.S. Environmental Protection Agency (EPA) and USACE (40 CFR 230). The Section 404(b)(1) Guidelines allow the discharge of dredged or fill material into an aquatic system only if no practicable alternative with fewer adverse effects is available.

Section 303(c)(2)(B) of the CWA requires the State to develop and adopt numeric water quality standards for priority toxic pollutants identified according to EPA's Water Quality Management and Planning Regulation (40 CFR 130.7(b)), if those pollutants could be reasonably expected to interfere with the designated beneficial uses for a particular water body. EPA enacted the California Toxics Rule (40 CFR 13.138) to establish water quality criteria for water bodies not yet identified by the State and without numeric water quality criteria for priority toxic pollutants.

Section 303(d) of the CWA requires the State to identify and list water bodies not meeting water quality standards; these waters are deemed "impaired." The State then must develop a total maximum daily load, which is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources for the impaired water body.

**Section 10 of Rivers and Harbors Act (33 United States Code 401 et seq.)**

Section 10 of the Rivers and Harbors Act requires a permit for any project obstructing waters of the U.S., including excavation and fill activities. Under the Rivers and Harbors Act, navigable waters are defined as water bodies with flows affected by the ebb and flow of the tide and/or that are used as means of transportation for interstate or foreign commerce.

### 3.9.1.2 State

**Porter-Cologne Water Quality Control Act**

The 1969 Porter-Cologne Water Quality Control Act gives statutory authority to regulate surface water and groundwater quality in the state to the State Water Resources Control Board (SWRCB) and the RWQCBs. The Porter-Cologne Water Quality Control Act is regulated by the SWRCB and nine RWQCBs, which regulate all pollutant or nuisance discharges that may affect surface water resources. The federal CWA authority under Section 402 was extended to the SWRCB and RWQCBs in 1972. The Porter-Cologne Water Quality Control Act protects the beneficial uses of surface water, as well as groundwater, in California, with a focus on water quality.

Each RWQCB is responsible for developing a Water Quality Control Plan for its region. The Proposed Program would be located within the jurisdiction of the Central Valley RWQCB, which prepared and regularly updates the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (CVRWQCB, 2018). The Water Quality Control Plan establishes water quality standards for all surface water and groundwater resources within the region, including designating the beneficial uses of waters, establishing numeric and narrative water quality objectives to ensure that beneficial uses are achieved, and incorporating the State's anti-degradation policy. In addition to administering the NPDES program through issuance of Waste Discharge Requirements, the SWRCB and RWQCBs also regulate discharges of waste to water or land that could affect surface water or groundwater.

**California Fish and Game Code**

Section 1602 of the California Fish and Game Code protects the natural flow, bed, channel, and bank of any perennial, intermittent, and ephemeral rivers, streams, and lakes in the state. These waterways are designated by the California Department of Fish and Wildlife if there is, at any time, any existing fish or wildlife resources, or benefit for the resources. Any activity conducted by any person, state, or local governmental agency, or public utility with the potential to: 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 must be notified to California Department of Fish and Wildlife; and a Section 1602 Lake and Streambed Alteration Agreement must be obtained.

**California Water Code Section 13260**

To avoid or minimize potential adverse impacts on waters of the State, California Water Code Section 13260 requires a waste discharge report submitted to the applicable RWQCB for any person discharging or proposing to discharge waste into any waters of the State other than into a community sewer system.

### 3.9.1.3 Local

**Merced County General Plan**

The Water Element of the *2030 Merced County General Plan* (Merced County, 2011) considers groundwater and surface water supply and quality one of the County's most important determinants of future growth and agricultural production. Objectives of the General Plan include conserving water to protect future generations, preventing water contamination, reusing water, and otherwise effectively managing the watershed. Achieving these objectives requires interagency communication, cooperation,

and coordination among irrigations districts, local governments, and water districts (Merced County, 2011).

The Public Facilities and Services Element of the General Plan also includes goals and policies to prevent flooding and enforce stormwater and floodplain management, as follows:

**Goal PFS-3: Ensure the management of stormwater in a safe and environmentally sensitive manner through the provision of adequate storm drainage facilities that protect people, property, and the environment.**

**Policy PFS-3.4: Agency Coordination (IGC)** — Coordinate with the U.S. Army Corps of Engineers and other appropriate agencies to develop stormwater detention/retention facilities and recharge facilities that enhance flood protection and improve groundwater recharge.

## 3.9.2 Environmental Setting

### 3.9.2.1 Hydrology

The San Joaquin River is the second largest river in California and the largest hydrologic feature in the Program Area. The headwaters of the San Joaquin River are located in the high Sierra Nevada from where water flows approximately 330 miles, generally northwest, through the San Joaquin Valley to the Sacramento-San Joaquin Delta. The San Joaquin River averages 5,110 cubic feet per second (cfs), but ranges from 30 to 325,000 cfs (Benke and Cushing, 2005). As presented in Table 3.9-1, San Joaquin River flows into Merced County, near Newman, California, have historically ranged from 11 to 36,000 cfs.

Table 3.9-1. Summary of Measured Streamflow Data
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Stream | Gage Number/Location | Data Site | Period of Record | Daily Minimum Flow (cfs) | Daily Maximum Flow (cfs) |
|---|---|---|---|---|---|
| San Joaquin River | 11274000 Newman, CA | USGS NWIS | 1912–2017 | 11 | 36,000 |
| Merced River | 11272500 Stevinson, CA | USGS NWIS | 1940–2010 | 0 | 12,000 |
| Bear Creek | B05525 Merced, CA | DWR WDL | 1968–1991 | 0 | 5,450 |
| Burns Creek | B56100 Planada, CA | DWR WDL | 1980–1991 | 0 | 1,530 |
| Owens Creek | B06151 Merced, CA | DWR WDL | 1980–1991 | 0 | 540 |
| Black Rascal Creek | Le Grand Canal | MID | 2001–2016 | 0 | 645 |
| Black Rascal Creek | Yosemite Avenue Diversion | USACE | 1956–2017 | 0 | 2,702 |

Sources: USGS, 2017a; USGS, 2017b; DWR, 2015a; DWR, 2015b; DWR, 2015c; USACE, 2017

Notes:

DWR = California Department of Water Resources
MID = Merced Irrigation District
NWIS = National Weather Information System
USACE = U.S. Army Corps of Engineers
WDL = Water Data Library

The Merced River traverses Merced County and the city of Merced, flowing from the Sierra Nevada in a generally southwesterly direction, and is a principal tributary to the San Joaquin River. The headwaters of the Merced River can be traced back to Mount Lyell and the Clark Range in Yosemite National Park (NPS, 2015). As shown in Table 3.9-1, the stream flow in the Merced River has historically ranged from 0 to 12,000 cfs. The annual flow of the Merced River averages 660 cfs, and it drains an area of approximately 1,040 square miles (City of Merced, 2010; USGS, 2017a).

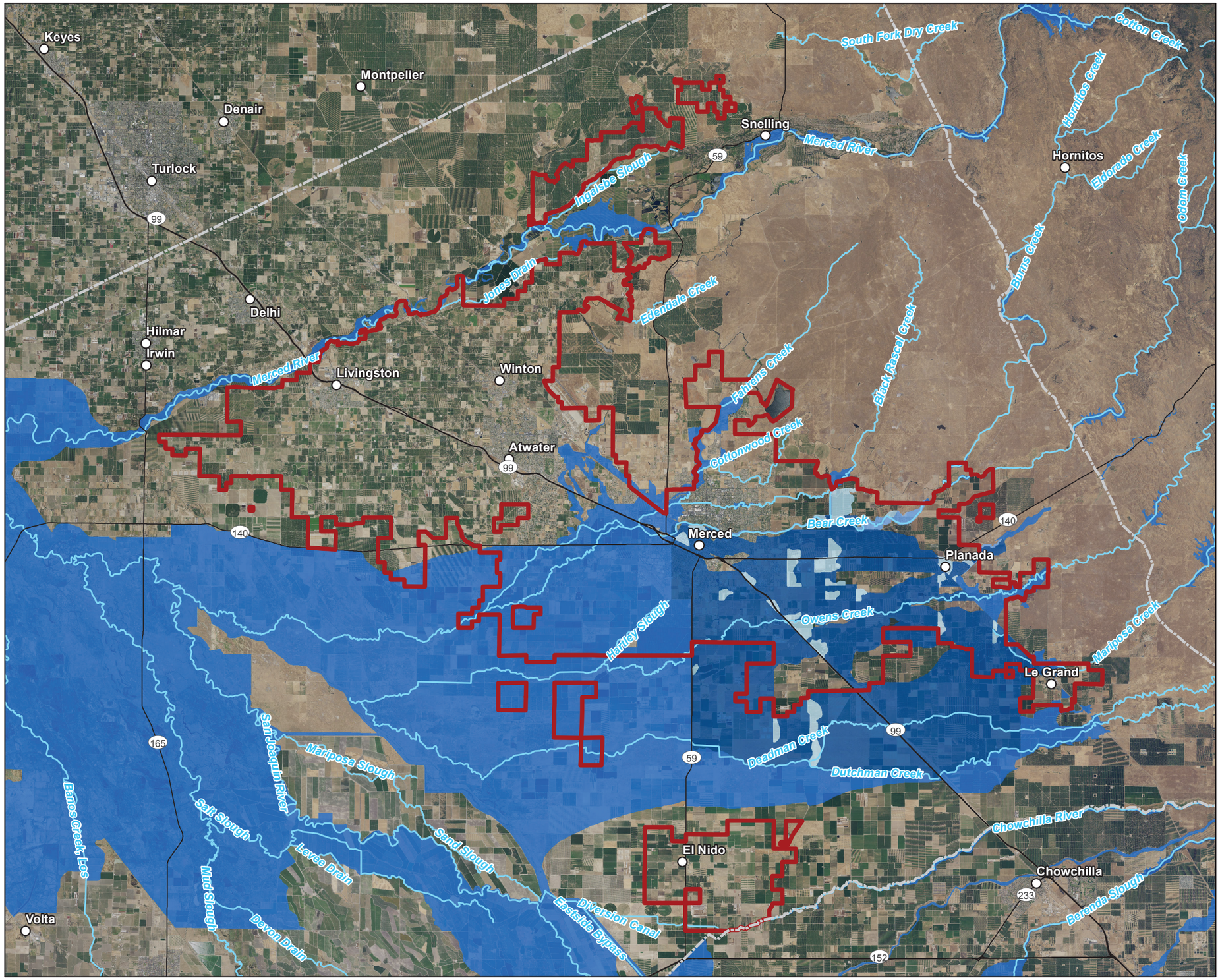
The Merced River is impounded by the New Exchequer and McSwain Dams, which are owned and operated by MID, upstream of its confluence with the San Joaquin River, forming Lake McClure and McSwain Reservoir, respectively. New Exchequer Dam and Reservoir are operated in accordance with the USACE Water Control Manual (USACE, 1981) in a seasonal store-and-release mode with the elevation of the impoundment fluctuating on an annual basis to retain snowmelt from springtime runoff for flood control, water supply, recreation, hydropower, and environmental purposes. In spring and summer, water levels are maintained relatively high for recreation at Lake McClure. From March through October, MID releases water primarily for downstream water supply. These releases are also used for hydropower generation at the New Exchequer and McSwain powerhouses. Flows from McSwain Reservoir are diverted through the powerhouse and then directly to the Merced Falls impoundment, which is owned and operated by MID. The Merced Falls Project is operated in a run-of-river mode. Inflow to the project passes through the impoundment, which is kept at a constant water elevation, and then passes either through the powerhouse or the dam's radial gates. Table 3.9-1 provides stream flow data for the San Joaquin and Merced Rivers and several relatively smaller tributaries to the San Joaquin River located in Merced County.

The headwaters of Bear Creek are impounded by Bear Reservoir, east of the Program Area in western Mariposa County; and the creek is again impounded at the Crocker Dam, west of the city of Merced. The creek runs east to west, discharging into the San Joaquin River approximately 20 miles west of the city of Merced, approximately 3.5 miles southeast of the community of Stevinson. Due to the relatively flat, low-lying topography of the County, the Program Area is susceptible to flooding during major storm events. Much of the Program Area spans parts of the County that have been identified by the Federal Emergency Management Agency (FEMA) as subject to a 1 percent chance of flooding during any given year, otherwise known as a 100-year flood hazard zone (Figure 3.9-1).

Flooding occurred on the Merced River as recently as February 2017 when a USACE levee broke approximately 14 miles downstream of Lake McClure (Miracle, 2017). With extended periods of above-average and record-breaking precipitation in early 2017, many local streams and creek also flooded; and the flooding was so widespread that the County was forced to declare a state of emergency (Calix, 2017), one of 50 counties in California to do so as a result of the rainfall (Feller, 2017). Flooding along local creeks and streams has occurred a number of times in recent years as well, including along Bear Creek in the city of Merced and along Black Rascal Creek near the diversion (URS, 2009).

#### 3.9.2.2 Water Quality

The quality of surface water in Merced County varies spatially and is dependent on factors such as climate, geology, and land use (RMC, 2013). Surface water quality generally decreases from east to west due to diversions (and other factors that decrease streamflow) and return flow from agricultural areas that may contain contaminants. Waterways in Merced County that are listed by the Central Valley RWQCB as being affected by elevated concentration of pesticides, *escherichia coli*, metals, temperature, electrical conductivity, or toxicity include Deadman Creek, Duck Slough, Miles Creek, the Merced River (McSwain Reservoir to the San Joaquin River), and the San Joaquin River (Mud Slough to Merced River).





LEGEND

- MID Service
- Merced County
- Streams and Rivers

**100-year Flood Hazard Zones**

- A - 1% annual chance flooding, for which no Base Flood Elevations have been determined
- AE - 1% annual chance flooding, for which Base Flood Elevations have been determined
- AH - 1% annual chance flooding (usually an area of ponding), for which Base Flood Elevations have been determined; flood depths range from 1 to 3 feet
- AO - 1% annual chance flooding (usually sheet flow on sloping terrain), for which average depths have been determined; flood depths range from 1 to 3 feet

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0 3.5 7
Miles

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom

Source: Flood Zones, https://www.fema.gov/flood-zones

**FIGURE 3.9-1 FEMA 1 PERCENT ANNUAL CHANCE FLOOD HAZARD ZONES**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

#### 3.9.2.3 Climate

Like much of California, the Program Area is characterized by a Mediterranean climate with warm, dry summers and wet but mild winters. Average annual precipitation within the Program Area is approximately 12 inches, coming in the form of rainfall, primarily between the months of November and March. In most years, the rainfall is sufficient to meet the water demand for winter annuals, pasture, and winter cover crops in the orchards; as a result, Merced Irrigation District (District) does not typically provide irrigation deliveries during this period (MID, 2013). However, during extended periods of drought, such as those years experienced between 2012 to 2016, demands generated may be more than those that can be supplied by precipitation; and off-season irrigation deliveries may be necessary. As discussed in Subsection 3.9.2.1, the majority of surface water flows within Merced County originate in the high Sierra Nevada. Average snowpack in the Sierra Nevada varies with a number of factors, including elevation, location, and weather conditions and phenomena, such as the El Niño Southern Oscillation.

#### 3.9.2.4 Regional Water Use

Municipal, industrial, and agricultural water demands in the San Joaquin River Hydrologic Region (SJR Region) are approximately 8.3 million acre-feet per year (AFY; DWR, 2013). Major water supplies in the SJR Region are provided through surface storage reservoirs, including San Luis Reservoir and O'Neill Forebay and Los Banos Creek Reservoir. Groundwater accounts for 38 percent of the water supply in the SJR Region and represents 19 percent of groundwater extracted in California.

Water supply in the San Joaquin River Hydrologic Region is provided by (1) local surface water supplies, (2) imported surface water from the State Water Project (SWP) or Central Valley Project (CVP) (where insufficient local surface water exists), and (3) groundwater (DWR, 2013). Shortfalls in surface supplies are met by groundwater where available and of sufficient quality. Within Merced County, groundwater accounts for about 38 percent of the annual supply for agricultural uses (approximately 764,600 AFY) and 97 percent of the annual supply for urban uses (approximately 84,600 AFY). Agricultural, industrial, and municipal groundwater users in the Merced Groundwater Subbasin pump primarily from deeper continental deposits, whereas domestic groundwater users in the basin generally pump from shallower deposits. Municipal, industrial, and irrigation well yields in the Merced Groundwater Subbasin average from 1,500 to 1,900 gallons per minute (gpm) but can reach up to 5,000 gpm (DWR, 2004) and can extend to depths of up to 800 feet. Groundwater resources and potential impacts/benefits associated with the Proposed Program are discussed in greater detail in Subsection 3.8, Groundwater Resources.

#### 3.9.2.5 Merced Irrigation District System

**Water Rights**

MID provides irrigation water for approximately 133,500 acres in Merced County. To meet water demands, the District conjunctively manages surface water and groundwater. MID holds a variety of water rights, including rights on the Merced River, local reservoirs, and creeks. Groundwater within MID is a secondary supply available to meet customer demands. The use of surface water and groundwater varies from year to year, depending primarily on surface water availability and, to a lesser extent, cropping patterns and weather conditions. Although the vast majority of MID's water supply comes from surface water, groundwater helps to make up shortfalls in surface water supply, particularly in dry years.

**Storage and Supply**

Surface water provided by MID is impounded from two dams on the Merced River. MID operates the New Exchequer Dam, which impounds Lake McClure, and McSwain Dam, which impounds Lake McSwain. Lake McClure was completed in 1967, replacing an existing structure, and provides a storage capacity of 1,024,000 acre-feet (AF), a significant increase compared to the 270,000-AF reservoir the

new facilities replaced. The two reservoirs provide a total of approximately 1,035,000 AF gross water storage and allow the District to meet irrigation demands, provide recreational services including boating and fishing, and provide for environmental needs and stewardship (ITRC, 2014).

Water from the District's reservoirs is diverted into the District's Main Canal, which serves approximately 90 percent of the District's needs. The Main Canal terminates at Lake Yosemite, which has a total storage capacity of approximately 8,000 AF, though the functional storage capacity is only up to 1,800 AF. Lake Yosemite services the three following canal systems:

- Le Grand and Planada Canals
- Fairfield and El Nido Canals
- El Capitan and Deane Canals via Bear Creek

The remaining three canal systems, Livingston, Escaladian, and Northside, are serviced through alternative conveyance routes. Livingston Canal is supplied by Castle Reservoir, which has a storage capacity of approximately 570 AF and is serviced through water diverted from the Main Canal to Canal and Edendale Creeks. The Escaladian Canal is serviced from water diverted directly from the Main Canal, and the Northside Canal is serviced from water diverted directly from the Merced River.

MID also makes water available for the Merced National Wildlife Refuge, Stevinson Water District, and Cowell Agreement Diverters in Merced County (Merced County, 2017). The District estimates available water supply at the beginning of the irrigation season, based on a variety of factors including anticipated runoff; District in-stream requirements; historical water commitments, such as those to senior water right holders and adjudicated rights, in the Merced River and throughout the distribution system; system losses from evaporation, leaks, and other means; existing storage and storage needs in Lake McClure (MID, 2013).

**System and Conditions Summary**

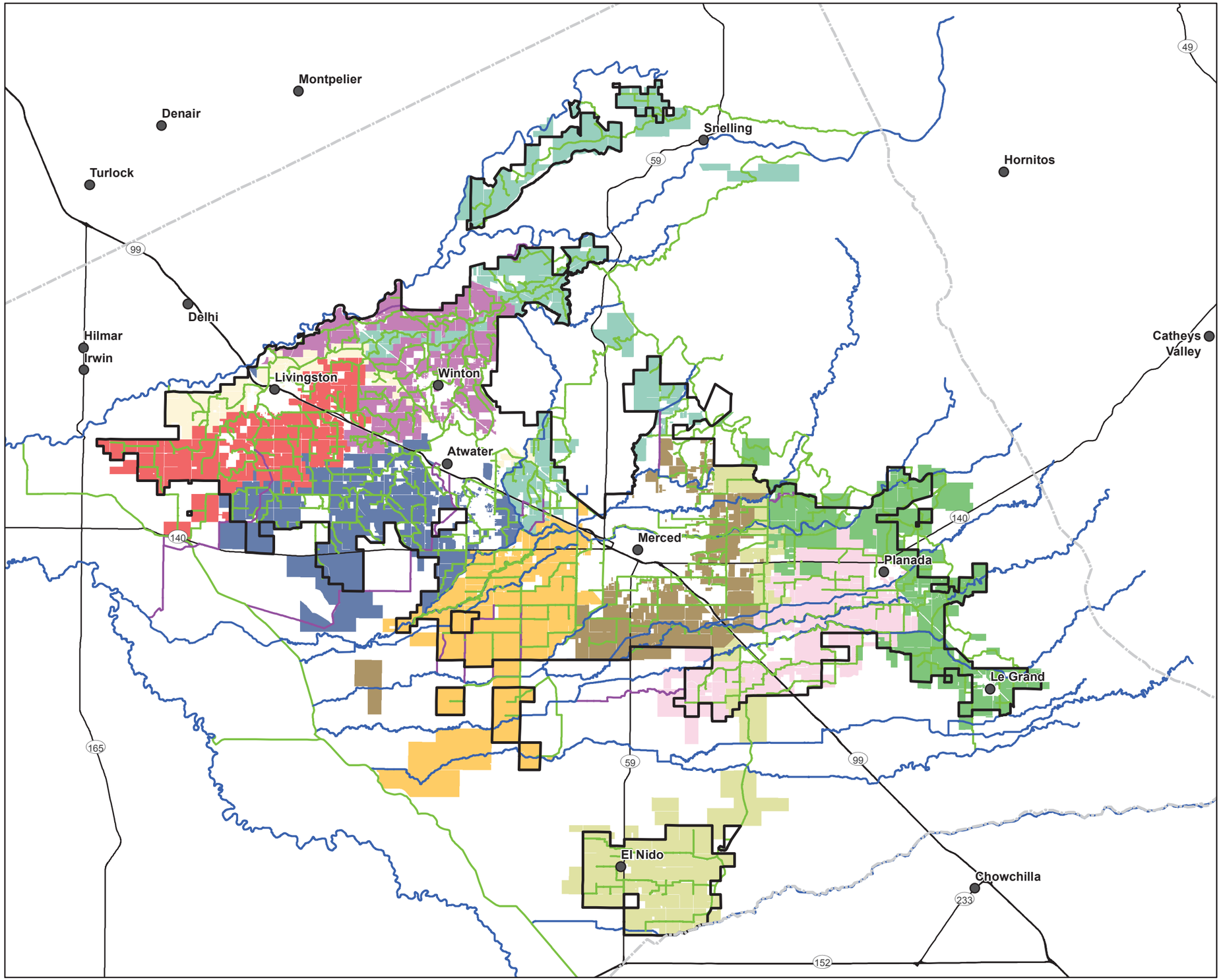
Planning and scheduling within the MID service area is managed by a number of Ditch Service Operators (DSOs) and Senior Ditch Service Operators (SDSOs). The MID distribution system is divided into 10 different DSO service areas, as identified on Figure 3.9-2. During the day shift (4:00 a.m. to 4:30 p.m.), eight DSOs manage their respective service areas, while two SDSOs each manage an additional service area and provide supervision to four DSO-managed service areas. During the night shift (4:30 p.m. to 4:00 a.m.), each DSO and SDSO manages two service areas, and the SDSO oversees all 10 service areas (ITRC, 2014). MID charges volumetrically at each farm turnout.

Across the service areas, the District is composed of over 850 miles of conveyance facilities. See Table 3.9-2 for details.

In addition to these facilities, MID operates a number of regulating reservoirs throughout the Program Area that serve to re-regulate flow releases from the larger reservoirs, Lake McClure and Lake McSwain, and to ensure steady instream releases. These facilities, as well as the larger reservoirs, and their respective capacities are identified in Table 3.9-3.

Castle Dam irrigation pool is located on Canal Creek and was completed by USACE around 1998. The pool serves as a multi-purpose flood control reservoir and irrigation pool. The pool cut nearly 24 hours off the time required to initiate flow changes at the head of the Livingston Canal (MID, 2013).

Bear Creek Pool is formed by Crocker Dam and captures runoff from the entire Bear Creek watershed, including Parkinson Creek, Fahrens Creek, Cottonwood Creek, Black Rascal Creek, Bear Creek, and Burns Creek. The facility, constructed in the late 1800s, was originally a wood-crib dam used as a direct diversion facility with limited regulating capacity but was later replaced with a reinforced concrete dam. Recent improvements have expanded regulating storage at the facility to approximately 180 AF (MID, 2013).





LEGEND

MID Service Area

**Irrigation Network**

- Canal
- Drain
- Creek; River; Slough

**DSO Area**

- Escaladian A Side
- Escaladian B Side
- Fairfield A Side
- Fairfield B Side
- Fairfield C Side
- Le Grand A Side
- Le Grand B Side
- Livingston A Side
- Livingston B Side
- Livingston C Side

N

0 3.5 7
Miles

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom

Source: Irrigation Network, MID 2017; DSO Area, MID 2014

**FIGURE 3.9-2 MERCED IRRIGATION DISTRICT DSO AREAS**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA



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Table 3.9-2. MID Conveyance and Delivery System
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Conveyance Facility | Length (miles) |
|---|---|
| Unlined Canal | 422 |
| Natural Channels (creeks and sloughs) | 121 |
| Lined Canal | 97 |
| Pipelines | 177 |
| Drains | 45 |
| **Total Mileage of System** | **862** |
| Wells | 235 |
| Delivery Gates | 1,968 |

Source: MID, 2013

Table 3.9-3. MID Regulating Reservoirs
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Regulating Reservoir | Total Volume (AF) | Active Regulating Volume (AF) |
|---|---|---|
| Lake Mc Swain | 9,740 | 1,600 |
| Lake Yosemite | 7,425 | 1,000 |
| Castle Dam Irrigation Pool | 1,000 | 400 |
| Bear Creek Pool (Crocker Dam) | 1,000 | 180 |
| El Nido Reservoir | 200 | 200 |
| Livingston Automatic No. 2 | 100 | 100 |
| Mariposa Creek Pool (El Nido Dam) | 55 | 55 |
| Puglizevich Dam Pool | 35 | 35 |
| Livingston Canal Pool | 20 | 20 |

Source: MID, 2013

Mariposa Creek Pool and El Nido Reservoir have also been improved to create up to 50 and 200 AF of regulating capacity, respectively. MID completed Livingston Automatic No. 2 in 2005 to further expand the District's regulating capacity. The facility is the only one operated by MID that is off-stream and can thus be bypassed without affecting operations (MID, 2013).

### Water Transfers

Previous water transfers have historically been made to, among other things, secure revenues needed to support District operational costs, finances, and capital budgets including water distribution system improvements. Transfers have been implemented via reservoir release of previously stored water and have generally required an associated refill agreement between the District, DWR, and Bureau of Reclamation.

Over the last several decades, MID has participated in a variety of transfer programs and flow agreements including the following:

- Davis-Grunsky Agreement as part of the initial licensing of the New Exchequer Dam
- State Drought Water Bank
- Vernalis Adaptive Management Plan
- In-basin transfers for irrigation within and outside MID's sphere of influence
- Agreements with the Bureau of Reclamation for wildlife
- Short-term temporary water transfers to out-of-basin transferees

MID has completed temporary water transfers almost every year since 1967, with annual transfer volumes in some years exceeding 100,000 AF. As shown in Appendix G, transfers have occurred almost every year and in all water year types. The District is generally able to make the greatest volume of water available for transfer in wetter years with generally adequate reservoir storage. The source of water for the majority of past transfers is the Merced River through release of previously stored water from New Exchequer Dam. Transfers have been and would likely be dictated in the future primarily by such factors as water availability, timing, and the location of the transfer recipient. In-basin transfers have historically been diverted from the Merced River at MID's Main Canal or Northside Canal. Out-of-basin transfers have been made available through Lake McClure releases and subsequently diverted downstream of Crocker-Huffman by the relevant downstream transferee.

## 3.9.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential impacts on surface water resources/water quality. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections. Anticipated impacts to other resources (e.g., aquatic resources) associated with proposed changes in reservoir or flow conditions are discussed in other specific sections as appropriate.

### 3.9.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and listed below. Impacts on surface water resources are considered significant if the Proposed Program would result in any of the following:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
- 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 i) result in substantial erosion or siltation on- or off-site, ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite, iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Potential impacts on groundwater resources are analyzed in Subsection 3.8, Groundwater Resources. Therefore, the second threshold listed above and impacts related to groundwater quality and groundwater management plans are not addressed below. The Program Area is several miles from large

reservoirs, is not located near the coast, and is on flat terrain. Therefore, inundation by seiche, tsunami, or mudflow is not addressed further.

#### 3.9.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each environmental resource area, as applicable. Other anticipated future changes, such as implementation of the Federal Energy Regulatory Commission (FERC) Final Environmental Impact Statement (EIS) and required increased flow releases from Lake McClure into the Merced River, are also considered in the following analysis. It is also assumed that some amount of District water transfer activity would continue to occur as has occurred almost every year over the last several decades. These transfers have in turn typically influenced river flow and temperature to some degree depending on transfer amount and timing.

Related to future Merced River flows and Lake McClure releases, although a flow schedule is provided in the FERC Final EIS, there are several unknown factors that may influence what the final flow schedule on the Merced River may be. These unknown factors include the update to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, which currently suggests that (if implemented) future Merced River flows would follow an unimpaired flow schedule between 30 and 50 percent. In addition, there are the potential conditioning requirements under the 401 Water Quality Certification that may lead to revision of the FERC Final EIS flow schedule. Although either of these processes may result in no change to the FERC Final EIS flow schedule, the current uncertainty does not allow for a reasonably foreseeable operation scenario for the No Program Alternative. Comparing the existing environment to the No Program Alternative, Lake McClure operations identified in the current proposed interim Merced River base flows and a spring pulse in May are anticipated to incrementally increase the amount of available fish habitat and decrease water temperatures as analyzed in the FERC Final EIS. The Final EIS flows are considered an incremental improvement to aquatic conditions that would not be substantially altered with the Proposed Program. Generally, the trending response of the Proposed Program flows with the aquatic ecosystem is similar to both the Existing Conditions and No Program Alternative and can be generally assessed similarly. Therefore, Program impacts are only evaluated when compared to Existing Conditions.

As described in Subsection 2.1, three elements of the Proposed Program are evaluated in this PEIR including 1) system improvements, 2) Class II to Class I conversion, and 3) water transfers. The system improvements element of the Proposed Program includes projects that have been grouped into project categories based on common features. To avoid repetitive text, where an impact analysis applies to more than one project category, the analysis is presented as a single discussion with the relevant categories specified. Similarly, if anticipated effects are similar across impact type, potential effects are referenced across impact type as appropriate.

The Class II to Class I conversion program element assumes that 8,000 acres within the El Nido area would be converted to Class I status. The assumed conversion would result in the availability of MID surface water in an area historically reliant on groundwater. As such, it is assumed there would be an increase in applied water delivery and use (and an approximately equivalent reduction in local groundwater pumping). The Class II to Class I conversion program element would improve water supply reliability for Class II users who choose to participate and would reduce water supply reliability slightly for existing Class I users because of the associated expansion of the Class I user base. The District would continue to operate within its existing water rights, and the Class II to Class I conversion program element would not result in a change in land use or agricultural practices. As such, the Class II to Class I conversion program element is addressed in Subsection 3.4, Biological Resources, related to impacts on species and habitat; Subsection 3.8, Groundwater Resources, in terms of its relationship to groundwater extraction; and Subsection 3.11, Public Services and Utilities, with regard to water supply.

**Water Transfers**

The District proposed water transfer element (through term and 1-year temporary water transfers) would include transfers within and outside the Merced Groundwater Subbasin. Transfers have historically been, and would continue to be, made for a variety of purposes, including to secure revenues to improve water management and customer service. As all potential transferees and points of diversion/rediversion and places of use are not yet specifically known outside the Merced Groundwater Subbasin, this Programmatic Environmental Impact Report evaluates out-of-basin transfers at a programmatic level and water transfers within the Merced Groundwater Subbasin at a project level. All water transfers are proposed to be implemented via reservoir release of previously stored water and would likely be subject to typical refill agreements with DWR and Bureau of Reclamation as well as MID water right license and FERC-related requirements.

Stored water transfers are proposed in two categories/types: "term" transfers and "as-available" transfers. "Term transfers" would be agreements where MID would make transfer water available in almost all years. "As-available" transfers would generally occur at the annual discretion of the District considering, among other things, reservoir storage, projected runoff, and District demand. Accordingly, four potential subtypes of transfers are included as part of the Proposed Project water transfer element: in-basin term, in-basin as-available, out-of-basin term, and out-of-basin as-available. Total transfers would range from 10,000 to 80,000 AF across all water supply (March 31 storage in addition to April–October inflow) availability conditions. Transfer volumes would likely be lowest in very dry and very wet years due to water supply availability and in-basin delivery constraints and out-of-basin pumping system constraints. The volume of in-basin and out-of-basin transfers would be determined annually by MID, with an anticipated maximum amount of 50,000 AF transferred in-basin and up to 30,000 AF of out-of-basin in any year. As identified above, additional environmental review of out-of-basin transfers would be conducted as necessary depending on term transfer volume(s), timing, and transferee.

In general, it is proposed when the available water supply is relatively limited (e.g., drier years), less water would be transferred to reduce potential impacts on MID's water supply. Transfers would occur in years when there is both water available to transfer and capacity available to divert and convey transfer water. In the wetter years, when the available water supply is highest, conveyance system constraints may limit the ability to transfer more water. Additionally, in wetter years, demand for transfer water may be less than in less wet or drier years, other than some potential transferees looking for transfer water to support groundwater recharge. Water transfers are proposed to be implemented from March through October on a variety of different patterns depending in part on water supply and reservoir storage conditions, and the location and needs of the transferee.

### 3.9.3.3 Impacts Associated with the Proposed Program

**Impact SW-1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality.**

As described in Section 2, Program Description and Alternatives, construction of the Proposed Program would include a variety of activities requiring the use of heavy equipment. It is possible that the operations and maintenance of construction equipment could result in hazardous materials spills if materials are misused or improperly handled and stored. Leaks and spills could enter the soil and potentially contaminate groundwater or runoff into nearby surface water features, causing a significant impact on water quality. Additionally, runoff from soil stockpiles in the disposal areas or temporary stockpiles, as well as runoff from disturbed areas could affect nearby surface water features, causing a significant impact on water quality.

As listed under Section 2.5, Environmental Commitments, the District would implement a SWPPP, as required by the Construction General Permit. The construction contractor(s) would prepare and implement a SWPPP consistent with the guidance provided in the most recent edition of the California

Stormwater Quality Association Best Management Practice Handbook or similar resource. The SWPPP would emphasize proper hazardous materials storage and handling procedures; would outline spill containment, cleanup, and reporting procedures; and would limit refueling and other hazardous activities to designated areas. Signs prohibiting refueling would be posted in sensitive areas. Equipment would be inspected prior to use each day to ensure that hydraulic hoses are tight and in good condition. Additionally, the contractor would employ BMPs, consistent with the guidance in *Construction Site Best Management Practice Field Manual and Troubleshooting Guide* (Caltrans, 2003), to reduce runoff from the project sites or disposal areas to nearby surface water features. These may include, but are not limited to temporary soil stabilization (such as proper grading and covering of soil stockpiles) and temporary sediment control (such as silt fences, fiber rolls, or sandbag barriers), and permanent soil stabilization (such as installing sediment barriers, vegetative buffer strips, and reseeding disturbed areas). Other appropriate BMPs, such as use of concrete washout basins and proper waste management and securely locating and maintaining portable toilets, would be used to prevent discharge of possible contaminants and chemicals associated with construction activities. The use, transport, and disposal of hazardous materials, such as fuels, lubricants, and solvents, would be completed in accordance with California Department of Toxic Substances Control, EPA, and U.S. Occupational Safety and Health Administration requirements. ***With implementation of the SWPPP and BMPs, Program construction would not violate water quality standards or waste discharge requirements, and impacts would be less than significant***.

The Proposed Program would increase the number of regulating reservoirs in the Program Area, and these new facilities could be used during storm events. The temporary impoundment of surface water during these events would allow for settling of suspended sediments within Program waterways, thereby improving surface water quality downstream. Additionally, the regulation of surface water supplies during the irrigation season would also create opportunities to beneficially affect water quality in waterways located within the Program Area. Furthermore, the measures outlined in the SWPPP and BMPs would be incorporated into routine maintenance activities, as applicable, to prevent the release of water pollutants during Program operation. ***Therefore, operation of the Proposed Program would result in a less than significant impact to water quality and would not result in the violation of any water quality standards or waste discharge requirements***.

As discussed in Subsection 3.4.2.7, Historical and Recent Water Transfers, MID has conducted numerous water transfers within the Merced River watershed for decades in all water year types. Sources have included Lake McClure, the Merced River, Lake Yosemite via Bear Creek and Crocker Dam, or from local creeks. Factors affecting whether the Board of Directors makes transfer water available have generally included water rights considerations, availability, timing, and the location of the transfer recipient/use. Recipients or releases have been made to support fishery habitat, environmental programs including Vernalis Adaptive Management Program, and local as well as regional water users.

Historical and proposed water transfer activity has and is proposed to continue to include in-basin and out-of-basin transfers. In-basin water transfers have historically and would continue to divert flow from the Merced River above Crocker-Huffman Dam at the MID Main Canal. Out-of-basin transfers have historically and likely would continue to move water through the lower Merced River, which have and would result in an overall increase in flows below Crocker-Huffman Dam. These transfers have historically and would generally reach the CVP and/or SWP pumping facilities and would increase flow in the San Joaquin River and portions of the Sacramento-San Joaquin Delta. Water transfers have historically been made during all times of the year depending on transfer purpose and Lake McClure inflows. Due to the elevated outflow, greater amounts of water would be reserved during winter months. Reductions in outflow would primarily occur in wetter years, where accretion would naturally increase streamflow, and temperatures are generally relatively cool as a result of ambient conditions. Figure 3.9-3 provides an overview of the

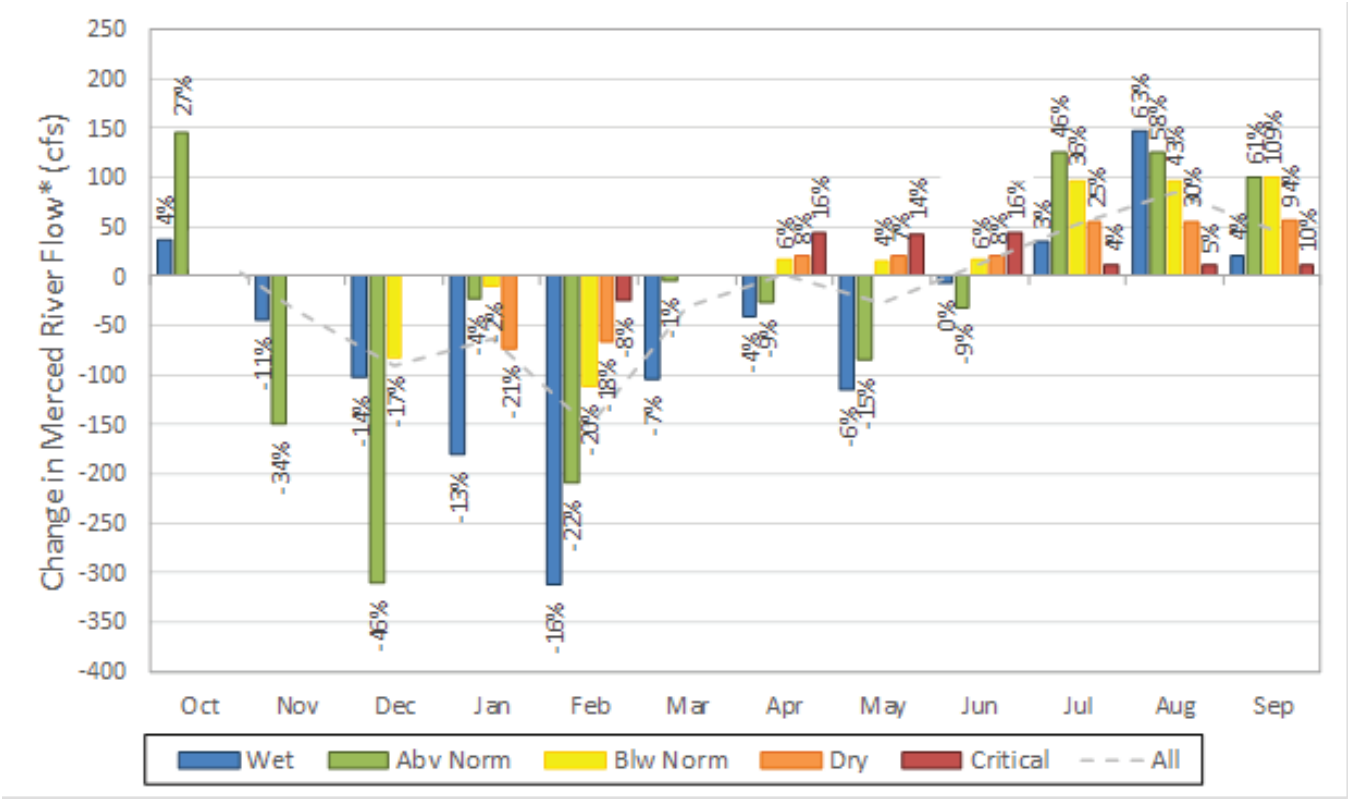


**FIGURE 3.9-3 SUMMARY OF PERCENT CHANGE IN MERCED RIVER TOTAL FLOW FROM PROPOSED WATER TRANSFER ELEMENT**

MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA

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potential for change of Merced River flows from baseline demands as a result of the Proposed Program by the five year types. As shown on the figure, flows are anticipated to increase in some months (generally associated with proposed out-of-basin transfers) and decrease in other months. Decreased flows are generally anticipated in the late fall and winter periods in wetter years when there are typically greater accretion flows in the system.

Potential water quality impacts on aquatic resources related to decreases/increases in in-stream temperatures are discussed in Subsection 3.4, Biological Resources. No other temperature-related impacts on other resources are anticipated.

**Impact SW-2: 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 offsite.**

As described in Section 2, Program Description and Alternatives, capital improvement projects are proposed throughout the District and would be implemented over approximately 30 years. During construction activities, particularly for proposed projects that would involve earth movement and soil stockpiling, there is the potential for substantial erosion or siltation on- or offsite. As described under Impact SW-1, the District would develop and implement a SWPPP and BMPs to minimize the potential for on- and offsite erosion and siltation. ***With implementation of the SWPPP and BMPs, Program construction would not result in substantial erosion or siltation on- or offsite, and impacts would be less than significant***.

The Proposed Program would enhance the District's ability to deliver water largely in the context of the existing system and would not result in substantial modifications to drainage in the Program Area. Where modifications to drainage at specific project sites is proposed, such as for the proposed regulating reservoirs, the projects would be designed to avoid substantial erosion and siltation during operation. Routine maintenance activities may involve occasional ground disturbance, and the applicable measures outlined in the SWPPP and BMPs would be incorporated into those activities to prevent substantial erosion and siltation, as needed. Additionally, the proposed water transfer element would increase or not affect in-river Merced flows during the time of the transfer and subsequently depending on a given transfer and year-type/reservoir inflow conditions, but not to the extent that the Merced River streambank or other tributaries would experience erosion or substantial geomorphic impacts. ***Therefore, operation of the Proposed Program would not result in substantial erosion or siltation on- or offsite, and impacts would be less than significant***.

**Impact SW-3: 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 substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or offsite.**

Construction of the majority of the proposed projects would occur primarily within the existing water delivery systems and would not involve substantial alteration of the existing drainage pattern of the project sites. Proposed regulating reservoirs and the Main Canal Improvements at Tunnel No. 1 Project, Options 1 and 2, would modify drainage on the relevant project sites; however, construction activities would be managed so as not to cause on- or offsite flooding in keeping with standard practice. ***During construction, the existing drainage pattern of proposed project sites would not be altered in a manner that would result in increased flooding, and impacts would be less than significant***.

The Proposed Program would enhance the District's ability to deliver water largely in the context of the existing system and would not result in substantial modifications to drainage in the Program Area. Where modifications to drainage is proposed at specific project sites, such as for the proposed regulating reservoirs, the projects would be designed such that they would not result in flooding. Additionally, the Proposed Program would slightly expand the regional ability to impound flows during

100-year flood events through the addition of the proposed regulating reservoirs. Additionally, the proposed water transfer element would increase or not affect in-river Merced flows during the time of the transfer and subsequently depending on a given transfer and year-type/reservoir inflow conditions, but not to the extent to result in Merced River streambank or other tributaries overtopping, flooding, or substantial change in the rate or amount of surface runoff. ***Operation of the Proposed Program would not alter existing drainage patterns in a manner that would result in increased flooding, and impacts would be less than significant***.

The Proposed Program would result in the construction of new regulating reservoirs, which would have the potential to cause flooding in the event of a failure. Each regulating reservoir would have a storage capacity of up to 120 AF and would be constructed by excavating an area and using the excavated material to construct berms around the perimeter. The elevation of the bottom of the regulating reservoirs would be below the elevation of the surrounding area by 2 to 4 feet. Under a failure scenario, water below that elevation would remain in the reservoir, and the water above the elevation of the surrounding land surface could inundate the area surrounding the reservoir. As the Program Area is characterized by flat terrain, water would spread out laterally rather than channeled toward a specific area. The regulating reservoirs are proposed in agricultural areas where few structures exist in the immediate vicinity. The regulating reservoirs would be designed to current engineering standards, which address potential failure modes. This includes the effects of anticipated earthquake loading for the Program Area, based on the site-specific detailed geotechnical analysis of each project site. Additionally, the proposed water transfer element would increase or not affect in-river Merced flows during the time of the transfer and subsequently depending on a given transfer and year-type/reservoir inflow conditions, but not to the extent to result in Merced River streambank or other tributaries overtopping, or increased risk of flooding. ***As a result of these characteristics, the exposure of people and structures to significant risk of flooding would be less than significant***.

**Impact SW-4: 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 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.**

As described under Impact SW-4, construction activities would be managed so as not to cause on- or offsite flooding. This includes the creation or contribution of runoff that would exceed the capacity of local drainage systems. As described under Impact SW-1, there is the potential for proposed construction activities to generate polluted runoff. Through development and implementation of a SWPPP and BMPs, the Proposed Program would not provide substantial additional sources of polluted runoff during construction. ***Construction of the Proposed Program would not create or contribute runoff that would exceed the capacity of stormwater drainage systems or provide substantial additional sources of polluted runoff, and impacts would be less than significant***.

The Proposed Program would enhance the District's ability to deliver water, and the proposed capital improvement projects would be designed to effectively convey and detain water throughout the District. The proposed projects would not involve the introduction of new impervious surfaces and would not result in increased local runoff. As described under Impact SW-1, operation of the Proposed Program would not result in new sources of surface water pollution and may have a beneficial effect on water quality. Additionally, the proposed water transfer element would increase or not affect in-river Merced flows during the time of the transfer and subsequently depending on a given transfer and year-type/reservoir inflow conditions, but not to the extent to result in Merced River related run-off. ***Operation of the Proposed Program would not create or contribute runoff that would exceed the capacity of stormwater drainage systems or provide substantial additional sources of polluted runoff, and impacts would be less than significant***.

**Impact SW-5: In a flood hazard zone, risk release of pollutants due to project inundation.**

Due to the extensive nature of 100-year flood zones within the Program Area (Figure 3.9-1), some of the proposed projects would be located within zones with a 1 percent or greater annual chance of flooding, as identified by FEMA. However, these facilities would be designed and operated to not impede or redirect flood flows and would slightly expand the regional ability to impound flows during 100-year flood events through the addition of the proposed regulating reservoirs. Additionally, the proposed water transfer element would increase or not affect in-river Merced flows during the time of the transfer and subsequently depending on a given transfer and year-type/reservoir inflow conditions, but not to the extent to result in Merced River streambank or other tributaries overtopping, flooding, or substantial redirecting flows. As described under Impact SW-1, water quality impacts during construction and operation would be less than significant, and the Proposed Program would not introduce new sources of pollutants that could be released as a result of flooding. ***Therefore, the Proposed Program would have a less than significant impact related to the risk of release of pollutants due to project site inundation***.

**Impact SW-6: Conflict with or obstruct implementation of a water quality control plan.**

As described under Impact SW-1, the Proposed Program would result in a less than significant impact to water quality during construction and operation. As such, the Proposed Program would not conflict with or obstruct implementation of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins. If the unimpaired flow schedule in the recent update to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins is implemented, the Proposed Program and the ability of the District to deliver water to its customers would be affected because the unimpaired flow schedule would result in a large decrease in water available for diversion. ***It is unknown when a determination will be made regarding the implementation of the unimpaired flow schedule. Based on what is required at this time, the Proposed Program would not conflict with or obstruct implementation of the Water Quality Control Plan, and impacts would be less than significant***.

## 3.9.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant impacts on surface water resources; therefore, mitigation is not required or recommended.

# 3.10 Noise

This section describes the regulatory setting with respect to noise and vibrations, existing noise and vibration conditions in the Program Area, and evaluates potential noise- and vibration-related impacts that could result from construction and operations and maintenance of the Proposed Program. For the purposes of this section, the Study Area is the Program Area.

## 3.10.1 Regulatory Setting

This section summarizes applicable noise guidelines and regulations related to the implementation of Proposed Program. U.S. Occupational Safety and Health Administration (OSHA) is the only relevant federal law that is applicable to anticipated Proposed Program-related worker facility or construction site noise exposure. State regulations mandate that local jurisdictions implement noise policies and ordinances. Given MID and the Proposed Program are located within Merced County (County), noise and vibration standards within the area of analysis are regulated by the local policies and regulations of Merced County. The City of Merced does not have a noise ordinance.

### 3.10.1.1 Federal

OSHA (29 *Code of Federal Regulations* 1910 et seq.) contains regulations that establish the maximum noise levels to which workers at a facility or construction site may be exposed. These OSHA noise regulations are designed to protect workers from the effects of noise exposure and list permissible noise-level exposure as a function of the amount of time during which the worker is exposed to the noise. OSHA regulations also dictate hearing conservation Program requirements and workplace noise monitoring requirements.

No federal laws exist that govern offsite noise. However, U.S. Environmental Protection Agency has identified a noise level of 55 decibels on the A-weighted scale (dBA) as adequate to protect outdoor activities against noise interference. This level does not represent an enforceable standard, but is viewed as a level below which an increased health risk is unlikely.

### 3.10.1.2 State

Generally, State noise regulations consist of California Environmental Quality Act (CEQA) and California OSHA (Cal/OSHA) requirements. These are described below.

**California Environmental Quality Act**

CEQA requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. CEQA Guidelines define a significant effect on the environment as one that will “increase substantially the ambient noise levels for adjoining areas…” CEQA Guidelines further require that a project’s impacts be considered cumulatively in conjunction with those of other projects planned for the area (14 *California Code of Regulations* [CCR] 15065[c]).

**California Occupational Safety and Health Administration**

The Occupational Noise Exposure Regulations promulgated by Cal/OSHA (8 CCR 5095 et seq.) set employee noise exposure limits and identify measures to be taken if limits are exceeded. These standards are equivalent to the federal OSHA standards described above. Additionally, vehicle noise limits are established by the California Vehicle Code, Section 23130 and Section 23130.5.

No State regulations limit environmental noise levels. California Government Code, Section 65302(f), mandates that the legislative body of each county adopt a comprehensive general plan policy document to address planning issues according to a variety of “elements,” including noise.

### 3.10.1.3 Local

This section describes the goal, policies, standards, and provisions implemented by the County for evaluating potential environmental noise impacts and mitigation.

**2030 Merced County General Plan Noise Element**

The Health and Safety Element of the *2030 Merced County General Plan* (Merced County, 2013) includes a Noise Element that provides noise level standards by land use type. The ambient noise environment in the County is influenced primarily by highway traffic, intermittent railroad operations, and aircraft operations (Merced County, 2013). Airports located near the Program Area include Castle Airport, Merced Regional Airport, and the Bonanza Hills Airport. The Noise Element applies to the County as a whole and identifies policies to minimize exposure to excessive noise sources. Table 3.10-1 summarizes Merced County noise level standards.

Table 3.10-1. Merced County Noise Element, Non-transportation Noise Standards Median/Maximum[a]
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| | Outdoor Area[b] | | Interior[c] |
|---|---|---|---|
| **Receiving Land Use** | **Daytime** | **Nighttime** | **Day or Night** |
| All Residential | 55/75 | 50/70 | 35/55 |
| Transient Lodging[d] | 55/75 | – | 35/55 |
| Hospitals and Nursing Homes[e,f] | 55/75 | – | 35/55 |
| Theaters and Auditoriums[f] | – | – | 30/50 |
| Churches, Meeting Halls, Schools, Libraries, etc.[f] | 55/75 | – | 35/60 |
| Office Buildings[f] | 60/75 | – | 45/65 |
| Commercial Buildings[f] | 55/75 | – | 45/65 |
| Playgrounds, Parks, etc.[f] | 65/75 | – | – |
| Industry[f] | 60/80 | – | 50/70 |

Source: Merced County, 2013.

[a] These standards shall be reduced by 5 decibels (dB) for sounds consisting primarily of speech or music and for recurring impulsive sounds. If the existing ambient noise level exceeds these standards, the noise level standards shall be increased at 5-dB increments to encompass the ambient noise level.

[b] Sensitive outdoor areas include primary outdoor activity areas associated with any given land use at which noise sensitivity exists and the location at which the County's exterior noise-level standards are applied.

[c] Sensitive interior areas include any interior area associated with any given land use at which noise sensitivity exists and the location at which the County's interior noise-level standards are applied. Examples of sensitive interior spaces include, but are not limited to, habitable rooms of residential and transient lodging facilities, hospital rooms, classrooms, library interiors, offices, worship spaces, and theaters. Interior noise-level standards are applied in noise-sensitive areas of the various land uses with windows and doors in the closed positions.

[d] Outdoor activity areas of transient lodging facilities are not commonly used during nighttime hours.

[e] Because hospitals are often noise-generating sources, the exterior noise-level standards are applicable only to clearly identified areas designated for outdoor relaxation by hospital staff or patients.

[f] Outdoor activity areas of these uses (if any) are not typically used during nighttime hours.

Note:

Where median noise-level data are not available for a particular noise source, average (equivalent sound pressure level [$L_{eq}$]) values may be substituted for the standards in this table if the noise source operates for at least 30 minutes. If the source operates less than 30 minutes, the maximum noise level standards shown shall apply.

In addition to the noise standards listed in Table 3.10-1, the County implements policies to reduce or eliminate conflicts between land uses and noise. The following are the applicable Health and Safety Element policies identified in the Noise Element and related goal relevant to the Proposed Program (Merced County, 2013):

- **Goal HS-7**: Protect residents, employees, and visitors from the harmful and annoying effects of exposure to excessive noise.
- **Policy HS-7.5**: Noise Generating Activities (RDR)

  Limit noise generating activities, such as construction, to hours of normal business operation.
- **Policy HS-7.7**: Noise Impacted Residential Area Monitoring (RDR)

  Consider any existing residential area "noise impacted" if the exposure to exterior noise exceeds the standards shown in Table HS-2 (see Table 3.10-1 herein). Identify and evaluate potential noise impacted areas and identify possible means to correct the identified noise/land use incompatibilities.
- **Policy HS-7.12**: New Project Noise Mitigation Requirements (RDR)

  Require new projects to include appropriate noise mitigation measures to reduce noise levels in compliance with the Table HS-2 (see Table 3.10-1 herein) standards within sensitive areas. If a project includes the creation of new non-transportation noise sources, require the noise generation of those sources to be mitigated so they do not exceed the interior and exterior noise level standards of Table HS-2 (see Table 3.10-1 herein) at existing noise-sensitive areas in the project vicinity. However, if a noise-generating use is proposed adjacent to lands zoned for residential uses, then the noise generating use shall be responsible for mitigating its noise generation to a state of compliance with the standards shown in Table HS-2 (see Table 3.10-1 herein) at the property line of the generating use in anticipation of the future residential development.

**Merced County Noise Ordinance**

The Merced County Code (MCC) (Merced County, 2016) includes provisions to control the level and frequency of disturbing, excessive, offensive, or unusually loud noise in the County that may jeopardize the health, welfare, or safety of the citizens of the County. Sound-level limitations relevant to the Proposed Program are provided under MCC 10.60.030(A), where no person shall:

> *A. Permit the operation of any sound source on private property in such a manner as to create a sound level that results in any of the following, when measured at or within the real property line of the receiving property:*
>
> *1. Exceeds the background sound level by at least ten (10) dBA during daytime hours (seven a.m. to ten p.m.) and by at least five dBA during nighttime hours (ten p.m. to seven a.m.). The background sound level for purposes of this section shall be determined as set forth in Section 10.60.060; or*
>
> *2. Exceeds sixty-five (65) dBA Ldn on residential real property or seventy (70) dBA Ldn on nonresidential real property; or*
>
> *3. Exceeds seventy-five (75) dBA Lmax on residential real property or eighty (80) dBA Lmax on nonresidential real property.*

However, MCC 10.60.030(B) provides the following exemption from the sound-level limits of MCC 10.60.030(A):

> *Noise from construction activity, provided that all construction in or adjacent to urban areas shall be limited to the daytime hours between 7 a.m. and 6 p.m., and all construction equipment shall be properly muffled and maintained.*

## 3.10.2 Environmental Setting

The Proposed Program is located within Merced County. Merced Irrigation District (MID or District) serves the cities and towns of Merced, Atwater, Livingston, Cressey, Le Grand, Winton, Franklin-Beachwood, Planed, Tuttle, and El Nido. The area is rural and predominantly surrounded by agricultural uses with pockets of residential neighborhoods, which are generally located near downtown Merced, Atwater, and Livingston. Sensitive receptors[9] within the Program Area include residences, schools (including University of California, Merced) and associated play areas, hospitals, parks, places of worship, and businesses. Sensitive receptors for noise are generally defined as locations where human activity may be adversely affected by program-related noise, including where low noise levels are important and where or on whom excessive noise levels could cause adverse health effects or disrupt activity.

Approximately 75 percent of the MID service area consists of irrigable acres used for agricultural purposes (SWRCB, 2013). Native vegetation and rangeland dominate the land immediately outside the MID service area to the north, south, and east. Noise levels within the Program Area are generally low and are seasonally influenced primarily by agricultural operations. Existing noise sources in the Program Area include agricultural equipment (e.g., trucks, tractors, and harvesters), traffic from interstate and State routes, railroad operations, aircraft operations, and active recreation and commercial areas. Noise levels are affected to a lesser degree by vehicle traffic and trains and other noise-generating land uses within the cities of Merced, Atwater, and Livingston and five other urban areas. Three major highways (State Route 99, State Route 59, and the Central Yosemite Highway [State Route 140]) are located near the Program Area. Active rail lines are located generally parallel to State Route 99 and State Route 140. Sensitive receptors in the Program Area primarily include private residences adjacent to farmlands as well as schools including Atwater High School, Livingston High School, Livingston Middle School, Winton Middle School, Cesar Chavez Middle School, Buhlach Colony High School, Joe Stefani Elementary School, Joseph Novach Academy, Merced College, and McSwain Elementary School. Other potential sensitive receptors include Winton Branch Library, William George Library, Le Grand Branch Library, Rahilly Park, Black Rascal Creek Park, Fahrens Park, Stephen Lenard Park, Joe Herb Community Park, Amie Marchini's Senior Care, Dina's Daycare, Helen's Daycare.

Potential sensitive receptors located within 0.5 mile[10] of the likely noise-creating Proposed Program facilities, mainly the reservoir projects as well as the Main Canal Improvements at Tunnel No. 1 Project, are identified in Table 3.10-2.

Table 3.10-2. Sensitive Receptors within 0.5 Mile of Proposed Program Facilities
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| | **Number of Sensitive Receptors** | |
|---|---|---|
| **Proposed Program Facility** | **Within Range of Potential Locations Boundary** | **Within 0.5 Mile around Range of Potential Locations Boundary** |
| Arena Canal Regulating Reservoir and Recharge Basin | 28 residences | Livingston Highschool<br>907 residences<br>1 apartment complex |
| Atwater Canal Regulating Reservoir and Recharge Basin | 12 residences | 125 residences |
| Bear Creek Regulating Reservoir | No sensitive receptors | 1 residence |

[9] A sensitive receptor includes facilities such as schools, residences, hospitals, resident care facilities, and libraries.

[10] Construction noise levels are anticipated to disperse to relatively low levels beyond 0.5 mile of each construction location/activity.

Table 3.10-2. Sensitive Receptors within 0.5 Mile of Proposed Program Facilities
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| | Number of Sensitive Receptors | |
|---|---|---|
| **Proposed Program Facility** | **Within Range of Potential Locations Boundary** | **Within 0.5 Mile around Range of Potential Locations Boundary** |
| Cressey Regulating Reservoir and Recharge Basin | No sensitive receptors | 32 residences |
| Deadman Creek Regulating Reservoir | No sensitive receptors | 7 residences |
| Hadley Lateral Reservoir | 8 residences | 30 residences |
| Increase Capacity of El Nido Reservoir | No sensitive receptors | 2 residences |
| Le Grand Canal near Black Rascal Automation | No sensitive receptors | University of California, Merced |
| Le Grand Reservoir | 1 residence | 15 residences |
| Main Canal Relining | No sensitive receptors | 3 residences |
| Main Canal Improvements at Tunnel No. 1 | No sensitive receptors | No sensitive receptors |
| McCoy Basin Reservoir | No sensitive receptors | 6 residences |
| Merced River Water Recovery | 3 residences | Washington Elementary School<br>18 residences |
| Northside Canal Flumes | No sensitive receptors | 8 residences |
| McCoy Lateral Upper Regulating Reservoir | 6 residences | 41 residences |
| Northside Regulating Reservoir | 3 residences | 6 residences |
| Spilker Lateral Regulating Reservoir | 3 residences | 13 residences |

## 3.10.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

### 3.10.3.1 Thresholds of Significance

The thresholds that were used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and listed below. Noise impacts are considered significant if the Proposed Program would result in any of the following:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Proposed Program in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive groundbourne vibration or groundbourne noise levels. For a project within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the Program Area to excessive noise levels.

### 3.10.3.2 Impacts Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area as applicable. The No Program Alternative is functionally the same as the Existing Conditions as related to noise because minimal additional future development is anticipated in areas adjacent to Proposed Program facilities and both represent a condition without noise generated by proposed activities. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into project categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

Operational noise and vibration levels of the Proposed Program facilities would not include noise-generating equipment or activities beyond typical District operations and maintenance and are, therefore, not discussed further in this section. This analysis focuses on impacts associated with Proposed Program construction. To assess construction noise and vibration impacts, anticipated noise and vibration levels were estimated, and the potential for the presence of sensitive receptors in the vicinity of any of the proposed projects was evaluated.

The following assumptions were made with respect to anticipated Proposed Program noise-related impacts and include the noise-related measures listed in Section 2.5, Environmental Commitments:

- Proposed canal rebuilding/lining, table topping dead-end facilities, canal automation and flow measurement improvements, siphon modifications, and interties, are all expected to have minimal noise and vibration impacts. Construction would occur between 7 a.m. and 6 p.m., when construction activities are exempt from sound-level limits. Therefore, these projects are not specifically discussed in the impacts section.
- Sensitive receptors, as defined in Table 3.10-2, are identified if they fall within a 0.5-mile radius of the project site, given construction noise levels are anticipated to disperse to relatively low levels beyond 0.5 mile of each construction location/activity.
- Proposed construction activity would be restricted to the hours between 7 a.m. and 6 p.m. on weekdays, which exempts the activity from sound-level limits according to Merced County Ordinance discussed in Subsection 3.10.1.3. Work on weekends would be approved by the Merced County Planning Department upon request.
- Stationary noise-generating equipment would be located as far as possible from nearby noise-sensitive receptors.
- Construction equipment powered by gasoline or diesel engines would have sound control devices at least as effective as those provided by the original equipment manufacturer. No equipment would be allowed to have unmuffled exhaust.
- Noise-generating mobile equipment and machinery would be turned off when not in use.

**Noise Characteristics**

Noise is typically defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. There are several different ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement. Noise levels are typically stated in terms of dBA, reflecting the response of the human ear by filtering out some of the noise in the

low- and high-frequency ranges that the ear does not detect well. The A-weighted scale is used in most ordinances and standards. The $eL_{eq}$ is defined as the average noise level, on an energy basis, for a stated period of time (e.g., hourly). Table 3.10-3 summarizes technical noise terms used in this section.

In determining the daily level of background environmental noise, it is important to account for the typical difference in an individual's response to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night, and exterior noise becomes more noticeable. To account for human sensitivity to nighttime noise levels, the Community Noise Equivalent Level (CNEL) was developed. CNEL is a noise index that accounts for the greater annoyance of noise during the evening and nighttime hours. CNEL values are calculated by averaging hourly $L_{eq}$ sound levels for a 24-hour period, and applying a penalty factor to evening and nighttime $L_{eq}$ values. For assessing noise, the 24-hour day is divided into three time periods, with the following weighting:

- Daytime: 7:00 a.m.–7:00 p.m. Penalty factor of 0 dB
- Evening: 7:00 p.m.–10:00 p.m. Penalty factor of about 5 dB
- Nighttime: 10:00 p.m.–7:00 a.m. Penalty factor of 10 dB

Table 3.10-3. Definitions of Acoustical Terms
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| Term | Definitions |
|---|---|
| Decibel (dB) | A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the sound pressure, which is 20 micropascals (20 micro-newtons per square meter). |
| A-weighted Sound Level (dBA) | The sound pressure level in dB as measured on a sound-level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low- and very high-frequency components of the sound in a manner similar to the frequency response of the human ear, and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted. |
| Equivalent Noise Level ($L_{eq}$) | The average A-weighted noise level during the measurement period. |
| Percentile Noise Level (Ln) | The noise level exceeded during n% of the measurement period, where "n" is a number between 0 and 100 (e.g., L90). |
| Community Noise Equivalent Level (CNEL) | The average A-weighted noise level during a 24-hour day, obtained after addition of 5 dB from 7:00 p.m. to 10:00 p.m., and after addition of 10 dB to sound levels between 10:00 p.m. and 7:00 a.m. |
| Ambient Noise Level | The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location. |
| Intrusive | Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence, and tonal or information content as well as the prevailing ambient noise level. |

Table 3.10-4 shows the relative A-weighted noise levels of common sounds measured in the environment and industry for various sound levels (Beranek, 1988).

Table 3.10-4. Typical Sound Levels Measured in the Environment
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Examples of Common, Easily Recognized Sounds | Decibels (dBA), at 50 feet | Subjective Evaluations |
|---|---|---|
| Near Jet Engine | 140 | Deafening |
| Threshold of Pain (Discomfort) | 130 | |
| Threshold of Feeling – Hard Rock Band | 120 | |
| Accelerating Motorcycle (at a few feet away) | 110 | |
| Loud Horn (at 10 feet away) | 100 | Very loud |
| Noisy Urban Street | 90 | |
| Noisy Factory | 85 | |
| School Cafeteria with Untreated Surfaces | 80 | Loud |
| Near Freeway Auto Traffic | 60 | Moderate |
| Average Office | 50 | |
| Soft Radio Music in Apartment | 40 | Faint |
| Average Residence without Stereo Playing | 30 | |
| Average Whisper | 20 | Very faint |
| Rustle of Leaves in Wind | 10 | |
| Human Breathing | 5 | |
| Threshold of Audibility | 0 | |

### Construction Noise

Heavy construction equipment would be used during construction of some of the proposed projects. The majority of the anticipated Proposed Program noise and vibration impacts would be generated by heavy machinery used to move and compact earth during construction of the reservoirs and main canal realignment; however, this noise and vibration would be limited to the construction period.

The *Roadway Construction Noise Model User's Guide* (RCNM User Guide; FHWA, 2006) is one of the most comprehensive construction noise databases developed in the United States, and the expected equipment noise levels identified in the RCNM User Guide are used for this evaluation. Table 3.10-5 lists the project-specific equipment noise levels as maximum dBA at a reference distance of 50 feet. The acoustical usage factor is the fraction of time that the equipment generates noise at the maximum level.

Table 3.10-5. Construction Equipment Noise Levels from the RCNM User Guide
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Equipment Description | Acoustical Usage Factor (%) | Specified $L_{max}$ at 50 Feet (dBA) | Actual Measured $L_{max}$ at 50 Feet (dBA) | Number of Actual Data Samples |
|---|---|---|---|---|
| All Other Equipment > 5 Horsepower | 50 | 85 | N/A | 0 |
| Backhoe | 40 | 80 | 78 | 372 |
| Compactor (ground) | 20 | 80 | 83 | 57 |
| Concrete Pump Truck | 20 | 82 | 81 | 30 |
| Dozer | 40 | 85 | 82 | 55 |
| Dump Truck | 40 | 84 | 76 | 31 |
| Excavator | 40 | 85 | 81 | 170 |
| Front End Loader | 40 | 80 | 79 | 96 |
| Generator | 50 | 82 | 81 | 19 |
| Generator (<25 kVA, VMS signs) | 50 | 70 | 73 | 74 |
| Grader | 40 | 85 | – | 0 |
| Pickup Truck | 40 | 55 | 75 | 1 |
| Scraper | 40 | 85 | 84 | 12 |
| Tractor | 40 | 84 | – | 0 |

Source*:* FHWA, 2006.

Notes:

> = greater than
< = less than
KVA = kilovolt-ampere(s)
$L_{max}$ = maximum noise standard
N/A = not applicable
VMS = variable message sign

Table 3.10-5 indicates that the loudest equipment anticipated to be used to construct many of the facilities included as part of the Proposed Program would generally emit noise in the range of 80 to 85 dBA at 50 feet. Noise at any specific receptor is dominated by the closest and loudest equipment. The construction noise estimate was based on conservative assumptions of multiple pieces of loud equipment operating in proximity to each other near the edge of the project sites. This scenario is considered to be conservative yet realistic. Google Earth was used to identify the project sites likely to create noise, as identified above in the assumptions section; and a 0.5-mile buffer was added around the project limits. Any sensitive receptors within this range were identified, and impacts were assessed.

The RCNM User Guide describes the models used to determine the levels generated by each piece of equipment. Construction equipment noise levels at various distances, based on equipment noise levels provided in the RCNM User Guide, are presented in Table 3.10-6. This extrapolation overstates likely noise impacts because it does not account for atmospheric absorption, ground effects, or other noise attenuation mechanisms.

Table 3.10-6. Construction Equipment Noise Levels Versus Distance
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| Distance from Right-of-Way or Property Line (feet) | $L_{eq}$ Noise Level (dBA) |
|---|---|
| 50 | 83 |
| 100 | 79 |
| 200 | 74 |
| 400 | 69 |
| 800 | 63 |
| 1,600 | 58 |
| 3,200 | 52 |
| 6,400 | 46 |

**Construction Vibration**

The Federal Transit Administration uses an evaluation approach that accounts for anticipated vibration from construction equipment at vibration-sensitive receptors (Federal Transit Administration, 2006). This method evaluates the potential for annoyance to people and damage to buildings. The criterion selected in this analysis for annoyance is 80 vibration decibels (VdB) (relative to 1 micro-inch/second root-mean-square) based on infrequent vibration events occurring at residences. This is the analysis chosen for the Proposed Program. The criterion selected for damage was a peak particle velocity of 0.2 inch per second based on nonengineered timber and masonry buildings.

The vibration sources selected for analysis for this Programmatic Environmental Impact Report include the following:

- A large bulldozer with a peak particle velocity at a reference distance of 25 feet of 0.089 inch per second and a vibration level of 87 VdB at a reference distance of 25 feet
- Loaded haul trucks with a peak particle velocity at a reference distance of 25 feet of 0.076 inch per second and a vibration level of 86 VdB at a reference distance of 25 feet

Calculations based on the algorithms provided by the Federal Transit Administration (2006) indicated that the damage criterion would not be exceeded at distances farther than 15 feet from the bulldozer or loaded haul trucks, and the annoyance criterion would not be exceeded at distances farther than 43 feet from the bulldozer or loaded haul trucks. Construction equipment is expected to operate at greater distances from the nearest noise-sensitive receptors. Impact pile driving is not anticipated for construction of the Proposed Program.

The same method was used to determine effects of construction vibration as was used above for construction noise. Projects in which sensitive receptors fell within the 0.5-mile radius of the project boundaries were assessed for potential impacts.

### 3.10.3.3 Impacts Associated with the Proposed Program

Under CEQA Guidelines, a noise assessment is required that (1) assesses the baseline noise setting of the project area and (2) evaluates how large or perceptible any potential project-related noise increase would be in the project area. No additional noise beyond that typical of District operations and maintenance activities would result from the Proposed Program facility operations. An assessment of potential noise impacts associated with construction of the Proposed Program is discussed below.

**Impact NOI-1: Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Proposed Program in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.**

Noise impacts associated with the Proposed Program would be generated from temporary construction activities during various construction periods. Noise levels resulting from construction would depend on several factors, such as the number and type of machines operating, the level of operation, and the distance between sources, sound, and noise receptors. As identified above, noise from construction activity between 7 a.m. and 6 p.m. is exempt from the sound-level limits according to Merced County noise ordinance MCC 10.60.030(A), provided "all construction equipment (is) properly muffled and maintained." For the Main Canal Improvements at Tunnel No. 1 Project, a variety of construction equipment including bulldozers, graders, concrete pumps and trucks, and onsite generators (see Section 2, Program Description and Alternatives, for a full list of required equipment) would be used. However, no sensitive receptors are located within 0.5 mile of the proposed project sites, and all construction would occur within the exempted time period specified in the Merced County noise ordinance MCC 10.60.030(A). Construction of the regulating reservoirs and recharge basins would require similar equipment. Noise generation would be expected to be greatest during the exempted hours and would be anticipated to last about a year. Table 3.10-2 shows residences around the regulating reservoirs, which are the main sensitive receptors around the proposed reservoirs. The majority of the reservoirs have residences within 0.5 mile of the edge of the Program Area. However, construction at the proposed regulating reservoirs would also occur during the hours of 7 a.m. and 6 p.m., and would be exempt from the sound-level limits.

There are nine proposed projects, consisting of canal automation and flow measurements improvements, that could have noise impacts with the potential to affect the University of California, Merced campus. However, work for these projects would occur during the hours of 7 a.m. to 6 p.m. and are exempt from the sound-level limits.

Construction of the Proposed Program is anticipated to take approximately 30 years to complete and would result in temporary increases in noise impacts. These temporary noise increases would occur throughout the entire Program Area, with projects in specific areas lasting generally only one construction season. Anticipated noise impacts would be localized and predominantly limited to proposed regulating reservoir construction sites given most facilities would be constructed in areas with no or a minimal number of sensitive receptors within 0.5 mile. In addition, projects proposed under the Proposed Program would be constructed during the exempted daytime hours according to the Merced noise ordinance MCC 10.60.030(A). ***Therefore, construction of the Proposed Program would result in a less than significant noise-related impact.***

Periodic maintenance would be required after implementation is complete. Associated vehicle use on local roadways would be minimal, and future maintenance activities would be consistent with existing maintenance activities and would not result increased noise levels. ***Therefore, operation of the Proposed Program would result in a less than significant noise-related impact.***

**Impact NOI-2: Generation of excessive groundborne vibration or groundborne noise levels.**

Construction activities (such as, ground-disturbing activities including grading, excavation, and movement of heavy construction equipment) could generate groundborne vibration and noise. Additionally, it is possible that blasting would be required as part of the Main Canal Improvements at Tunnel No. 1 Project. If needed to complete construction of the Main Canal Improvements at Tunnel No. 1 Project, blasting would generate groundborne vibration and noise. Groundborne vibration and noise associated with construction activities other than blasting are not anticipated to be excessive given typical construction equipment would be used in the construction of facilities, no pile driving would be required, and all necessary equipment would be located more than 50 feet (measurement used by Federal Highway Administration above) from the nearest sensitive receptor for most projects. Construction within the

major projects (Main Canal Improvements at Tunnel No. 1 Project, reservoir and recharge basins) would not be concentrated along the property boundary, where any potential sensitive receptors are located. It is anticipated that construction for these major projects would last 6 to 18 months (see Section 2, Program Description and Alternatives, for more details). In addition, implementation of the best management practices listed in Impact NOI-1 would reduce noise resulting from temporary construction activities. Potential blasting activities would be addressed in subsequent environmental review as necessary (including potential presence of sensitive receptors) when the Main Canal Improvements at Tunnel No. 1 Project alignment and project details are finalized. ***Therefore, construction of the Proposed Program would not result in generation of excessive groundborne vibration or groundborne noise levels, and the impact would be less than significant.***

**Impact NOI-3: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the Program Area to excessive noise levels.**

The proposed Main Canal Improvements at Tunnel No. 1 Project and Northside Canal Seepage Reduction Project are located within 2 miles of a private air strip. This private airstrip is located 0.3 mile from the Northside Canal Seepage Reduction Project and 1.7 miles from the Main Canal Improvements at Tunnel No. 1 Project at their closest points. The airstrip does not show Federal Aviation Administration data and is used infrequently. As such, it is unlikely to expose construction workers to excessive noise levels. ***Therefore, impacts would be less than significant.***

Two public airports (Castle and Merced Regional) are located within 2 miles of Proposed Program facilities. Castle Airport is located less than 2 miles from projects that include canal rebuilding/lining and table topping dead-end facilities, headwall modifications, and flow measurement improvements. Castle Airport records over 220,000 aircraft operations per year, averaging over 575 per day (Castle Airport, 2018). Merced Regional Airport is located within a 2-mile radius of projects including canal rebuilding/lining and table topping dead-end facilities, canal automation and flow measurement improvements, interties, as well as improvements to level control for reservoir and recharge basins. Merced Regional Airport has 58,650 aircraft operations annually, averaging 161 per day (Airport IQ, 2018). Two proposed projects, Dead-end Lateral Modifications at Booster 14 Lateral B and Dead-end Lateral Maintenance at an Existing Open Channel, occur adjacent to or on the property of the airport. The Booster 14 improvements include a portion of a pipeline that crosses underneath the airport runway. The project does not result in new noise-sensitive uses or receptors. Construction at Merced Regional Airport would take approximately 1 week and would involve raising boxes and placing concrete. The only equipment would be concrete trucks and potentially a concrete pumper. There is potential at these two sites that construction workers may be periodically exposed to excessive noise levels. Construction worker exposure to noise is governed by OSHA and Cal/OSHA. The District would be required to comply with applicable OSHA and Cal/OSHA standards related to protecting construction workers from excessive noise levels. ***Therefore, impacts would be less than significant.***

## 3.10.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant noise and vibration impacts; therefore, mitigation is not required or recommended.

# 3.11 Public Services and Utilities

This section describes the regulatory and environmental setting with respect to public services and utilities, and evaluates potential public services and utilities-related impacts that would result from implementation of the Proposed Program. The Study Area is Merced County (County) because the applicable agencies and systems exist at the County level.

## 3.11.1 Regulatory Setting

This section describes relevant federal, State, and local laws, regulations, guidelines, and policies.

### 3.11.1.1 Federal

There are no applicable federal regulations pertaining to public services and the construction, operations, or maintenance activities associated with the Proposed Program.

### 3.11.1.2 State

**California Water Code**

The California Water Code section of the *California Code of Regulations* (CCR) establishes the regulatory environment governing water management in California. Special districts that provide domestic water service in unincorporated areas of counties, including irrigation districts, must operate in accordance with the California Water Code. Division 11, CCR 20500-29978, specifically outlines laws governing irrigation districts and associated activities; Merced Irrigation District (MID and District) must comply with all regulations identified within (Merced County, 2013a).

**California Government Code Section 65303**

According to Section 65303 of the California Government Code, local governments may adopt or address other elements in their general plans related to the physical development of the county or city. The Public Services and Utilities Element in a general plan addresses many of the facilities or services provided by the various local public agencies serving the residents within its sphere of influence. The Public Facilities and Services Element of the *2030 Merced County General Plan* provides goals and policies that guide the development and use of utilities and services in the County.

**California Public Utilities Code**

The California Public Utilities Code was enacted in 1951 to provide legislative oversight to public utility organizations operating within the state and ensure increased public safety. Because MID generates and distributes electricity from the New Exchequer Dam, the District operates as a public utility and is, therefore, subject to the regulations outlined within the code, which provide legal requirements related to governance, consumer protection, renewables, pollution reduction, and fees, among others.

**California Integrated Waste Management Act**

Under the California Integrated Waste Management Act (Assembly Bill 939), CalRecycle establishes priorities for local agencies regarding source reduction, recycling, and environmentally safe transformation and land disposal. The act also establishes landfill diversion goals intended to extend the useful life of landfills throughout the state (Merced County, 2013a).

**27 CCR 21600–21900**

In accordance with 27 CCR 21600–21900, solid and hazardous waste transfer and disposal facilities in Merced County are regulated jointly by the Regional Water Quality Control Board and CalRecycle. The Merced County Public Works Department and the Merced County Association of Governments Regional Waste Authority support Merced County's solid waste and landfill diversion goals (Merced County, 2013a).

### 3.11.1.3 Local

**2030 Merced County General Plan**

This section describes the applicable goals and policies from the *2030 Merced County General Plan* (Merced County, 2013b) as well as the applicable provisions from the MCC (2017) used for evaluating potential impacts on public services and utilities and service systems in the County.

The Public Facilities and Services Element of the *2030 Merced County General Plan* provides goals and policies that guide the development and use of utilities and services in the County. The County implements the policies and programs of the General Plan through many actions and tools that can be grouped according to the following eight categories:

- Regulation and Development Review (RDR)
- Infrastructure and Service Master Plans, Strategies, and Programs (MPSP)
- Financing and Budgeting (FB)
- Planning Studies and Reports (PSR)
- County Services and Operations (SO)
- Inter-Governmental Coordination (IGC)
- Joint Partnerships with the Private Sector (JP)
- Public Information (PI)

The following goals and policies and the associated category have the potential to be applicable to the Proposed Program:

- *Goal PFS-3. Ensure the management of stormwater in a safe and environmentally sensitive manner through the provision of adequate storm drainage facilities that protect people, property, and the environment.*
  - *Policy PFS-3.4: Agency Coordination (IGC). Coordinate with the U.S. Army Corps of Engineers and other appropriate agencies to develop stormwater detention/retention facilities and recharge facilities that enhance flood protection and improve groundwater recharge.*
  - *Policy PFS-3.5: Pre-Development Storm Flows (MPSP) Require on-site detention/retention facilities and velocity reducers when necessary to maintain pre-development storm flows and velocities in natural drainage systems.*
  - *Policy PFS-3.6: Retention/Detention Facility (RDR/MPSP) Encourage stormwater detention/retention project designs that minimize drainage concentrations and impervious coverage, avoid floodplain areas, are visually unobtrusive and, where feasible, provide a natural watercourse appearance and a secondary use, such as recreation.*
- *Goal PFS-4. Ensure the safe and efficient disposal and recycling of solid and hazardous waste generated in the County.*
  - *Policy PFS-4.5: Solid Waste Service Availability (RDR). Require all new development to adequately provide solid waste storage, handling, and collection through the development review and permitting process.*
  - *Policy PFS-4.6: Solid Waste Reduction (SO). Support and promote feasible waste reduction, recycling, and composting efforts.*
  - *Goal PFS-6: Ensure the provision of timely and adequate law enforcement through proper management and staffing of the Sheriff Department in Merced*

*County. Policy PFS-6.1: Staffing Levels (SO) Encourage optimum staffing levels for both sworn Sheriff Deputies and civilian*

- *Policy PFS-6.2: Sheriff Department Response Time Standards (SO) Strive to achieve and maintain appropriate Sheriff Department response times for all call priority levels to provide adequate law enforcement services for all County residents.*

- *Goal PFS-7. Provide adequate fire and emergency medical facilities and services to protect County residents from injury and loss of life, and to protect property from fire.*
  - *Policy PFS-7.1: Fire Staffing and Response Time Standards (SO) Strive to maintain fire department staffing levels and response times consistent with National Fire Protection Association standards.*
  - *Policy PFS-7.6: Emergency Medical Service Staffing and Response Time Standards (SO) Strive to achieve and maintain optimum staffing levels and appropriate response times to provide adequate emergency medical services for all County residents.*
  - *Policy PFS-7.10: Adequate Fire Flows for Agricultural Facilities (RDR) Require all agricultural commercial facilities to have adequate water supply and fire flows to meet the Uniform Fire Code and other State and local ordinances.*

Included in the MCC, Title 9.04 and 9.08 of the General Health and Safety Ordinance, and Title 18.44 of the Zoning Ordinance, are provisions that regulate solid waste disposal facilities and transport within the County.

**Merced County Ordinance 1567 Section 1, Chapter 2.72**

Chapter 2.72 of the MCC requires the development, and implementation when needed, of a countywide emergency preparedness plan. The County is located within the Governor's Office of Emergency Service Mutual Aid Region V; and the Merced County Emergency Operations Plan, which was most recently updated in 2007, is consistent with the California Standardized Emergency/National Incident Management System. The plan is designed to establish emergency management organization, policies and responsibilities, and operational procedures.

## 3.11.2 Environmental Setting

The Proposed Program and associated projects would span across various parts of Merced County. Although the majority of the projects would be located within 15 miles of the city of Merced, the areas where individual projects included as part of the overall Proposed Program would be located are rural, sparsely populated, and dominated by agriculture and agricultural facilities.

### 3.11.2.1 Public Services

**Police and Fire Protection**

The Program Area is primarily served by Merced County Sheriff's Office, which is responsible for law enforcement services in the unincorporated areas of the County. Merced County Sherriff's Office operates the County jails, John Latorraca Correctional Facility, and the main jail; functions as the County Coroner; issues Carry Concealed Weapons permits; and provides animal control services (Merced County, 2018a). The Merced County District Attorney handles criminal prosecution, and investigation and fraud within the County (Merced County, 2018b). Law enforcement services are also provided by seven police departments within the County established in the following locations: Atwater, Dos Palos, Gustine, Livingston, Los Banos, Merced, and Merced Community College (USACOPS, 2018). The

California Highway Patrol serves as the primary law enforcement agency responsible for State highways traversing the Program Area, providing law enforcement, traffic control, accident investigation, and management of hazardous materials spill incidents on State highways (Cal OES, 2014).

There are a total of 28 fire stations within Merced County (FireDepartment.net, 2018). Fire departments within the County are operated by cities within incorporated areas or by California Department of Forestry and Fire Protection under an agreement with the Merced County Fire Department in unincorporated areas.

Paid personnel provide fire protection and emergency response services, including ambulances for medical emergencies, within the cities of Atwater, Dos Palos, Los Banos, and Merced, as well as at the University of California, Merced; and a volunteer fire department is located in Gustine (FireDepartment.net, 2018). Merced County Fire Department provides fire protection and emergency response services for all unincorporated areas. Fire stations are staffed 24 hours a day by a full-time staff, including, at a minimum, a Fire Captain or Fire Apparatus Engineer, and supplemental emergency response services are provided by Paid Call Firefighters or volunteers. Responsible areas vary by station, from 16 to 325 square miles; and the service area of the County department is over 2,000 square miles (Merced County, 2013a). The Merced County Fire Chief also acts as the Madera-Mariposa-Merced Ranger Unit Chief for California Department of Forestry and Fire Protection, which operates 20 of the fire stations within the County (FireDepartment.net, 2018).

The Merced County Fire Department also serves as the County Coordinator of the State Office of Emergency Services, which aims to “mitigate against, prepare for, respond to, and recover from the effects of emergencies that threaten lives, property, and the environment” (Merced County, 2013a). The County Office of Emergency Services was established in 1971 and is responsible for preparation and implementation of an Emergency Operation Plan that supports the goals of the State Emergency Plan (Merced County, 2013a).

**Schools and Parks**

In the 2015–16 school year, in Merced County, a total of 57,477 students were enrolled in 114 public elementary schools, junior high/middle schools, high schools, and other types of schools, including continuation, community day, juvenile court, and special education (Ed-Data, 2017). Additional educational opportunities are provided through the Merced Community College District and the University of California, Merced campus. Table 3.11-1 characterizes each public school district in the County.

Table 3.11-1. Merced County Schools

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| District | Address | Lowest Grade | Highest Grade | Total Students | Total Staff[a] |
|---|---|---|---|---|---|
| Atwater Elementary | 1401 Broadway Avenue, Atwater, CA | K | 8th | 4,899 | 235 |
| Ballico-Cressey Elementary | 11818 West Gregg Street, Ballico, CA | K | 8th | 382 | 23 |
| Delhi Unified | 9716 Hinton Avenue, Delhi, CA | K | Adult | 2,669 | 143 |
| Dos Palos Oro Loma Joint Unified | 2041 Almond Street, Dos Palos, CA | P | Adult | 2,293 | 116 |
| El Nido Elementary | 161 East El Nido Road, El Nido, CA | P | 8th | 153 | 9 |
| Gustine Unified | 1500 Meredith Avenue, Gustine, CA | P | 12th | 1,888 | 97 |
| Hilmar Unified | 7801 North Lander Avenue, Hilmar, CA | K | 12th | 2,291 | 138 |
| Le Grand Union Elementary | 13071 East Le Grand Road, Le Grand, CA | K | 8th | 402 | 21 |

Table 3.11-1. Merced County Schools

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| District | Address | Lowest Grade | Highest Grade | Total Students | Total Staff[a] |
|---|---|---|---|---|---|
| Le Grand Union High | 12961 East Le Grand Road, Le Grand, CA | 9th | 12th | 504 | 39 |
| Livingston Union | 922 B Street, Livingston, CA | P | 12th | 2,558 | 130 |
| Los Banos Unified | 1717 South 11th Street, Los Banos, CA | P | 12th | 10,520 | 485 |
| McSwain Union Elementary | 926 Scott Road, Merced, CA | K | 8th | 822 | 47 |
| Merced City Elementary | 444 West 23rd Street, Merced, CA | 6th | 6th | 10,888 | 565 |
| Merced County Office of Education | 632 West 13th Street, Merced, CA | K | 12th | 1,173 | 144 |
| Merced River Union Elementary | 4402 West Oakdale Road, Winton, CA | K | 8th | 143 | 10 |
| Merced Union High | 3430 A Street, Merced, CA | 9th | Adult | 10,203 | 536 |
| Plainsburg Union Elementary | 3708 South Plainsburg Road, Merced, CA | K | 8th | 119 | 7 |
| Planada Elementary | 9722 East Haskell Avenue, Planada, CA | P | 8th | 800 | 44 |
| Snelling-Merced Falls Union Elementary | 16099 North Highway 59, Snelling, CA | K | 8th | 83 | 6 |
| Weaver Union | 3076 East Childs Avenue, Merced, CA | P | 8th | 2,815 | 156 |
| Winton | 7000 North Center Street, Winton, CA | K | 8th | 1,872 | 100 |

Source: Ed-Data, 2017.

[a] Indicates full-time equivalent teachers, administrators, and pupil services staff.

Notes:

K = kindergarten
P = preschool

### 3.11.2.2 Utilities and Service Systems

**Water Supply and Delivery**

Merced County is within the San Joaquin River basin, where a number of the larger streams and rivers are regulated by dams and reservoirs that support a variety of water uses. Agricultural irrigation constitutes the largest water use in the County, followed by municipal and environmental uses. Water supply sources include groundwater, surface water, and large-scale State and federally contracted water conveyances (Merced County, 2013a). MID provides the majority of the irrigation water in the eastern half of Merced County, conveying approximately 500,000 acre-feet of water per year through over 800 miles of water conveyance facilities spanning more than 160,000 acres. MID possesses three “pre-1914” appropriative water rights, which provide the District with the legal authority to directly divert up to a total of 7,760 cubic feet per second from the Merced River (Merced County, 2013a). Outside the MID service area, agricultural surface water supplies are primarily provided from outside the County via the Delta-Mendota Canal, the San Luis Canal, the California Aqueduct, and the Merced and San Joaquin Rivers (Nolte Associates, Inc., 2009).

The City of Merced provides drinking water to residents from 22 active groundwater wells and 340 miles of distribution pipeline (City of Merced, 2017a). The County has 13 large public water systems with more than 200 service connections, and 80 smaller public water systems (Merced County, 2013a). Domestic water systems that provide water to individual communities in the County are generally small and

isolated. Several agencies, such as community service districts, public utility districts, sanitary districts, and other irrigation districts provide domestic water to portions of residents in unincorporated areas of the County. Residents in unincorporated areas of the County outside of the service districts must generally rely on private wells as their source for drinking water (Merced County, 2013a).

**Wastewater Collection and Disposal**

The City of Merced is responsible for collecting and treating sewage and storm drain discharge in Merced, as well as monitoring groundwater for contamination. The largest wastewater treatment facility in Merced County is the Merced Wastewater Treatment Plant operated by the City of Merced and located on Gove Road, approximately 2.5 miles southwest of Merced. The plant has a capacity to treat up to 12 million gallons per day of influent (City of Merced, 2017b).

Special districts, including community service districts, public utility districts, sanitary districts, and sewer maintenance districts, provide the majority of sanitary sewer service within Merced County. These districts generally serve small communities in unincorporated areas of the County (Merced County, 2013a). However, some unincorporated areas of the County, including several communities with populations of less than 500, lack sewer infrastructure and, thus, rely on individual and community septic systems (Merced County, 2013a). Septic tank systems are the primary means of onsite wastewater disposal in rural areas, including areas within the Program Area.

In the majority of unincorporated communities located in Merced County, developers are required to construct onsite storm drainage systems. Once constructed, the County maintains these storm drainage systems. New subdivisions within the MID service area often use MID canals for the discharge of stormwater. As stormwater discharges increase, improvements to MID canals are generally required and must be funded by the developers of new subdivisions. The County enforces stormwater management and floodplain management controls to manage flow rates to existing drainage channels (Merced County, 2013a).

**Solid and Hazardous Waste**

The Merced County Regional Waste Authority operates two active solid waste disposal landfill facilities in Merced County – the State Route (SR) 59 Landfill site and the Billy Wright Landfill (Merced County, 2017). The SR 59 Landfill is located within the MID service area and would likely receive solid waste generated from construction of the Proposed Program. The SR 59 Landfill serves the city of Merced and unincorporated areas in eastern Merced County. The SR 59 Landfill was constructed in 2001 and is permitted to continue operating until 2030 with a maximum intake of 1,500 tons per day (CalRecycle, 2017a). Table 3.11-2 summarizes both facilities located in Merced County, including the existing and remaining capacity of the landfills and the types of wastes accepted.

Table 3.11-2. Merced County Solid Waste Disposal Facilities

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Facility | Address | Permit | Permitted Capacity (CY) | Remaining Capacity (CY) | Wastes Accepted |
|---|---|---|---|---|---|
| SR 59 Landfill | 7040 N. SR 59<br>Merced, California | 24-AA-0001 | 30,012,352 | 28,025,334[a] | Class III, nonhazardous solid waste, inert wastes, and non-friable asbestos |
| Billy Wright Landfill | 17173 S. Billy Wright Road<br>Los Banos, California | 24-AA-0002 | 14,800,000 | 11,370,000[b] | Class III, nonhazardous solid waste, inert wastes, and non-friable asbestos |

Source: CalRecycle, 2017a, 2017b.

[a] Remaining capacity inspection date September 1, 2005.

[b] Remaining capacity inspection date September 30, 2010.

Note:

CY = cubic yard

There are no transfer stations in Merced County. Waste hauling operations are conducted primarily by two haulers, Gilton Disposal Services and Winton Disposal, which provide curbside collection and waste hauling for light industrial customers in unincorporated areas of the County (Merced County, 2013a).

The Merced County Department of Public Works operates a household hazardous waste collection facility at the SR 59 Landfill that collects a number of common household hazardous wastes, including waste oil, batteries, fertilizer, household pesticides and herbicides, antifreeze, and electronic (e)-wastes, among other household waste types (Merced County, 2013b). Hazardous wastes generated must be properly handled, stored, and disposed of in accordance with the Merced County Hazardous Waste Program (Merced County, 2013a). Although not anticipated, currently unidentified but potentially hazardous materials could be present within the Program Area, near specific project sites. These unidentified disposal sites could include those associated with agricultural production, industrial and commercial activities, construction sites, and disposal sites that accepted waste prior to 1991, when hazardous wastes were accepted at most solid waste landfills.

Additionally, major transportation corridors through Merced County, including Interstate 5 and SR 99, and some railroads allow movement of large quantities of hazardous materials.

**Electricity and Gas**

Pacific Gas and Electric Company (PG&E) is the primary electric power provider within Merced County, and operates and maintains the regional electric power supply grid that is part of a larger supply network encompassing the entire Central Valley. Within the County, PG&E operates a 220-kilovolt primary line running northwest-southeast, east of SR 99; additional transmission lines transmitting less energy traverse segments of the County, primarily stemming from the main line or from one of the approximately 20 substations located within the County (CEC, 2014).

Under the authority of the California Water Code, MID has the authority to operate as an electric utility and has been providing wholesale power to utility companies since the Exchequer Dam began operations in 1926. MID has expanded its power delivery area since its retail business was established in 1996, and currently serves approximately 10,000 customers, providing low-cost electricity in eastern Merced County, including the cities of Atwater, Livingston, and Merced, with a particular focus on industrial and commercial users.

The primary source of natural gas in Merced County is a major gas transmission line operated by PG&E, running northwest-southeast within the County, adjacent to SR 99; and several smaller distribution lines stem from the main pipeline to serve urban areas along the corridor, including the cities of Merced, Atwater, and Livingston. Additionally, although not located within the County, a large pipeline also runs northwest-southeast adjacent to Interstate 5 along the western border of the County, and distribution lines from this pipeline serve the communities of Los Banos, Volta, and Gustine, all located within Merced County (CEC, 2017).

Merced County is located atop the Monterey Shale formation, and some natural gas exploration has been conducted (Merced County, 2010). However, development of a production industry has been limited, according to employment and economic contribution statistics and the most recent available Division of Oil, Gas, and Geothermal Resources well count and production report (LAEDC, 2015; DOGGR, 2013). Based on current trends in the San Joaquin Valley, it would be anticipated that future development plans would primarily focus on the extraction process of hydraulic fracturing or “fracking”; however, no significant extraction projects within the Program Area are currently planned (SJVAPCD, 2013).

**Telecommunications**

AT&T provides telecommunications services in Merced County. Nationwide service providers, including AT&T, Verizon, and Sprint, provide cellular telephone service within the Program Area via local cellular

towers (Merced First, 2017). Comcast provides cable television services and high-speed internet access. Wireless internet access is also available in some areas with services provided by a variety of local providers, including Clearwire and Valley Tech Logic. Internet access in rural areas is generally limited to dial-up service or satellite connections (Merced County, 2013a).

## 3.11.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

### 3.11.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines and listed below. Impacts on public services and utilities and service systems are considered significant if the Proposed Program would result in any of the following:

- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause potentially significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:
  - Fire protection
  - Police protection
  - Schools
  - Parks
  - Other public facilities
- Require or result in the relocation or construction of new or expanded water, wastewater treatment, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Have sufficient water supplies available to serve the Proposed Program and reasonably foreseeable future development during normal, dry and multiple dry years.
- Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.
- Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.
- Comply with federal, State, and local management and reduction statutes and regulations related to solid waste.

### 3.11.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area as applicable. The No Program Alternative is considered functionally the same as Existing Conditions related to public services and utilities and service systems given no substantial changes in services are anticipated, including as related to anticipated future population growth. Future urbanization would take place adjacent to current urban lands primarily inside the MID service area and would result in a conversion of

approximately 8.5 percent of farmlands/agriculture to urban uses inside the MID service area and less than 1 percent to urban uses outside the MID service area, but within the Program Area by 2040. Anticipated growth would occur at a rate such that public services and utility systems would expand to keep pace with urbanization and would provide the same or similar services and functions. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions recognizing that impacts would be generally the same in comparison to the No Program Alternative.

It is assumed that in the absence of the Proposed Program, MID would continue to maintain existing level of service to its customers. Impacts associated with public services and utilities, including electricity and solid waste disposal, would be related to ongoing MID operations and maintenance activities. Similarly, it is assumed that public services provided by entities other than MID would be maintained as necessary, and provision of service would accommodate future growth. Because the Study Area is projected to remain primarily agricultural even in the absence of the Proposed Program, it is assumed that the degree of additional public services in the Study Area in the future would not substantially vary from Existing Conditions.

The Proposed Program includes a Capital Improvement Plan with projects that have been grouped into categories based on common features, as described in Section 2, Program Description and Alternatives, and Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where an impact analysis applies to more than one category, the analysis is presented as a single discussion with the relevant categories specified.

A combination of publicly available data, including existing landfill capacity within the Program Area, Program description details, and professional judgment was used to evaluate potential impacts related to public services and utilities. Anticipated construction- and operations and maintenance-related impacts are summarized below.

As described in Section 2.5, Environmental Commitments, projects would be designed and constructed to avoid utility provider facilities wherever possible. If avoidance is not possible, MID would coordinate with service providers to relocate facilities without interrupting service to customers.

#### 3.11.3.3 Impacts Associated with the Proposed Program

**Impact Pub-1: A substantial adverse physical impact associated with the provision of new or physically altered governmental facilities or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection, police protection, schools, parks, and/or other public facilities.**

***Fire and Police Protection***

During construction of the Proposed Program, construction-related traffic would increase in localized areas surrounding proposed projects. If an emergency occurred requiring police or fire protection, the increased construction traffic could result in temporary congestion or delays, but would generally be limited to brief periods of time when additional equipment is required to be moved to support a given construction activity. This could have an adverse effect on emergency service providers' ability to maintain acceptable response times. However, given projects would be subject to a traffic control plan (as necessary given the individual project) as part of the implementation of a given project, construction traffic levels would not be expected to disrupt emergency service response to the point that would require the construction or expansion of government facilities. ***Impacts would be less than significant.***

During operations and maintenance of the Proposed Program, adequate emergency access to individual landowner properties located along routes adjacent to project facilities would be maintained by the County's congestion management agency for designated roads or highways. Routine maintenance of

proposed facilities would be required, but vehicle use of the roadways used would be minimal and would not result in congestion due to the rural nature of the Program Area and the use of District access routes to prevent traffic delays. Therefore, operation of the Proposed Program would not result in a need for new or altered government facilities. ***Impacts would be less than significant.***

***Schools, Parks, and Other Public Services and Utilities***

Implementation of the Proposed Program would occur over 30 years. Although construction would require a relatively small labor force that would primarily be filled by local residents, some portion of the construction force could be hired from outside the Program Area. This could cause a slight increase in demand for public services, such as schools, parks, utilities, and community facilities, by construction workers. However, the demand would be both temporary and minimal, and would not be expected to be to such an extent as to require the provision of new or extended public services, or require additional schools or parks. ***Therefore, impacts would be less than significant.***

Construction activities are proposed throughout the Program Area and could require the temporary relocation of utility provider facilities such as electric or telephone transmission and distribution lines or gas, water, or wastewater transmission and distribution pipes. As described in Section 2.5, Environmental Commitments, projects would be designed and constructed to avoid utility provider facilities wherever possible. If avoidance is not possible, MID would coordinate with service providers to relocate facilities without interrupting service to customers. ***Therefore, impacts would be less than significant.***

Operations and maintenance of the Proposed Program may result in the need to hire additional employees, but if additional staff are needed, the number would be minimal and would not result an increased demand for schools, parks, public services, or utilities and, therefore, would not require new or altered governmental facilities. ***Impacts would be less than significant.***

The Proposed Program and associated regulating reservoirs would not be anticipated to induce increased recreation or generate new recreational visitors to the area. Therefore, demand for schools, parks, and other public services and utilities would not be expected to increase; and thus, no additional government facilities would be required. ***Impacts would be less than significant.***

**Impact Pub-2: Require or result in the relocation or construction of new or expanded water, wastewater treatment, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.**

Construction, operations, and maintenance activities associated with the Proposed Program are not anticipated to generate wastewater that would require treatment, nor would treated potable water be required for Program facilities. Any negligible increase would be served by one of several water or wastewater treatment plant providers operating within the Study Area, including within the cities of Merced, Atwater, and Livingston, or by individual or community septic and well systems located near specific project sites; and no additional or augmented facilities would be required. Similarly, implementation of the Proposed Program is not anticipated to require additional or changes to electric power, natural gas, or telecommunication facilities; existing facilities would serve the needs of the Program. Therefore, no additional public service facilities with potential to result in significant environmental impacts would be required for the Proposed Program. ***Impacts would be less than significant.***

**Impact Pub-3: Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.**

Construction activities would be conducted primarily during the dry season or during dry winter periods outside the irrigation season as required to minimize interruptions to MID operations. Construction disturbance would be limited to the project sites and associated staging areas. As described in

Subsection 3.9, Hydrology and Water Quality, best management practices would be implemented to minimize potential erosion and sedimentation impacts associated with stormwater flows. The Proposed Program would, thus, not be expected to result in significant impacts on downstream stormwater drainage facilities or require the expansion of existing facilities other than District facilities requiring capacity improvements as part of the Proposed Program. ***Therefore, impacts during construction activities would be less than significant.***

The majority of stormwater runoff within the Program Area is channeled through MID facilities, including channels and laterals. A primary purpose of the Proposed Program is to improve water management through the construction and operation of water management facilities, including regulating reservoirs and recharge basins, which would provide increased capabilities to manage water supplies during the irrigation season. Other proposed improvements to existing siphon and canal facilities would improve irrigation-season conveyance capacity. Facilities that would improve capacity would be expected to provide some degree of benefit in terms of conveying winter flows, but the benefits would not be anticipated to be substantial, as stormwater conveyance is not the primary function of the proposed facilities. However, each proposed project would be designed to avoid impacts on existing stormwater drainage facilities, and the expansion of existing facilities would not be required. ***Impacts during Program operation would be less than significant.***

**Impact Pub-4: Have sufficient water supplies available to serve the Proposed Program and reasonably foreseeable future development during normal, dry, and multiple dry years.**

Construction activities requiring water supplies would be primarily limited to the use of water for dust suppression. Existing water supplies and associated entitlements would allow for sufficient water supplies to support onsite dust-suppression activities. ***Therefore, impacts during construction would be less than significant.***

Operation of the Proposed Program would not require additional water supplies beyond quantities currently managed by the District. The system improvements element of the Proposed Program would improve the management of the surface water supplies by enhancing flexibility, reducing losses to seepage and spills, and expanding conjunctive use of surface water and groundwater.

Water availability each year is more limited by water supply captured in Lake McClure than MID's water right. In years of limited water availability where MID delivers the maximum available for irrigation use, the Class II to Class I conversion program element would improve water supply reliability for Class II users that choose to participate and would reduce water supply reliability slightly for existing Class I users because of the associated expansion of the Class I user base. In years of ample water supply, the Class II to Class I conversion program element would have little effect on existing Class I customers.

The District proposed water transfers element (through term and 1-year temporary water transfers) would include transfers within and outside the Merced Groundwater Subbasin. Transfers have historically been, and would continue to be, made to secure revenues to improve water management and customer service. As all potential transferees and points of diversion/rediversion and places of use are not yet specifically known outside the Merced Groundwater Subbasin, this PEIR evaluates out-of-basin transfers at a programmatic level, and water transfers within the Merced Groundwater Subbasin at a project level. All water transfers are proposed to be implemented via reservoir release of previously stored water and would be subject to typical refill agreements with California Department of Water Resources and Bureau of Reclamation as well as MID water right license and Federal Energy Regulatory Commission-related requirements. Transfer volumes would likely be lowest in very dry and very wet years due to water supply availability and in-basin delivery constraints and out-of-basin pumping system constraints. The volume of in-basin and out-of-basin transfers would be determined annually by MID, with an anticipated maximum amount of 50,000 acre-feet transferred in-basin and up to 30,000 acre-feet of out-of-basin in any year. Additional environmental review of out-of-basin transfers would be conducted as necessary depending on term transfer volume(s), timing, and transferee. In general, it is

proposed when the available water supply is relatively limited (e.g., drier years), less water would be transferred to reduce potential impacts to MID's water supply. Transfers would likely occur in years when there is both water available to transfer and capacity available to divert and convey transfer water. In the wetter years, when the available water supply is highest, conveyance system constraints may limit the ability to transfer more water. Additionally, in wetter years demand for transfer water may be less than in less wet or drier years, other than some potential transferees looking for transfer water to support groundwater recharge. Water transfers are proposed to be implemented from April through September on a variety of different patterns depending in part on water supply and reservoir storage conditions, and the location and needs of the transferee. Overall, under the Proposed Program, MID would have sufficient supply under existing water rights to serve future development during normal, dry, and multiple dry years. ***Therefore, impacts during Program operation would be less than significant.***

**Impact Pub-5: Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.**

As described under Impact Pub-3, construction, operations, and maintenance activities associated with the Proposed Program are not anticipated to generate wastewater that would require treatment. Any negligible increase would be served by one of several wastewater treatment plant providers operating within the Program Area, including within the cities of Merced, Atwater, and Livingston or by individual and community septic systems located within areas where projects are specifically located; and no additional or augmented facilities would be required. ***Therefore, impacts would be less than significant.***

**Impact Pub-6: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.**

Proposed Program construction would include the excavation of earthen material to accommodate construction of the proposed projects identified in Section 2, Program Description and Alternatives. Excavated materials associated with the Main Canal Improvements at Tunnel No. 1 Project would not be diverted to a landfill. Options 1, 2, 3, and 4 of the Main Canal Improvements at Tunnel No. 1 Project would generate approximately 850,000, 900,000, 575,000, and 100 CY of material, respectively. If the capacity of the tunnel is increased under Option 4, approximately 9,000 CY of demolition debris would be generated; however, some of this debris may be used to fill voids in the tunnel bottom and stabilize canal banks along the Main Canal. Material would be stockpiled onsite and/or in and along the portion of the Main Canal that would be abandoned (Options 1 and 2 only). Suitable material would be segregated and used as a dirt source to repair canal banks when needed. Unsuitable material for canal maintenance would remain onsite permanently.

As described in Subsection 2.1.2.3, it is anticipated that construction of each of the proposed regulating reservoirs would require the excavation of approximately 150,000 CY of soil. It is assumed that 60 percent of this material would be suitable for reuse. Approximately 75,000 CY would be used in the construction of the berms surrounding the new project facilities, and up to 15,000 CY may also be used along existing MID canal banks within a 5-mile radius of each project site to support ongoing bank maintenance. The remaining up-to 60,000 CY of nonsuitable material excavated for each project would either be sold to fill buyers or be permanently stored on District-owned property adjacent to project sites. Excess excavation materials are not anticipated to be diverted to landfills during facility construction.

Construction of proposed canal rebuilding/relining, table topping dead-end facilities, canal automation, siphon modification, and intertie projects would involve excavation ranging from 500 to 10,000 CY per project. It is expected that approximately 60 percent of the excavated material would be suitable for reuse in berms, canal embankment reinforcement and lining, and table topping. The remaining 40 percent would be used to support ongoing bank maintenance along existing MID canal banks within a

5-mile radius of each project site, would be sold to buyers of fill, or would be stored on District-owned property adjacent to the project sites, and would not be diverted to landfills.

Other solid waste generated in the Program Area during construction would include debris from demolition phases, nonfunctional equipment that is replaced during project construction, and packaging for new equipment and materials. As described in Section 2, Program Description and Alternatives, demolition activities would generate volumes of debris ranging from 20 to 500 CY per project. This solid waste would be transported offsite to either SR 59 Landfill or Billy Wright Landfill, depending on the location of the project and type of waste. These landfills have sufficient capacity to accept the solid waste generated during Program construction, as identified in Table 3.11-2 (CalRecycle, 2017a, 2017b). ***Therefore, impacts associated with construction activities would be less than significant.***

Program operations would not produce solid waste or require solid waste disposal; however, Program maintenance may generate minimal solid waste including discarded equipment and packaging associated with chemicals or new equipment. This waste would be diverted to either the SR 59 Landfill or the Billy Wright Landfill, depending on the project location and waste classification. As presented in Table 3.11-2 (CalRecycle, 2017a, 2017b), these facilities have sufficient permitted capacity to accept the anticipated solid waste. ***Impacts during Program operation would be less than significant.***

**Impact Pub-7: Comply with federal, State, and local management and reduction statutes and regulations related to solid waste.**

Solid waste materials generated during construction would be disposed of in compliance with federal, State, and local regulations. Solid waste generated during Program construction would vary by project and would be transported to the appropriate disposal site. ***Impacts during Program construction would be less than significant.***

As described under Impact Pub-7, Program operations would not produce solid waste or have solid waste disposal needs. Maintenance of the Proposed Program would generate minimal solid waste and would be disposed of in accordance with all applicable regulations. ***Impacts during Program operation would be less than significant.***

## 3.11.4 Mitigation Measures

Construction, operation, and maintenance of the Proposed Program would have less than significant impacts on public services and utilities; therefore, mitigation is not required or recommended.

# 3.12 Traffic and Transportation

This section describes the regulatory and environmental setting with respect to traffic and transportation, and evaluates potential traffic and transportation-related impacts that could result from implementation of the Proposed Program. The Study Area for the traffic and transportation analysis is Merced County (County) because the applicable systems and networks exist at the County scale.

## 3.12.1 Regulatory Setting

This section describes relevant State and local laws, regulations, guidelines, and policies. There are no federal traffic and transportation regulations applicable to the Proposed Program.

### 3.12.1.1 State

The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, operating, and maintaining all State-owned roadways. Federal standards for interstate highways are implemented in California by Caltrans. The Program Area is within Caltrans District 10, which includes Alpine, Amador, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus, and Tuolumne Counties and more than 3,500 miles of State Routes (SRs) (Caltrans, 2017b). In the vicinity of the Program Area, Caltrans operates and maintains SRs 99, 140, and 59, which provide regional access to the cities of Merced, Atwater, and Livingston, as well as neighboring cities and communities.

According to the *Guide for the Preparation of Traffic Impact Studies* (Caltrans, 2002), "Caltrans endeavors to maintain a target level of service (LOS)[11] at the transition between LOS C and LOS D on state highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing LOS should be maintained."

In January 2016, the Governor's Office of Planning and Research (OPR) released the *Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA* (OPR, 2016). One of the most substantial changes to the guidelines is replacing LOS with vehicle miles traveled (VMT) as the primary metric on transportation impact across the state. Implementation of VMT as the primary metric is required by July 2020. As discussed below, Merced County continues to use the LOS approach.

### 3.12.1.2 Local

The vast majority of projects would occur within unincorporated areas of Merced County; therefore, this section includes potentially applicable regulations falling under the jurisdiction of countywide agencies.

**Merced County**

The Circulation Element of the *2030 Merced County General Plan* (Merced County, 2013) provides the policy context to achieve safe and efficient circulation of people, vehicles, and goods throughout the County. The element establishes goals and policies for the circulation system to balance the varying needs of motorists, bicyclists, and pedestrians as well as the unique needs for the movement of farm equipment and agricultural commodities. The Circulation Element is used as a working document with the Land Use Element.

As discussed above, although California Environmental Quality Act (CEQA) Guidelines will soon require the use of VMT as the means of assessing roadway performance and capacity, Merced County currently

[11] LOS is a qualitative assessment of the quantitative effects of such factors as traffic volume, roadway geometrics, speed, delay, and maneuverability on roadway and intersection operations.

uses the LOS criteria. Merced County revised their General Plan in 2013, before the regulatory change was approved, and LOS remains the standard within the County.

Merced County Public Works Department uses a functional classification of roadways, whereby roads are typically classified by their function and characteristics. The *2030 Merced County General Plan* labels road segments as freeways, arterials, major collectors, minor collectors, or local roads. However, County road capacities are based on generalized LOS volume thresholds used in the *2013 Quality/Level of Service Handbook,* which includes 24 roadway types (FDOT, 2013). The Florida Department of Transportation (FDOT) thresholds account for the physical characteristic of various roadways types and for the characteristics of motorists in urban, suburban, and rural settings. The thresholds are grounded in the capacities established in the *Highway Capacity Manual* (Transportation Research Board, 2010) but reflect the use of generalized assumptions related to factors such as traffic controls, speed, and adjacent land use. FDOT uses LOS thresholds that are based on daily traffic volume factors.

Table 3.12-1 summarizes the FDOT Functional Classification system, which Merced County uses to establish LOS thresholds for each roadway classification type. Merced County designates LOS C for rural areas and LOS D for urban areas as the minimum acceptable (MCAG, 2018).

Table 3.12-1. Level of Service Thresholds by Roadway Classification
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Area | Roadway Classification | Intersections | Flow | Lanes | Median | Level of Service | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | A | B | C | D | E |
| Urban | Freeway | N/A | N/A | 4 | N/A | 22,000 | 36,000 | 52,000 | 67,200 | 76,500 |
| | Expressway | N/A | N/A | 4 | Divided | 22,000 | 36,000 | 21,400 | 31,100 | 32,900 |
| | Highway | N/A | Uninterrupted | 2 | Undivided | 2,000 | 7,000 | 13,800 | 19,600 | 27,000 |
| | Highway | <2/mile | N/A | 2 | Undivided | 2,000 | 4,200 | 13,800 | 16,400 | 16,900 |
| | Highway | <4.5/mile | N/A | 2 | Undivided | 2,000 | 1,900 | 11,200 | 15,400 | 16,300 |
| | Collector | N/A | N/A | 2 | Undivided | 2,000 | 1,900 | 4,800 | 10,000 | 12,600 |
| | Highway | <4.5/mile | N/A | 4 | Undivided | 2,000 | 3,500 | 23,200 | 29,100 | 30,600 |
| | Arterial | N/A | N/A | 4 | Undivided | 2,000 | 3,500 | 15,600 | 27,800 | 29,400 |
| | Highway | <2/mile | N/A | 4 | Undivided | 2,500 | 20,900 | 24,600 | 25,700 | 29,400 |
| | Collector | N/A | N/A | 4 | Undivided | 2,500 | 20,900 | 9,800 | 19,200 | 22,800 |
| | Highway | <2/mile | N/A | 2 | Undivided | 2,500 | 4,000 | 13,100 | 15,500 | 16,300 |
| | Arterial | N/A | N/A | 2 | Undivided | 2,500 | 4,000 | 7,000 | 13,600 | 14,600 |
| Transitioning | Freeway | N/A | N/A | 4 | N/A | 23,500 | 38,700 | 52,500 | 62,200 | 69,100 |
| | Collector | N/A | N/A | 2 | Undivided | 23,500 | 38,700 | 4,400 | 9,400 | 12,000 |
| Rural | Freeway | N/A | N/A | 6 | N/A | 33,100 | 54,300 | 73,900 | 87,400 | 97,200 |
| | Freeway | N/A | N/A | 4 | N/A | 21,300 | 35,300 | 47,900 | 56,600 | 63,000 |
| | Non-Freeway | N/A | Uninterrupted | 4 | Divided | 17,500 | 28,600 | 40,800 | 52,400 | 58,300 |
| | Non-Freeway | N/A | Isolated Stops | 4 | N/A | 17,500 | 2,900 | 17,400 | 23,000 | 25,200 |
| | Non-Freeway | N/A | Uninterrupted | 2 | Undivided | 2,600 | 5,300 | 8,600 | 13,800 | 22,300 |
| | Non-Freeway | N/A | Isolated Stops | 2 | Undivided | 2,600 | 1,900 | 8,000 | 10,700 | 12,100 |

Table 3.12-1. Level of Service Thresholds by Roadway Classification
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Area | Roadway Classification | Intersections | Flow | Lanes | Median | Level of Service | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | A | B | C | D | E |
| Suburban | Non-Freeway | N/A | Interrupted | 4 | Divided | 2,600 | 5,300 | 25,500 | 29,400 | 31,200 |
| | Highway | N/A | Uninterrupted | 2 | Undivided | 2,500 | 7,200 | 12,700 | 17,300 | 23,500 |
| | Arterial | N/A | Interrupted | 2 | Undivided | 2,500 | 2,200 | 11,000 | 13,900 | 14,900 |
| | Freeway | N/A | N/A | 2 | Undivided | 2,500 | 2,200 | 1,900 | 7,600 | 10,100 |

Source: Merced County, 2012b; FDOT, 2013

**Merced County Association of Governments**

In addition to the County and City of Merced rules and regulations, the Merced County Association of Governments (MCAG) also effectively serves as the congestion management agency. MCAG recently published a Regional Transportation Plan (RTP)/Sustainable Communities Strategy for Merced County (MCAG, 2018). The RTP outlines a number of proposed goals and objectives related to highways, streets, and roads; transit; and bicycle and pedestrian transportation, among others, which are intended to "ensure that the Merced County transportation system will continue to operate efficiently over the next 25 years with sufficient capacity to meet demand and that mobility options are available for all of Merced County's residents" (MCAG, 2018). Relevant goals for the Proposed Program include maintaining an LOS D on all regionally significant roads.

## 3.12.2 Environmental Setting

Due to the rural nature of the local communities, low development densities, and limited alternative travel options, the primary means of travel in Merced County is the automobile. The Program Area is transected by numerous primary transportation corridors of regional importance and contains an extensive local roadway network. In addition to the primary transportation corridors, many paved and unpaved roadways run adjacent to and transect local farmlands. The city of Merced experiences comparatively high traffic volumes within areas near the interchanges and in central downtown areas. Additionally, trains periodically cause traffic to stop for several minutes throughout the day. In general, however, local transportation systems receive limited traffic volumes, and congestion and delays are unusual.

### 3.12.2.1 Existing Road Network

Figure 3.12-1 presents the regional and local road network. The majority of the proposed project sites are located in rural areas outside of city limits.

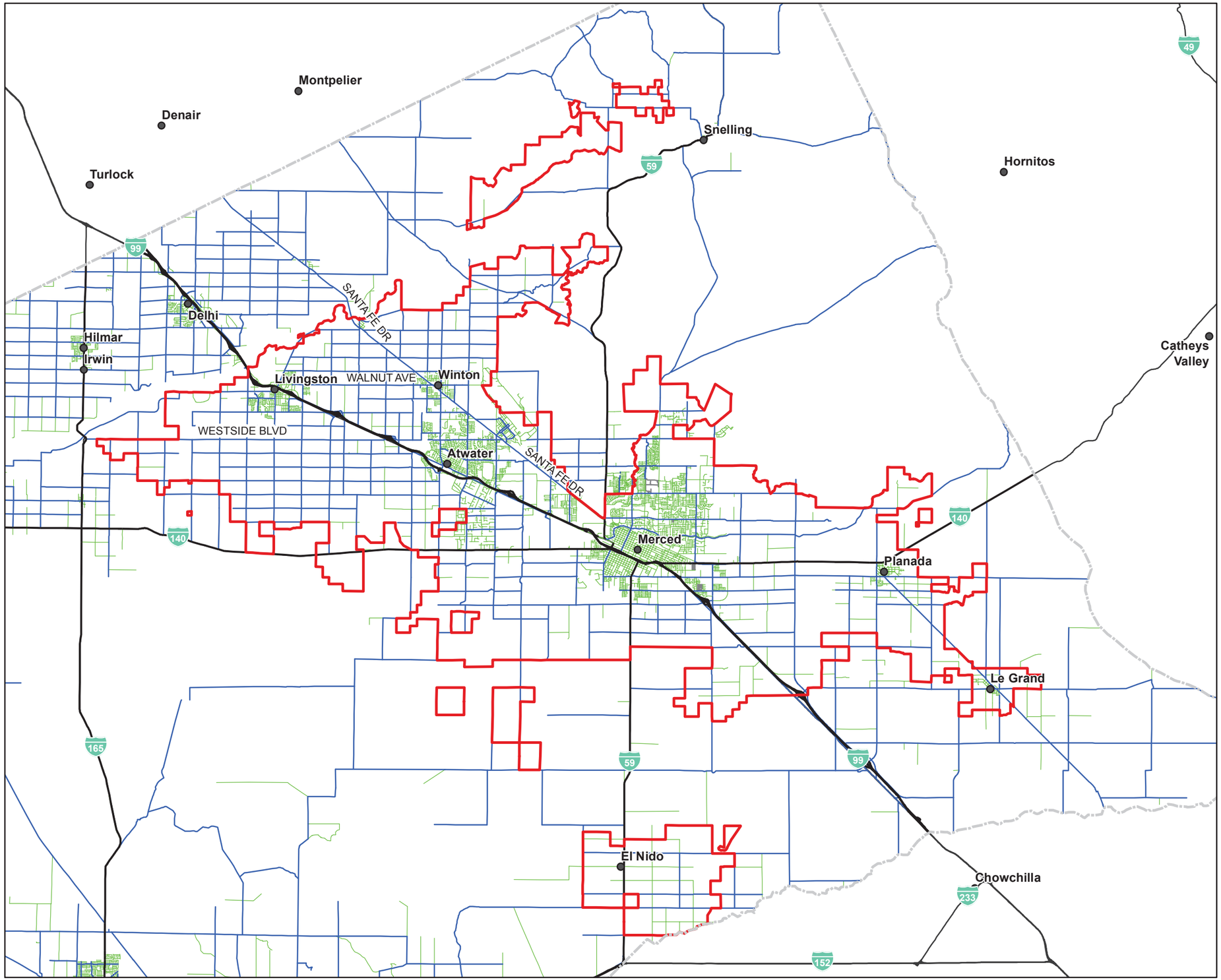
The major regional and local roadways within the Program Area include SRs 99, 59, 140, County Route J Zone 7 (J7), Westside Boulevard (J18), and Walnut Avenue. These are the highest volume roadways within the Program Area and would be used to access many of the proposed project sites. Although Interstate 5 (I-5) traverses Merced County north to south, it is located approximately 20 miles west of the westernmost proposed projects. The following provides a summary of the primary, potentially affected roadways:

- **SR 99** is a major north-south freeway varying between four and six lanes and traverses generally northwest-southeast through the Program Area. Access between SR 99 and the Program Area is provided at several interchanges. Average daily traffic (ADT) volumes range from 42,500 vehicles per day (vpd) near the Madera County line to 74,500 vpd at Shanks Road in Delhi (Caltrans, 2017a).

- **SR 59**, known as Snelling Highway north of the city of Merced, is a north-south highway that extends approximately 34 miles from its southern origin at SR 152, at the Merced-Madera County line, to the town of Snelling, near the Stanislaus County line. The highway is primarily two-lane, except a 1-mile segment within the city limits of Merced, where the highway temporarily converges with SR 99 and SR 140. Peak ADT is at 16th Street and V Street in Merced (27,400 vpd). Outside Merced, ADT ranges from 1,500 vpd at Turlock Road to 9,200 vpd at Dickenson and Mission Roads (Caltrans, 2017a).
- **SR 140** extends 102 miles east-west from I-5 near Gustine to Yosemite National Park. SR 140 is generally four lanes with a median and shoulder within city limits and narrows to a two-lane rural highway with no median and limited shoulders within unincorporated areas of the County. SR 140 is a designated Principal Arterial. At the westernmost segment of SR 140 located within the Program Area, at the intersection of SR 140 and Lincoln Boulevard, the ADT is 3,550 vpd. At the junction of SR 99 in the city of Merced, SR 140 has a maximum ADT of 14,700 vpd. East of the city of Merced, near the Mariposa County line, the ADT drops to 3,900 vpd (Caltrans, 2017a).
- **J7**, also known as Santa Fe Road, Santa Fe Drive, and Santa Fe Avenue at various locations, generally parallels SR 59 as a northwest-southwest route, extending approximately 43 miles between the community of Empire, east of Modesto, and the city of Merced. As Santa Fe Avenue, the roadway is designated as a major collector between the Madera County line and Childs Avenue with a maximum ADT of 1,644 vpd. As Santa Fe Drive, between the Stanislaus County line and SR 59, the roadway is designated as an arterial with a maximum ADT of 28,268 vpd between Bellevue Road and Franklin Road (Merced County, 2012b).
- **J18,** also known as Westside Boulevard, is a two-lane, east-west major collector extending approximately 11 miles west from SR 99 northwest of the City of Atwater to SR 165. The roadway has a peak ADT of 2,805 between Washington Boulevard and Lincoln Boulevard and would be anticipated to be used to access multiple projects within the Program Area (Merced County, 2012b).
- **Walnut Avenue** is a two-lane, east-west major collector extending approximately 7 miles east from Main Street in the City of Livingston to the northern portion of the Merced County Castle Airport, east of the community of Winton. The roadway has a maximum ADT of 4,989 vpd between Cressey Way and Vine Avenue and would be anticipated to be used to access multiple projects within the Program Area (Merced County, 2012b).

ADT volumes were used to assess the LOS for the Program Area roadways. The 2016 ADT volumes for SRs 99, 59, and 140 were obtained from the Caltrans Traffic Data Branch (Caltrans, 2017a), and ADT volumes for local roadways were obtained from the *Merced County General Plan Revised Draft Background Report: Transportation and Circulation* (Merced County, 2012b) and Chapter 4, Transportation and Circulation, the *Merced Vision 2030 General Plan* (City of Merced, 2015). For the ADT data from Merced County and the City of Merced, a 2 percent annual growth rate was applied to the most recent available traffic counts before 2016 to establish an estimated 2016 baseline.

The existing ADT as well as the LOS on each of these roadways, along segments that could be used within the Program Area, are presented in Appendix H. Because the Program Area roadways proposed to be used are throughout Merced County, Merced County's LOS thresholds, from the most recent *Quality/Level of Service Handbook* (FDOT, 2013), are used for consistency.





LEGEND
- Program Area
- Merced County
- Interstate
- State Route
- Rural Collectors/Arterials
- Urban Collectors/Arterials
- Private

N

0 3.5 7
Miles

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom

**FIGURE 3.12-1 EXISTING ROADWAY NETWORK IN THE PROGRAM AREA**
MERCED IRRIGATION DISTRICT
WATER RESOURCES MANAGEMENT PLAN
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT
MERCED COUNTY, CALIFORNIA



ch2m

#### 3.12.2.2 Air Traffic

There are numerous small, private airports and airstrips that are primarily used for agricultural-related activities located throughout the Program Area. Public airports include the Merced Regional Airport, the Merced County Castle Airport (formerly, Castle Air Force Base), and the Atwater Municipal Airport.

#### 3.12.2.3 Pedestrian and Bicycle Facilities

The city of Merced has the most extensive bikeway system in the County, including Class I paths, which are separated from roadways, and Class II, on-street bike lanes. Most of the Class II bike lanes are within urban areas of the city; Class I bike paths are along portions of Black Rascal Creek and Bear Creek. Few dedicated bicycle facilities exist in the smaller communities and unincorporated areas of Merced County. The County has one Class I bike path (on Lake Road between Yosemite Avenue and Scout Island), and there are plans to construct an additional Class I bike path along Segments 2 and 3 of Campus Parkway. There are no additional sidewalks or bicycle routes or lanes within unincorporated Merced County where projects are proposed (Merced County, 2012a).

#### 3.12.2.4 Public Transit

A combined bus transit system for the County, called “The Bus,” is administered and managed by the Merced Transit Authority. It provides service in Atwater, Los Banos, and Merced, as well as intercity options connecting Merced to Livingston, Los Banos, Planada, Turlock, and Winston. The system operates a total of 16 routes and serves approximately 1,000,000 passengers per year (The Bus, 2019).

The Yosemite Area Regional Transportation Service (YARTS) provides service from the city of Merced to Yosemite National Park year-round, with limited service during the winter. YARTS picks up and drops off customers at the Merced Airport, the Greyhound Bus Station, and the Amtrak Station (YARTS, 2019). University of California, Merced transit also provides eight route options through their bus service, CatTracks, which connects students to the campus from on- and off-campus locations (University of California, Merced, 2019).

### 3.12.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential impacts on traffic and transportation. The thresholds used to evaluate potential traffic and transportation impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

#### 3.12.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the 2019 CEQA Guidelines and relevant local policies. Impacts on traffic and transportation are considered significant if the Proposed Program would result in any of the following:

- Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
- Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.

Within Merced County, a project is considered to have a significant effect if it would cause the following:

- Result in a roadway operating at an acceptable LOS (LOS C for rural areas and LOS D for urban areas [Policy CIR-1.5]) to deteriorate to an unacceptable LOS (e.g., LOS D, E, or F in rural areas and LOS E or F in urban areas) (Merced County, 2013).

The City of Merced has a minimum LOS threshold of LOS D.

As described above, updated CEQA Guidelines were released in December 2018 requiring implementation of VMT as the primary metric by July 2020. Merced County revised their General Plan before the regulatory change was approved, and LOS remains the County's evaluation standard.

### 3.12.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area, as applicable. For the purposes of traffic and transportation, the No Program Alternative would differ from Existing Conditions because the population within the Program Area is projected to continue growing, which is anticipated to result in increased traffic. Therefore, the Proposed Program was analyzed in comparison to Existing Conditions and the No Program Alternative.

The system improvements element of the Proposed Program includes projects that have been grouped into project categories based on common features. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

The following assumptions were made regarding the Proposed Program-related construction, operations, and maintenance impacts related to transportation and traffic:

- Two year types were identified to represent a high (2021) and low (2023) construction activity year.
- Based on projections from the 2018 RTP (MCAG, 2018), it is anticipated that population will grow by an average rate of 1.6 percent through 2050, and assumed ADT will grow by the same rate.
- As described above, I-5 is not anticipated to be used during Program construction.

Existing ADT and LOS with a baseline year of 2016 were estimated and are provided in Appendix H to this PEIR. To determine existing LOS, roadways were classified based on several factors. The Circulation Diagram presented in the *Merced County General Plan Background Report* (Merced County, 2012b) was used to identify general roadway classifications; these were further refined to be compatible with the *2013 Quality/Level of Service Handbook* (FDOT, 2013) LOS Thresholds (Table 3.12-1) using aerial imagery to determine number of lanes, roadway setting (i.e., urban or rural), and frequency of stops, all of which are components of the FDOT classifications.

To estimate the traffic that would result from proposed construction activities, the number of vehicle trips associated with each project category, as identified in Subsection 3.3, Air Quality, were multiplied by the number of projects from each project category scheduled for implementation in the high and low construction activity years used in the air quality impact analysis—2021 and 2023, respectively. This calculation provided the total number of trips expected in 2021 and 2023. The number of trips for each of the years was divided by the expected number of working days per year to estimate the ADT associated with proposed construction activities. The results of this analysis are presented in Table 3.12-2. The implementation schedule (see Section 2, Program Description and Alternatives), includes the number of projects within each category that are planned for each year of Program implementation.

To estimate future conditions without the Proposed Program in 2021 and 2023, the existing ADT for each roadway segment (Table 3.12-2) was multiplied by a 1.6 percent annual growth rate (MCAG, 2018),

and the LOS was determined based on the 2013 FDOT thresholds (Table 3.12-1). The ADT anticipated during the high and low construction activity years without implementation of the Proposed Program, based on this growth factor assumption, are presented in Appendix H of this Programmatic Environmental Impact Report. Based on this approach, in 2021, under the Proposed Program, approximately 34 percent of the 61 roadway segments assessed would operate at an unacceptable LOS, compared to 31 percent without implementation of the Proposed Program (Table H-1), with an increase to 30 percent in 2023. In 2023, approximately 43 percent of the roadway segments would operate at an unacceptable LOS, both with and without implementation of the Proposed Program (Table H-2).

Table 3.12-2. Average Annual and Daily Trips during High and Low Construction Activity Years
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| | | Per Project | | "High" (2021) | | "Low" (2023) | |
|---|---|---|---|---|---|---|---|
| **Project Category** | **Vehicle Types** | **Average Daily Trips** | **Working Days/ Year** | **Projects** | **Trips** | **Projects** | **Trips** |
| Main Canal Improvements at Tunnel No. 1 Option 1: Open Channel on New Alignment South of the Existing Alignment | Worker Commute | 60 | 264 | 1 | 15,840 | 0 | 0 |
| | Haul Truck | 40 | 5 | | 200 | | 0 |
| | Ready-mix Trucks | 20 | 25 | | 500 | | 0 |
| | Pickup | 40 | 198 | | 7,920 | | 0 |
| Main Canal Improvements at Tunnel No. 1 Option 2: Open Channel on New Alignment North of the Existing Alignment | Worker Commute | 60 | 264 | 1 | 15,840 | 0 | 0 |
| | Haul Truck | 40 | 80 | | 3,200 | | 0 |
| | Ready-mix Trucks | 20 | 15 | | 300 | | 0 |
| | Pickup | 40 | 198 | | 7,920 | | 0 |
| Main Canal Improvements at Tunnel No. 1 Option 3: Open Channel along Existing Tunnel Alignment | Worker Commute | 60 | 132 | 1 | 7,920 | 0 | 0 |
| | Haul Truck | 40 | 8 | | 320 | | 0 |
| | Ready-mix Trucks | 10 | 5 | | 50 | | 0 |
| | Pickup | 40 | 132 | | 5,280 | | 0 |
| Main Canal Improvements at Tunnel No. 1 Option 4: Rehabilitation of Existing Tunnel | Worker Commute | 60 | 132 | 1 | 7,920 | 0 | 0 |
| | Haul Truck | 40 | 23 | | 920 | | 0 |
| | Ready-mix Trucks | 4 | 63 | | 252 | | 0 |
| | Pickup | 40 | 132 | | 5,280 | | 0 |
| Canal Rebuilding/ Relining | Worker Commute | 20 | 66 | 3 | 3,960 | 3 | 7,920 |
| | Haul Truck | 10 | 66 | | 1,980 | | 1,980 |
| | Ready-mix Trucks | 4 | 66 | | 792 | | 792 |
| | Pickup | 40 | 66 | | 7,920 | | 7,920 |
| Table Topping Dead-end Facilities | Worker Commute | 20 | 22 | 2 | 880 | 2 | 1,760 |
| | Haul Truck | 10 | 22 | | 440 | | 440 |
| | Ready-mix Trucks | 4 | 22 | | 176 | | 176 |
| | Pickup | 40 | 22 | | 1,760 | | 1,760 |
| Canal Automation | Worker Commute | 12 | 132 | 5 | 7,920 | 5 | 7,920 |
| | Haul Truck | 20 | 20 | | 2,000 | | 2,000 |
| | Ready-mix Trucks | 4 | 40 | | 800 | | 800 |
| | Pickup | 4 | 10 | | 200 | | 200 |
| Flow Measurement | Worker Commute | 0 | 0 | 5 | 0 | 5 | 0 |
| | Haul Truck | 0 | 0 | | 0 | | 0 |
| | Ready-mix Trucks | 0 | 0 | | 0 | | 0 |
| | Pickup | 4 | 22 | | 440 | | 440 |

Table 3.12-2. Average Annual and Daily Trips during High and Low Construction Activity Years

*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| | | Per Project | | "High" (2021) | | "Low" (2023) | |
|---|---|---|---|---|---|---|---|
| **Project Category** | **Vehicle Types** | **Average Daily Trips** | **Working Days/ Year** | **Projects** | **Trips** | **Projects** | **Trips** |
| Siphon Modifications | Worker Commute | 12 | 40 | 5 | 2,400 | 5 | 2,400 |
| | Haul Truck | 0 | 0 | | 0 | | 0 |
| | Ready-mix Trucks | 4 | 40 | | 800 | | 800 |
| | Pickup | 4 | 10 | | 200 | | 200 |
| Siphon Demolition | Worker Commute | 12 | 44 | 5 | 2,640 | 5 | 2,640 |
| | Haul Truck | 20 | 20 | | 2,000 | | 2,000 |
| | Ready-mix Trucks | 4 | 40 | | 800 | | 800 |
| | Pickup | 4 | 10 | | 200 | | 200 |
| Interties | Worker Commute | 40 | 130 | 1 | 5,200 | 1 | 5,200 |
| | Haul Truck | 20 | 130 | | 2,600 | | 2,600 |
| | Ready-mix Trucks | 4 | 40 | | 160 | | 160 |
| | Pickup | 40 | 10 | | 400 | | 400 |
| Reservoirs and Recharge Basins | Worker Commute | 40 | 264 | 1 | 10,560 | 1 | 10,560 |
| | Haul Truck | 120 | 67 | | 8,040 | | 8,040 |
| | Ready-mix Trucks | 24 | 120 | | 2,880 | | 2,880 |
| | Pickup | 20 | 264 | | 5,280 | | 5,280 |
| Highlands | Worker Commute | 10 | 88 | 0 | 0 | 0 | 0 |
| | Haul Truck | 4 | 88 | | 0 | | 0 |
| | Ready-mix Trucks | 0 | 0 | | 0 | | 0 |
| | Pickup | 4 | 88 | | 0 | | 0 |
| Owens Creek Diversion Channel | Worker Commute | 40 | 264 | 0 | 0 | 0 | 0 |
| | Haul Truck | 4 | 264 | | 0 | | 0 |
| | Ready-mix Trucks | 8 | 7 | | 0 | | 0 |
| | Pickup | 4 | 264 | | 0 | | 0 |
| Black Rascal Diversion Channel | Worker Commute | 52 | 132 | 0 | 0 | 0 | 0 |
| | Haul Truck | 4 | 132 | | 0 | | 0 |
| | Ready-mix Trucks | 8 | 10 | | 0 | | 0 |
| | Pickup | 4 | 132 | | 0 | | 0 |
| Merced River Water Recovery | Worker Commute | 32 | 260 | 0 | 0 | 0 | 0 |
| | Haul Truck | 20 | 70 | | 0 | | 0 |
| | Ready-mix Trucks | 8 | 71 | | 0 | | 0 |
| | Pickup | 4 | 260 | | 0 | | 0 |
| Le Grand Canal near Black Rascal Automation | Worker Commute | 20 | 176 | 1 | 3,520 | 0 | 0 |
| | Haul Truck | 12 | 156 | | 1,764 | | 0 |
| | Ready-mix Trucks | 8 | 116 | | 928 | | 0 |
| | Pickup | 8 | 176 | | 1,176 | | 0 |
| Northside Canal Flumes | Worker Commute | 20 | 88 | 0 | 0 | 0 | 0 |
| | Haul Truck | 8 | 69 | | 0 | | 0 |
| | Ready-mix Trucks | 8 | 87 | | 0 | | 0 |
| | Pickup | 4 | 88 | | 0 | | 0 |
| **All Projects[a]** | **Worker Commute** | **236** | **1,138** | **29** | **52,920** | **27** | **33,560** |
| | **Haul Truck** | **252** | **561** | | **22,132** | | **17,060** |

Table 3.12-2. Average Annual and Daily Trips during High and Low Construction Activity Years
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Category | Vehicle Types | Per Project | | "High" (2021) | | "Low" (2023) | |
|---|---|---|---|---|---|---|---|
| | | Average Daily Trips | Working Days/ Year | Projects | Trips | Projects | Trips |
| | Ready-mix Trucks | 76 | 499 | | 7,636 | | 6,408 |
| | Pickup | 200 | 788 | | 25,024 | | 16,400 |
| Annual Trips Associated with the Proposed Program[a] | | | | 107,712 | | 73,428 | |
| ADT Associated with the Proposed Program[a, b] | | | | 408 | | 278 | |

[a] Based on Main Canal Improvements at Tunnel No. 1 Option 2, which requires the most trips among the four options.
[b] Assumes 264 working days per year.

As provided in Subsection 2.5, Environmental Commitments, the following project commitments would be incorporated as part of the Proposed Program to avoid or minimize potential traffic and transportation impacts:

- Short-term full or partial road closures may be required to allow for certain construction activities and to maintain public safety as part of implementation of the Proposed Program. MID would develop a traffic control plan, as appropriate, with Merced County to address emergency responder access and management of local traffic including managing construction traffic routing and Program road use. The plan would include traffic controls, such as the use of flaggers and signage, and other traffic safety measures to maintain proper traffic flow during temporary construction activities, as necessary.
- MID would inform residents of construction activities and potential delays, and coordinate with Caltrans and Merced County to minimize construction impacts to the extent necessary. MID would obtain all required encroachment and transportation permits.
- MID would work with the Merced Regional Airport in advance of construction of the Dead-end Lateral Modifications at Booster 14 Lateral B and Dead-end Lateral Maintenance at an Existing Open Channel Projects to identify how to avoid or minimize potential runway disruption during construction activities, which are anticipated to occur over 1 week. MID would also work with the Merced Regional Airport to avoid or minimize disruption during Program operation, as necessary.

### 3.12.3.3 Impacts Associated with the Proposed Program

**Impact TT-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.**

As described under Impact TT-4 below, the Proposed Program would not result in a conflict with the current Merced County LOS criteria during construction or operation. Proposed construction activities would not be expected to interfere with bicycle and pedestrian access; however, temporary localized use of roadway shoulders may result in limited access near proposed projects. Construction equipment would be parked so as to not block or impede through-traffic on the roadways, which would also apply to public transit and pedestrian and bicycle traffic. Because these potential interferences would be both temporary and localized to specific project locations, which are predominantly located in rural areas where bicycle and pedestrian traffic is extremely limited and public transit is generally unavailable, construction of the Proposed Program would not substantially reduce the performance or safety of these facilities. ***Therefore, the Proposed Program would not conflict with the Merced County General Plan or the RTP, and impacts would be less than significant.***

**Impact TT-2: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).**

Construction and operation of the Proposed Program would not substantially increase hazards due to any geometric design features or incompatible uses because the Program would not alter any public roadways or intersections or introduce any design features or incompatible uses to the Program Area. ***Therefore, implementation of the Proposed Program would result in no impact***.

Two public airports are located within 2 miles of Proposed Program facilities:

- Castle Airport is located less than 2 miles from projects that include canal rebuilding/lining and table topping dead-end facilities, headwall modifications, and flow measurement improvements. Castle Airport records over 220,000 aircraft operations per year, averaging over 575 per day (Castle Airport, 2018).
- Merced Regional Airport is located within a 2-mile radius of projects including canal rebuilding/lining and table topping dead-end facilities, canal automation and flow measurement improvements, interties, as well as improvements to level control for reservoir and recharge basins. Merced Regional Airport has 58,650 aircraft operations annually, averaging 161 per day (Airport IQ, 2018). Two proposed projects, Dead-end Lateral Modifications at Booster 14 Lateral B and Dead-end Lateral Maintenance at an Existing Open Channel, occur adjacent to or on the property of the airport. The Booster 14 improvements include a portion of a pipeline that crosses underneath the airport runway. Construction at Merced Regional Airport would take approximately 1 week and would involve raising boxes and placing concrete. This construction activity would have the potential to temporarily result in minor changes to takeoff and landing patterns at the airport. MID would work with Merced Regional Airport in advance of construction to identify how to avoid or minimize disruption of traffic patterns on the runway.

The proposed improvements would not result in an increase in traffic levels or a change in location that creates substantial safety risks. ***Impacts during construction at or near local airports would be less than significant.***

Operations and maintenance activities during operation of the Proposed Program would be consistent with existing operations and maintenance activities. If future operations and maintenance activities require work on or near the Merced Regional Airport runway, MID would work with the Merced Regional Airport to avoid or minimize disruption of traffic patterns on the runway. ***Impacts during operation at or near local airports would be less than significant.***

**Impact TT-3: Result in inadequate emergency access.**

During construction of proposed projects, potential traffic delays immediately adjacent to project sites could affect emergency response times or access. As part of the environmental commitments associated with the Proposed Program, MID would develop a traffic control plan, as appropriate, with Merced County to address emergency responder access and management of local traffic. The plan would include traffic controls, such as the use of flaggers and signage, and other traffic safety measures to maintain proper traffic flow during temporary construction activities, as necessary. ***Therefore, construction of the Proposed Program would result in a less than significant impact to emergency access***.

Proposed projects would require periodic maintenance, but vehicular use of the roadways used to maintain service would be consistent with existing conditions and would not result in traffic congestion or impediments to emergency access. ***Therefore, operations and maintenance of the Proposed Program would result in a less than significant impact to emergency access.***

**Impact TT-4: Result in a roadway operating at an acceptable LOS (LOS C for rural areas and LOS D for urban areas [Policy CIR-1.5]) to deteriorate to an unacceptable LOS (e.g., LOS D, E, or F in rural areas and LOS E or F in urban areas).**

Implementation of the Proposed Program would result in temporary increases in traffic along roadways in the vicinity of proposed projects. While the locations of all proposed projects are known, the timing of projects each year of Program implementation are not known. MID would evaluate which specific project locations should be prioritized in a given year as the Program is implemented. In 2021, the year with the greatest anticipated construction traffic, 408 annual daily trips would be generated by proposed construction activities and distributed within the roadway network in the Program Area (Table 3.12-2). This volume would not be anticipated to result in the deterioration of an acceptable LOS. Projected growth without the Proposed Program is anticipated to result in a decrease in LOS along some roadway segments in the Program Area. As part of the environmental commitments associated with the Proposed Program, MID would inform residents of construction activities and potential delays, and coordinate with Caltrans and Merced County to minimize construction impacts including managing construction traffic routing and Program road use. MID would also obtain all applicable encroachment and transportation permits. ***Therefore, impacts during construction would be less than significant***.

Proposed projects would require periodic maintenance, but vehicular use of the roadways used to maintain service would be consistent with existing conditions. ***Therefore, operations and maintenance of the Proposed Program would result in a less than significant impact.***

## 3.12.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant impacts on transportation and traffic; therefore, mitigation is not required or recommended.

SECTION 4

# Other CEQA Considerations

## 4.1 Cumulative Impacts

This section analyzes cumulative impacts or potential impacts of the Proposed Program in conjunction with those of other development proposals in the Program Area.

Section 15355 of the California Environmental Quality Act (CEQA) Guidelines states the following:

*Cumulative impacts refers to two or more individual effects, which, when considered together, are considerable or which compound or increase other environmental impacts.*

> *(a) The individual effects may be changes resulting from a single project or a number of separate projects.*
>
> *(b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.*

The concept of "cumulatively considerable" effects is used to established a threshold. It is derived from the CEQA Guidelines Section 15130: "An EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in Section 15065 (a)(3). Where a lead agency is examining a project with an incremental effect that is not 'cumulatively considerable,' a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable." According to Section 15065 (a)(3), cumulatively considerable means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

The cumulative analysis relies on a list of past, present, and reasonably foreseeable future projects. Projects included in the list of reasonably foreseeable projects are proposed by formal public notices (e.g., Notices of Preparation), have pending environmental documents, or are in the process of regulatory review and other nearby infrastructure projects that could result in impacts and benefits similar to those of the Proposed Program. Although any project under consideration could be modified or abandoned, development has been occurring in Merced County and will continue in the foreseeable future. To develop a list of reasonably foreseeable projects, environmental documents currently or recently under consideration by Merced County were reviewed. Additionally, any current efforts related to water management by other agencies are included. The cumulative project information is based on the best information available at the time this Programmatic Environmental Impact Report (PEIR) was prepared. Table 4.1-1 lists the projects that were identified.

Table 4.1-1. Reasonably Foreseeable Future Projects in the Program Area
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Name | Location | Project Size (acres) | Description | Status |
|---|---|---|---|---|
| Black Rascal Creek Flood Control Project | Black Rascal Creek | 320 | Flood detention basin | Environmental review December 2017 |
| Landfill-Gas-to-Energy Project | Highway 59 Landfill and University of California, Merced | 1.25 | Landfill gas capture at Highway 59 landfill | Environmental review June 2019 |
| Merced 140 Roadside Safety Improvements Project | State Route 140 near Gustine and Planada | 0.5 | Extend culverts, reconstruct headwalls, add new guardrails at 10 locations | Environmental review May 2019 |
| California High-Speed Train Project: Merced to Fresno | Alignment from Merced to Fresno | Thousands | Merced to Fresno Section of the California High-Speed Train Project | Environmental review May 2019 |
| Merced Falls Road Shoulders Project | Merced Falls Road just east of Henderson Park | 16 | Widen the shoulders of an approximate 1-mile segment of Merced Falls Road | Environmental review April 2019 |
| Le Grand Community Plan Update | Le Grand Community | 430 | Long-range vision and land use strategy plan for guiding development within Le Grand | Environmental review April 2019 |
| Oliveira Dairy Expansion Project | West Oak Avenue and North Gurr Road | 7 | Dairy expansion to allow for an additional 2,182 animals | Environmental review April 2019 |
| Merced Seismic Retrofit Project | State Routes 59, 140, and 152 | 21 | Seismic retrofit seven bridges on State Routes 59, 140, and 152 | Environmental review February 2019 |
| Quinley Avenue Bridge Replacement Project | Quinley Avenue at Black Rascal Creek | 12 | Replace the existing bridge with a structure that would meet current design standards | Environmental review October 2018 |
| Winton Community Plan Update | Winton Community | 430 | Long-range vision and land use strategy plan for guiding development within Winton | Environmental review October 2018 |
| Wright Solar Park Project | Los Banos | 1,250 | 200-megawatt photovoltaic solar power-generating facility | Environmental review September 2018 |
| Poquito Lakes Luxury Garden Apartments | Hilmar | 11 | 103-unit multi-family residential apartment complex | Environmental review July 2018 |
| Dickenson Ferry Road Bridge Replacement Project | Dickenson Ferry Road and Quinley Avenue | 1 | Replacement of an existing bridge and relocation of the O'Donnell Lateral Canal | Environmental review July 2018 |

Table 4.1-1. Reasonably Foreseeable Future Projects in the Program Area
*Merced Irrigation District Water Resources Management Plan Programmatic Environmental Impact Report*

| Project Name | Location | Project Size (acres) | Description | Status |
|---|---|---|---|---|
| John Toste Dairy Expansion Project | Santa Fe Grade and West Brazoo Road | 282 | Dairy expansion to allow for an additional 1,805 animals | Environmental review pending |
| Godinho Heifer Facility Expansion Project | Johnson Road and Henry Miller Avenue | 50 | Dairy expansion to allow for an additional 1,497 animals | Environmental review pending |
| Merced Biogas Upgrade Facility and Pipeline | Highway 99 and Ranch Road | 0.7 | Biogas upgrade facility and 34 miles of associated pipeline | Environmental review pending |

General development trends in rural Merced County in recent years include the conversion of agricultural fields to solar photovoltaic facilities and the construction or expansion of industrial-scale dairies.

### 4.1.1 Future Merced River Flow Regime

The Federal Energy Regulatory Commission (FERC) license renewal process for the Merced River Hydroelectric Project is currently underway. The FERC Final Environmental Impact Statement (EIS)was published in December 2015 and included a revised flow schedule for the Merced River (FERC, 2015). As described in Section 2, Program Description and Alternatives, and Subsection 3.9, Hydrology and Water Quality, although a flow schedule is provided in the FERC Final EIS, there are several unknown factors that may influence the final Merced River flow schedule. These unknown factors include the update to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, which currently suggests that (if implemented) future Merced River flows would follow an unimpaired flow schedule between 30 and 50 percent. In addition, there are the potential conditioning requirements under the 401 Water Quality Certification that may lead to revision of the FERC Final EIS flow schedule. While either of these processes may result in no change to the FERC Final EIS flow schedule, the current uncertainty does not allow for a reasonably foreseeable operation scenario.

### 4.1.2 Aesthetics and Visual Resources

The projects described in Table 4.1-1 and the anticipated conversion of agricultural to developed lands associated with population growth in Merced County would contribute to localized changes in the visual character of the Program Area, primarily in the vicinity of existing development. The Proposed Program would include system improvements and other actions to improve agricultural water supply in the Program Area, which would be consistent with the existing rural and agricultural land uses and associated visual character of the region. Therefore, the Proposed Program would not create a cumulatively considerable impact on aesthetics.

### 4.1.3 Agricultural Resources and Land Use

Farmlands adjacent to individual system improvement projects under the Proposed Program may be temporarily taken out of production to accommodate construction activities such as vehicle access and material and equipment staging. The Proposed Program would result in the permanent loss of some agricultural land, particularly as a result of proposed diversion channel and reservoir improvements. Each of the proposed reservoirs would convert approximately 60 acres of land in agricultural production. Reservoir locations would be chosen to avoid or minimize conversions of lands under Williamson Act

contracts when feasible. Although the Proposed Program would result in the permanent conversion of agricultural lands, the Proposed Program would improve long-term water supply delivery to agricultural land uses, thereby supporting rural agricultural communities and discouraging conversion of agricultural lands to other uses. Therefore, the Proposed Program would not create a cumulatively considerable impact on agriculture or land use.

### 4.1.4 Air Quality

As discussed in Subsection 3.3.3.3, Impacts Associated with the Proposed Program, Impact AQ-3, the Proposed Program would not result in a cumulatively considerable net increase of any criteria pollutant for which the Program region is nonattainment under an applicable federal or State ambient air quality standard. Prior to the onset of any system improvement project, MID would assess each project's expected emissions and, as appropriate, work with San Joaquin Valley Air Pollution Control District (SJVAPCD) to determine the potential level of project-related impacts and applicable regulations. For projects expected to exceed SJVAPCD's thresholds, MID would implement mitigation measures to address potentially significant air quality impacts. After implementation of these mitigation measures, impacts would be less than significant. Operation emissions would be negligible. Therefore, the Proposed Program would not create a cumulatively considerable impact on air quality.

### 4.1.5 Biological Resources

The Proposed Program would have potentially significant impacts on biological resources as a result of proposed system improvements. A series of mitigation measures would be implemented to reduce impacts to a less than significant level. With these mitigation measures, the Proposed Program is not anticipated to create cumulatively considerable impacts on biological resources.

### 4.1.6 Cultural, Paleontological, and Tribal Cultural Resources

Depending on the presence as of yet-not-known cultural and/or tribal resources, construction of the proposed system improvements could affect significant historic period archaeological resources, tribal cultural resources, and/or human remains; and thus, construction impacts on historical, archaeological, and tribal cultural resources, as well as human remains, could be significant. Several mitigation measures would be implemented and would reduce the Program impact to less than significant. With these mitigation measures, the Proposed Program would not create cumulatively considerable impacts on cultural resources.

### 4.1.7 Geology and Soils

Facilities under the Proposed Program, including the impoundment facilities associated with the proposed regulating reservoirs, would be designed and constructed to withstand the effects of anticipated earthquake loading for the Program Area, based on the site-specific detailed geotechnical analysis of each project site. The Proposed Program would include best management practices to reduce soil erosion and the loss of topsoil. Therefore, the Proposed Program would not create a cumulatively considerable impact on geology and soils.

### 4.1.8 Greenhouse Gases

Greenhouse gas (GHG) emissions from an individual project are generally insignificant when considered in the context of global climate impacts. However, every project that emits GHG contributes to a cumulative increase in global atmospheric concentrations of GHG.

For the Proposed Program, GHG impacts were evaluated on the basis of whether emissions from the Program would hinder or delay California's ability to meet GHG reduction targets set in Assembly Bill 32. Nearly all GHG emissions associated with the Proposed Program would be generated during

construction. Operation emissions would be negligible. Construction in the projected maximum year of Proposed Program emissions is estimated to be a very small fraction of anticipated annual Merced County carbon dioxide equivalent and overall GHG emissions. The Proposed Program would not create a cumulatively considerable impact on GHG emissions.

### 4.1.9 Groundwater Resources

The Proposed Program would result in some impacts on water levels associated with proposed canal lining as well as a net benefit to groundwater resources in the Merced Groundwater Subbasin through reductions in groundwater pumping in the El Nido area and Escaladian, Henderson-Fahrens, Fairfield, and Livingston Lateral Service Areas (LSAs) and increased recharge near Crocker Dam, North Side, and east of the Le Grand LSA. Therefore, the Proposed Program would not create a cumulatively considerable impact on groundwater resources.

### 4.1.10 Hydrology and Water Quality

The Proposed Program would result in a substantial amount of earth movement, particularly for construction of the Main Canal Improvements at Tunnel No. 1 Project and the proposed regulating reservoirs. However, the Proposed Program would include the implementation of a stormwater pollution and prevention plan and best management practices to avoid significant water quality impacts during Program construction and operation. Additionally, the Proposed Program would not result in changes to drainage such that flooding or flooding-related water quality impacts would occur. Therefore, the Proposed Program would not cause a cumulatively considerable impact on hydrology and water quality.

### 4.1.11 Noise

Implementation of the Proposed Program would involve construction activities in several locations in the Program Area each year through 2050. Construction at any given location would last from 1 to 6 months for most projects, and 18 months for the proposed regulating reservoirs. Construction activities would be limited to weekdays between 7:00 a.m. and 6:00 p.m. The Proposed Program includes several environmental commitments that would reduce noise resulting from construction activities (see Subsection 2.5). The Proposed Program would not generate significant noise or groundbourne vibration impacts during construction, and Program operation would not produce appreciable noise. Thus, the Proposed Program would not create cumulatively considerable noise impacts.

### 4.1.12 Public Services and Utilities

The Proposed Program would have less than significant impacts on police and fire services, water and wastewater treatment, and stormwater drainage systems. Landfill space to accommodate the relatively small volume of anticipated solid waste generation exists, and Program impacts would be less than significant.

### 4.1.13 Traffic and Transportation

Cumulative traffic impacts may occur when two or more projects have overlapping construction schedules and excessive construction-related traffic is generated. Construction activities associated with the Proposed Program may coincide with other proposed projects in Merced County. Additionally, short-term full or partial road closures may be required to allow for certain construction activities and to maintain public safety as part of implementation of the Proposed Program. Merced Irrigation District (MID) would develop a traffic control plan, as appropriate, with Merced County to address emergency responder access and management of local traffic including managing construction traffic routing and Program road use. MID would inform residents of construction activities and potential delays, and coordinate with California Department of Transportation and Merced County to minimize construction

impacts to the extent necessary. Therefore, the Proposed Program would not create a cumulatively considerable impact on traffic and transportation.

## 4.2 Growth-inducing Impacts

A project could result in growth-inducing impacts through several means, including the removal of obstacles to population growth or actions that encourage and facilitate other activities beyond those proposed by the project. Except where supply limitations have been specifically identified as an impediment to development approvals, water supply reliability alone is not the determinative factor inducing growth in any region of California.

The development of surplus water supplies, new employment opportunities, and improved cultural amenities are examples of actions that could have growth-inducing impacts. Growth inducement may or may not be detrimental, beneficial, or significant. However, if induced growth resulting from a project adversely affects the environment or the ability of agencies to provide public services to an extent not envisioned, the impacts would be considered adverse.

The Proposed Program is located in Merced County, and includes proposed facility improvements and other agricultural water supply-related actions throughout the Program Area. The Proposed Program is intended to provide continued protection of MID's water rights in a financially sound manner to support the region's agricultural economy while promoting the sustainable management of its groundwater resources.

In July 2016, Merced County had an estimated population of 268,672 (U.S. Census Bureau, 2016a). Between 2000 and 2010, the Merced County population increased approximately 22 percent (U.S. Census Bureau, 2016b). The population is expected to continue growing, with a projected growth of 417,200 persons by 2030, which is a nearly a 100 percent increase from its 2000 population (Merced County, 2013b). The Program Area also includes the cities of Merced, Atwater, and Livingston, where approximately half of Merced County's population resides along the State Route 99 corridor. The analysis completed as part of the Water Resources Management Plan showed that future urbanization would take place adjacent to current urban lands primarily inside the MID service area and would result in a conversion of approximately 8.5 percent of farmlands/agriculture to urban uses inside the MID service area and less than 1 percent to urban uses outside the MID service area, but within the Program Area by 2040. This urban growth would not be affected by MID water use or the implementation the Proposed Program.

Implementation of the Proposed Program would involve construction activities in several locations in the Program Area each year through 2050. Demand for construction labor is expected to be met by the local labor pool. The Proposed Program was developed to improve and plan for long-term water supply delivery to agricultural land uses, thereby supporting rural agricultural communities and discouraging conversion of agricultural lands to other uses. Therefore, growth inducement would not result from implementation of the Proposed Program.

SECTION 5

# Consultation and Coordination

## 5.1 Lead Agency

MID is the State lead agency responsible under the California Environmental Quality Act (CEQA).

## 5.2 Applicable Laws, Policies, and Programs

When implementing CEQA, several federal, State, and local laws and policies must be considered, depending on the project type. At this stage of development, it is anticipated that the approvals presented below would potentially be required to implement the Proposed Program. As the projects and actions under the Proposed Program become more defined, the list below would become more defined. A summary of the approvals is provided below.

### 5.2.1 Federal Clean Water Act, Section 404

Section 404 of the Clean Water Act (CWA) regulates the discharge of dredged and fill material into waters of the United States (U.S.), which include navigable waters, interstate waters, all other waters that could affect interstate or foreign commerce, impoundments of waters of the U.S., the territorial seas, tributaries of the aforementioned waters, and wetlands adjacent to the aforementioned waters (33 *Code of Federal Regulations* [CFR] Section 328.3; 40 CFR Section 122.2.4). Areas typically not considered to be jurisdictional waters of the U.S. include non-tidal drainage and irrigation ditches excavated on dry land, artificially irrigated areas, and small artificial water bodies such as swimming pools (33 CFR Section 328). In June 2015, U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency published a rule to clarify the definition of waters of the U.S. (2015 WOTUS Rule). In February 2016, the 2015 WOTUS Rule was stayed by the U.S. Court of Appeals for the Sixth Circuit; on August 16, 2018, that stay was enjoined by the U.S. District Court for South Carolina. The 2015 WOTUS Rule is currently in effect in 26 states, including the state of California. Areas meeting the regulatory definition of waters of the U.S. are subject to the jurisdiction of USACE under provisions of CWA Section 404. Construction activities involving placement of fill into jurisdictional waters of the U.S., including such activities as sidecasting material during excavation or temporary fills to provide equipment access during construction, are regulated by USACE through permit requirements. Merced Irrigation District (MID or District) would need to obtain a CWA Section 404 permit for any of the activity that involves discharge of dredged and fill material to waters of the U.S. No Section 404 permit is effective in the absence of State Water Quality Certification pursuant to Section 401 of the CWA. CWA Section 401 is described further in Subsection 5.2.6.

### 5.2.2 Endangered Species Act

The federal Endangered Species Act (FESA), most recently amended in 1988 (16 United States Code 1536), establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the preservation of the ecosystems upon which they depend. Section 7(a) of the FESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) on any activities that may affect species listed as endangered or threatened. MID will consult with USFWS and NMFS as appropriate either directly or as part of obtaining federal clearances (including a Section 404 permit from the USACE).

### 5.2.3 Lake or Streambed Alteration Agreement

California Department of Fish and Wildlife (CDFW) regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to Fish and Game Code Section 1600-1607. Authorization, known as a Lake or Streambed Alteration Agreement, is required from CDFW for projects prior to any action that substantially diverts, obstructs, or changes the natural flow of a river, stream, or lake, or uses material from a streambed. This agreement applies to any work undertaken within the 100-year floodplain of a body of water or its tributaries. MID will work with CDFW to ensure that all applicable legal requirements are fulfilled.

### 5.2.4 California Endangered Species Act

The current version of the California Endangered Species Act (CESA) was enacted in 1984 and patterned after the FESA. CDFW is responsible for CESA implementation. The CESA requires lead agencies to consult before implementing projects to ensure that any action carried out by the lead agency is not likely to jeopardize the continued existence of any listed endangered species, or destroy or adversely modify essential habitat. “Essential habitat” is defined as habitat necessary for the continued existence of the species. MID will consult with CDFW regarding impacts to State-listed endangered and threatened species as appropriate.

### 5.2.5 Federal Fish and Wildlife Coordination Act Report

The Fish and Wildlife Coordination Act requires consultation with USFWS when any water body is impounded, diverted, controlled, or modified for any purpose by any agency under a federal permit or license. USFWS and State agencies charged with managing fish and wildlife resources are to conduct surveys and investigations to determine the potential damage to fish and wildlife and the mitigation measures to be taken. USFWS may incorporate the concerns and finishing of State agencies and other federal agencies. Compliance with the Fish and Wildlife Coordination Act will be coordinated with consultation for FESA, as described above.

### 5.2.6 Section 401, Water Quality Certification

Under Section 401 of CWA, activities that may result in the discharge of pollutants into waters of the U.S. must first undergo review and approval by the appropriate Regional Water Quality Control; in this case, the Central Valley Regional Water Quality Control Board has jurisdiction over the Program Area. USACE will not issue a Section 404 permit until the State has issued a certification (or a waiver of certification) of compliance with the State water quality standards.

### 5.2.7 Section 402, National Pollutant Discharge Elimination System

The State Water Resources Control Board regulates both point-source discharges (e.g., wastewater treatment plant discharges) and nonpoint-source discharges (e.g., urban runoff). National Pollutant Discharge Elimination System permits are issued for discharges to surface waters. If an activity may result in the discharge of waste (including stormwater runoff for construction activities) to surface water, the owner or operator is required to obtain a National Pollutant Discharge Elimination System permit. This permit, accompanied by the development of a stormwater pollution prevention plan is required for all construction projects that disturb more than 1 acre, or part of a larger common plan of development.

### 5.2.8 National Historic Preservation Act of 1966

Section 106 of the National Historic Preservation Act of 1966 requires that federal agencies consider the effects of their undertakings on historical, archaeological, and cultural resources and afford the Advisory

Council on Historic Preservation the opportunity to comment on the proposed undertaking. The review process is implemented using the following five-step procedure:

1. Identification and evaluation of historic properties
2. Assessment of the effects of the undertaking on properties that are eligible for the National Register of Historic Places
3. Consultation with the State Historic Preservation Office and other agencies for the development of a Memorandum of Agreement that addresses the treatment of historic properties
4. Receipt of Advisory Council on Historic Preservation comments on the Memorandum of Agreement or results of consultation
5. The project implementation according to the conditions of the Memorandum of Agreement

The Section 106 compliance process may not consist of all the steps above, depending on the situation. For example, if identification and evaluation result in the documented conclusion that no properties included in or eligible for inclusion are present, the process ends with the identification and evaluation step. The District would comply with this process likely through the acquisition of a Section 404 permit from USACE.

### 5.2.9 Assembly Bill 52 Tribal Cultural Resources (CEQA Lead Agency)

Assembly Bill 52 requires early notice and coordination with California Native American tribes by lead agencies under CEQA for all projects issuing a Notice of Preparation after July 1, 2015. The bill establishes a consultation process with all Native American tribes on the Native American Heritage Commission List. This law creates a new CEQA class of resources termed “Tribal Cultural Resources” and requires consideration of tribal cultural values and resources as well as meaningful consultation as requested by a potentially affected tribe.

## 5.3 Federal Permits and Authorizations

- General Construction Stormwater Permit – State Water Resources Control Board
- Section 404 of the Clean Water Act – U.S. Army Corps of Engineers Permit
- Federal Endangered Species Act Consultation (Section 7) – U.S. Fish and Wildlife Service and National Marine Fisheries Service
- Section 106 of the National Historic Preservation Act – Federal Lead Agencies

## 5.4 State Permits and Authorizations

- Section 401 Water Quality Certification – Regional Water Quality Control Board
- Water Rights – State Water Resources Control Board
- California Department of Fish and Game Code Section 1600 Streambed Alteration Agreement – California Department of Fish and Wildlife
- California Endangered Species Act Consultation – California Department of Fish and Wildlife
- Division of Safety of Dams – California Department of Water Resources
- Assembly Bill 52 Tribal Cultural Resources – (CEQA Lead Agency)

## 5.5 Local Permits and Authorizations

- Electric power utility connections
- County zoning variances or revisions

SECTION 6

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SECTION 7

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