

Addendum to the Suisun Marsh Plan Final Environmental Impact Statement/ Environmental Impact Report



Prepared for:



California Department of Water Resources
Division of Environmental Services
3500 Industrial Boulevard, 2nd Floor
West Sacramento, CA 95691

State Clearinghouse No. 2003112039

AECOM

March 2020

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March 2020

TABLE OF CONTENTS

Section	Page
1 Introduction.....	1-1
1.1 Suisun Marsh Plan Background	1-1
1.2 Addendum	1-3
2 Project Description	2-1
2.1 Introduction	2-1
2.2 Project Location.....	2-2
2.3 Project Site Background.....	2-2
2.4 Project Goals and Objectives.....	2-5
2.5 Proposed Project.....	2-5
2.6 General Construction Methods and Activities.....	2-11
2.7 Construction Schedule, Equipment, and Labor Force	2-22
2.8 Post-Construction Conditions.....	2-24
2.9 Environmental Commitments and Mitigation Measures	2-24
2.10 Permits, Approvals, and Regulatory Requirements.....	2-24
3 Supplemental Environmental Review	3-31
3.1 Introduction	3-31
3.2 Impact Conclusions	3-31
3.3 Resources.....	3-33
3.4 Water Supply, Hydrology, and Delta Water Management.....	3-33
3.5 Water Quality	3-34
3.6 Geology and Groundwater.....	3-38
3.7 Flood Control and Levee Stability.....	3-42
3.8 Sediment Transport	3-42
3.9 Transportation and Navigation	3-43
3.10 Air Quality	3-45
3.11 Noise.....	3-50
3.12 Greenhouse Gas Emissions and Climate Change.....	3-55
3.13 Fish	3-57
3.14 Recreational Resources.....	3-65
3.15 Vegetation and Wetlands.....	3-66
3.16 Wildlife.....	3-70
3.17 Land Use and Delta Plan Policies.....	3-72
3.18 Utilities and Public Services.....	3-75
3.19 Visual/Aesthetic Resources	3-77
3.20 Cultural Resources.....	3-77
3.21 Public Health and Environmental Hazards.....	3-79
3.22 Growth-Inducing Impacts, Including Population and Housing.....	3-82
3.23 Cumulative Impacts.....	3-82
3.24 Mandatory Findings of Significance	3-86
4 References.....	4-1
4.1 Chapter 1, “Introduction”	4-1
4.2 Chapter 2, “Project Description”	4-1
4.3 Chapter 3, “Supplemental Environmental Review”	4-1

Appendices

Appendix A	List of the Environmental Commitments and Best Management Practices
Appendix B	Invasive Vegetation Management Plan
Appendix C	Hydrodynamic Modeling Report
Appendix D	Air Quality Modeling Details and Assumptions
Appendix E	Cultural Resources Report

Figures

Figure 2-1.	Vicinity Map.....	2-3
Figure 2-2.	Project Area and Elevations.....	2-4
Figure 2-3.	Preliminary Restoration Site Plan for Bradmoor.....	2-7
Figure 2-4.	Preliminary Restoration Site Plan for Arnold.....	2-9
Figure 2-5.	Beach Seine Monitoring Ramp Layout	2-13
Figure 2-6.	Beach Seine Monitoring Ramp Typical Cross Section	2-14
Figure 2-7.	Typical Water Control Structures and Timber Breakwater	2-17
Figure 2-8.	Typical Levee Grading Sections.....	2-19
Figure 2-9.	Kayak Trail Route from Belden's Landing to Bradmoor and Arnold	2-21
Figure 2-10.	Conceptual Estimate of Post-Restoration Outcome Based on Existing Elevation Data.....	2-30
Figure 3-1.	Nurse Slough Flows for Base and Restoration Cases in July 2013	3-34
Figure 3-2.	Locations of University of California, Davis, Suisun Marsh Fish Study Sampling Sites	3-39
Figure 3-3.	Special-Status Plants Documented in the Project Area	3-68

Tables

Table 1-1.	Additional Responsible and Trustee Agencies	1-3
Table 1-2.	Impacts of Restoration Project by Resource Area of the Proposed Project.....	1-4
Table 2-1.	Proposed Construction Timeline for Bradmoor and Arnold	2-11
Table 2-2.	Ditch Filling and Ditch Blocks for Restoration on Bradmoor and at Arnold.....	2-16
Table 2-3.	Levee Grading for Arnold Restoration	2-20
Table 2-4.	Exterior Levee Breaches for Bradmoor and Arnold Restoration.....	2-20
Table 2-5.	Work Windows.....	2-22
Table 2-6.	Construction Durations, Equipment, and Labor Force	2-23
Table 2-7a.	Bradmoor Island Existing Habitat, Restoration Outcome, and Net Conversion by Existing Habitat Type	2-25
Table 2-7b.	Bradmoor Island Total Estimated Habitat Areas Pre- and Post-Restoration and Gain/Loss of Habitat Area by Type	2-25
Table 2-8a.	Arnold Slough Existing Habitat, Restoration Outcome, and Net Conversion by Existing Habitat Type	2-26
Table 2-8b.	Arnold Slough Total Estimated Habitat Areas Pre- and Post-Restoration and Gain/Loss of Habitat Area by Type	2-26
Table 2-9a.	Blacklock Restoration Outcome by Existing Habitat and Net Conversion of Existing Habitat Type	2-27
Table 2-9b.	Blacklock Total Estimated Habitat Areas Pre- and Post-Restoration and Gain/Loss of Habitat Area by Type	2-27
Table 2-10a.	Project Summary Restoration Outcome by Existing Habitat and Net Conversion of Existing Habitat Type	2-28
Table 2-10b.	Project Summary Total Estimated Habitat Areas Pre- and Post-Restoration and Gain/Loss of Habitat Area by Type	2-28
Table 2-11.	Regulatory Agencies and Approvals	2-29
Table 3-1.	Impacts of Restoration Project by Resource Area of the Proposed Project Compared to the Final SMP EIS/EIR.....	3-32

Table 3-2.	Salinity (EC) Modeling Results for the Proposed Project	3-36
Table 3-3.	Summary of Modeled Average Daily Construction-Related Emissions of Criteria Air Pollutants and Precursors.....	3-47
Table 3-4.	Summary of Modeled Average Daily Ongoing Operational Maintenance-Related Emissions of Criteria Air Pollutants and Precursors	3-47
Table 3-5.	Calculated Noise Levels at the Nearest Noise-Sensitive Uses	3-52
Table 3-6.	Construction Truck Traffic Noise Levels at the Nearest Noise-Sensitive Uses	3-53
Table 3-7.	Summary of Modeled Daily Construction-Related Emissions of Greenhouse Gas Emissions	3-54
Table 3-8.	Denverton Slough Fish Sampling Trawl Data by Year	3-59
Table 3-9.	Denverton Slough Fish Sampling Seine Data by Year	3-60
Table 3-10.	Impacts on Fish Considered in the SMP EIS/EIR	3-61
Table 3-11.	Salinity Tolerances for Special-Status Fish at Various Life Stages	3-64
Table 3-12.	Impacts on Vegetation and Wetland Resources Considered in the SMP EIS/EIR.....	3-66
Table 3-13.	Updated Wetland Restoration and Enhancement Cumulative Project List	3-85
Table 3-14.	Updated Other Projects Cumulative Project List.....	3-85

ACRONYMS AND ABBREVIATIONS

μS/cm	microsiemens per centimeter
BAAQMD	Bay Area Air Quality Management District
BCDC	San Francisco Bay Conservation and Development Commission
BDCP	Bay Delta Conservation Plan
BiOp	biological opinion
Blacklock	Blacklock restoration project
BMP	best management practice
Bradmoor	Bradmoor Island
CAAQS	California Ambient Air Quality Standards
CALFED	CALFED Bay-Delta Program
CalEEMod	California Emissions Estimator Model
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CIWQS	California Integrated Water Quality System
cm	centimeter(s)
CNEL	community noise equivalent level
CO	carbon monoxide
CO ₂	carbon dioxide
CRHR	California Register of Historical Resources
dB	decibel(s)
dBA	A-weighted decibel(s)
DFG	California Department of Fish and Game (now CDFW)
DO	dissolved oxygen
DPM	diesel particulate matter
DSC	Delta Stewardship Council
DWR	California Department of Water Resources
EB	exterior breach
EC	electrical conductivity
EIR	environmental impact report
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ER	Engineering Regulation
ERPP	Ecosystem Restoration Program Plan
ESA	Endangered Species Act
FHWA	Federal Highway Administration
ft/s	foot (feet) per second
GHG	greenhouse gas
Guidelines	Bay Area Air Quality Management District California Environmental Quality Act Air Quality Guidelines
IB	interior breach

ITE	Institute of Transportation Engineers
IVMP	Bradmoor Island and Arnold Slough Invasive Vegetation Management Plan
L _{eq}	equivalent continuous sound level
LiDAR	light detection and ranging
Marsh	Suisun Marsh
MHHW	mean higher high water
MLLW	mean lower low water
mS/cm	millisiemens per centimeter
MT CO ₂ e	metric tons of carbon dioxide equivalent
NAAQS	National Ambient Air Quality Standards
NAVD88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO _x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PG&E	Pacific Gas and Electric Company
PM	particulate matter
PM ₁₀	particulate matter 10 micrometers in diameter or smaller
PM _{2.5}	particulate matter 2.5 micrometers in diameter or smaller
POD	Pelagic Organism Decline
Proposed Project	Bradmoor Island and Arnold Slough Restoration Project
Reclamation	U.S. Bureau of Reclamation
RMA	Resource Management Associates
RWQCB	Regional Water Quality Control Board
SFBAAB	San Francisco Bay Area Air Basin
SMP	<i>Suisun Marsh Habitat Management, Preservation, and Restoration Plan</i> , aka Suisun Marsh Plan
SMPA	Suisun Marsh Preservation Agreement
SRCD	Suisun Resource Conservation District
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
UC	University of California
URBEMIS	Urban Land Use Emissions Model
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WCS	water control structure

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1 INTRODUCTION

The *Suisun Marsh Habitat Management, Preservation, and Restoration Plan*, referred to as the Suisun Marsh Plan (SMP), was finalized in 2011 (Reclamation et al. 2011). The SMP balances the benefits of tidal wetland restoration with wetland management and other land uses in Suisun Marsh (Marsh) by evaluating alternatives that provide an acceptable change in Marsh-wide land uses, such as salt marsh harvest mouse habitat, managed wetlands, public use, and upland habitat. The SMP incorporates existing science and information developed through adaptive management. The SMP was prepared by the Suisun Principal Agencies, a group of agencies with primary responsibility for Suisun Marsh management. The Suisun Principal Agencies include the U.S. Fish and Wildlife Service (USFWS), U.S. Bureau of Reclamation (Reclamation), California Department of Fish and Wildlife (CDFW), California Department of Water Resources (DWR), National Marine Fisheries Service (NMFS), Suisun Resource Conservation District (SRCD), and Delta Stewardship Council (DSC). These agencies consulted with other participating agencies, including the U.S. Army Corps of Engineers (USACE), San Francisco Bay Conservation and Development Commission (BCDC), San Francisco Regional Water Quality Control Board (RWQCB), and State Water Resources Control Board (SWRCB), to develop the SMP.

DWR served as a responsible agency under the California Environmental Quality Act (CEQA) for the SMP Environmental Impact Statement/Environmental Impact Report (EIS/EIR) and will rely on the SMP EIS/EIR in acting on the aspects of the SMP (i.e., the original project under CEQA) that require DWR's approval. DWR is the lead agency for actions taken as part of this addendum to the SMP EIS/EIR for the Bradmoor Island and Arnold Slough Restoration Project (Proposed Project) in compliance with CEQA and Section 15164 of the State CEQA Guidelines to cover minor modifications to, and the resulting environmental effects of, the project evaluated in the SMP EIS/EIR.

1.1 SUISUN MARSH PLAN BACKGROUND

The SMP is intended to guide near-term and future actions related to restoring tidal wetlands and managed wetland activities. The SMP is a comprehensive plan that addresses various conflicts regarding the use of Marsh resources, with a focus on achieving an acceptable multi-stakeholder approach to restoration of tidal wetlands and management of wetlands and their functions. Thus, the SMP is a flexible, science-based management plan for the Marsh, consistent with the revised (2005) Suisun Marsh Preservation Agreement (SMPA) and the CALFED Bay-Delta Program (CALFED), the predecessor of the Delta Stewardship Council. It also sets the regulatory foundation for future actions in the Marsh. The SMP reflects the following four major Marsh resources and functions, which are linked directly to the purpose and objectives of the SMP EIS/EIR:

- ▶ **Habitat and Ecological Processes**—Implement the CALFED Ecosystem Restoration Program Plan (ERPP) restoration target for the Suisun Marsh ecoregion (5,000 to 7,000 acres of tidal marsh), and by protecting and enhancing 40,000 to 50,000 acres of managed wetlands.
- ▶ **Public and Private Land Use**—Maintain the heritage of waterfowl hunting and other recreational opportunities and increase the surrounding communities' awareness of the ecological values of Suisun Marsh.
- ▶ **Levee System Integrity**—Maintain and improve the Suisun Marsh levee system's integrity to protect property, infrastructure, and wildlife habitats from catastrophic flooding.

- ▶ **Water Quality**—Protect and, where possible, improve water quality for beneficial uses in Suisun Marsh, including estuarine, spawning, and migrating habitat uses for fish species, as well as for recreational uses and associated wildlife habitat.

These resources and functions are interrelated and interdependent, and to some extent, objectives of all SMP actions. For example, restoration of certain properties (i.e., the Proposed Project) may help protect or improve water quality; habitat and ecological processes would help achieve private and public land use objectives. Based on these relationships, implementation of the SMP is expected to contribute to meeting each objective in parallel over the 30-year planning period.

The Final SMP EIS/EIR was completed and the EIR was certified on December 22, 2011 (State Clearinghouse No. 2003112039; Reclamation et al. 2011). USFWS and Reclamation served as joint lead agencies under the National Environmental Policy Act (NEPA) and signed a Record of Decision for the SMP in April 2014. The California Department of Fish and Wildlife (CDFW; formerly California Department of Fish and Game [DFG]) served as lead agency under CEQA.

Multiple agencies were involved in preparing the SMP EIS/EIR, including all Suisun Principal Agencies. The EIS/EIR evaluated the SMP and documented all potentially significant environmental impacts that could result from implementing the SMP and activities associated with managed wetlands and tidal restoration.

The SMP EIS/EIR describes the agencies involved in preparing the SMP and the SMP EIS/EIR as well as those expected to use the SMP EIS/EIR. These agencies assumed roles and responsibilities either through their agency's authority or through their participation in the NEPA and CEQA process. These agencies included:

- ▶ USFWS and Reclamation as NEPA lead agencies, responsible primarily for preparing and certifying the EIS;
- ▶ NMFS and USACE as NEPA cooperating agencies, responsible primarily for providing special expertise and holding jurisdiction over the project; and
- ▶ CDFW as CEQA lead agency and trustee agency, responsible primarily for preparing and certifying the EIR and managing certain resources that are held in trust for the citizens of California. Table 1-1 lists additional responsible and trustee agencies.

The SMP EIS/EIR provided a programmatic evaluation of restoration of tidal habitat in the Marsh and of associated activities regarding a wide variety of environmental resources. The SMP developed environmental commitments for implementation during restoration activities in the Marsh. These environmental commitments, where applicable, would be implemented as part of the Proposed Project. Applicable Environmental Commitments are outlined in Chapter 3, "Supplemental Environmental Review," and are provided in more detail in Appendix A.

The SMP EIS/EIR disclosed that impacts on most environmental resources from tidal restoration activities either would be less than significant or would not occur (i.e., no impact). To reduce potentially significant impacts to a less-than-significant level, mitigation was incorporated in the SMP EIS/EIR with respect to the effects of restoration activities on environmental resources, as shown in Table 1-2. The SMP EIS/EIR found that impacts on air quality and utilities would be less than significant with proposed mitigation.

Table 1-1. Additional Responsible and Trustee Agencies

Agency	Jurisdiction
Responsible Agencies	
California Department of Fish and Wildlife	Impacts on state-listed species
California Office of Historic Preservation	Historic and cultural resources
California Department of Water Resources	Suisun Marsh Preservation Agreement funding, water management facilities
Suisun Resource Conservation District	Managed wetlands
Regional Water Quality Control Board	Pollutant discharges to water bodies
San Francisco Bay Conservation and Development Commission	Development in the Suisun Marsh Primary Management Area as defined by the Suisun Marsh Protection Plan
Trustee Agency	
State Lands Commission	State-owned “sovereign” lands

Notes:

Trustee Agency: State agency with jurisdiction over certain resources that are held in trust for citizens of California but does not necessarily have legal authority with respect to approving or carrying out the project.

Responsible Agency: Public agency with some discretionary authority over a project or portion of it, but which is not the lead agency

For cultural resources, the analysis determined that restoration activities could significantly and unavoidably affect known and as-yet-unidentified cultural resources by damaging or destroying them. Although mitigation measures were included in the SMP EIS/EIR (as summarized in Table 1-2), the analysis determined that the measures would not reduce the impacts to a less-than-significant level. Thus, impacts on cultural resources were identified as significant and unavoidable in the SMP EIS/EIR.

1.2 ADDENDUM

Section 15164 of the State CEQA Guidelines states that a lead agency or responsible agency may prepare an addendum to a previously certified EIR if some changes or additions are necessary, but none of the conditions calling for preparation of a subsequent EIR have occurred or will occur.

The Proposed Project (described in Chapter 2) would not result in any new significant or potentially significant environmental effects and would not substantially increase the severity or intensity of previously identified effects.

In addition, no new information of substantial importance has arisen showing that:

- ▶ the Proposed Project modifications would have new significant or potentially significant effects;
- ▶ the Proposed Project modifications would have substantially more severe effects than those analyzed in the SMP EIS/EIR;
- ▶ mitigation measures or alternatives previously found to be infeasible, in fact would be feasible; or
- ▶ mitigation measures or alternatives that are considerably different from those analyzed in the SMP EIS/EIR would reduce substantially one or more significant or potentially significant effects on the environment.

Consequently, an addendum to the SMP EIS/EIR is the appropriate CEQA document to address the Proposed Project.

Table 1-2. Impacts of Restoration Project by Resource Area of the Proposed Project

Resource	Final SMP EIS/EIR Environmental Commitments	Proposed Project Mitigation Measures
Water Supply and Management		
Water Quality	EC-1:EC-4, EC-9	
Geology and Groundwater	EC-1:EC-4	
Flood Control and Levee Stability	EC-1, EC-3	
Sediment Transport	EC-1, EC-3, EC-4	
Transportation and Navigation	EC-1, EC-2	
Air Quality	EC-10, EC-10.1: EC-10.3	AQ-MM-3: Implement All Appropriate BAAQMD Mitigation Measures AQ-MM-4: Limit Construction Activity during Restoration and Management
Noise	EC-1, EC-2, EC-5	
Climate Change		
Fish	EC-1:EC-4, EC-9, EC-13, EC-14, EC-14.1, EC-15	
Recreation	EC-1, EC-7	
Vegetation and Wetlands	EC-1, EC-2, EC-7, EC-13, EC-13.1:EC-13.4, EC-13.4a, EC-13.4b, EC-14, EC-14.1, EC-15	
Wildlife	EC-1:EC-3, EC-13, EC-13.1:EC-13.4, EC-13.4a, EC-13.4b, EC-14, EC-14.1	
Land Use		
Visual Aesthetic Resources	EC-1, EC-11	
Cultural Resources	EC-12, EC-16	CUL-MM-1: Document and Evaluate the Montezuma Slough Rural Historic Landscape, Assess Impacts, and Implement Mitigation Measures to Lessen Impacts
		CUL-MM-2: Evaluate Previously Recorded Cultural Resources and Fence NRHP- and CRHR-Eligible Resources before Ground-Disturbing Activities
		CUL-MM-3: Protect Known Cultural Resources from Damage Incurred by Inundation through Plan Design (Avoidance)
		CUL-MM-3: Protect Known Cultural Resources from Damage Incurred by Inundation through Plan Design (Avoidance)
		CUL-MM-4: Resolve Adverse Effects before Construction
		CUL-MM-5: Conduct Cultural Resource Inventories and Evaluations and Resolve Any Adverse Effects
Public Health and Environmental Hazards		
Growth-Inducing Impacts, including Population and Housing	EC-1, EC-2, EC-4, EC-8, EC-9	
Cumulative Impacts		

Notes:

BAAQMD = Bay Area Air Quality Management District; CRHR = California Register of Historical Resources; NRHP = National Register of Historic Places

2 PROJECT DESCRIPTION

2.1 INTRODUCTION

DWR is planning tidal restoration on Bradmoor Island (Bradmoor) and at Arnold Slough (Arnold). At project completion, the restoration sites would provide 855.09 acres of tidal waters and salt marsh habitat. This tidal restoration is intended to meet the obligations to improve habitat conditions for special-status fish species, set forth by:

- ▶ Reasonable and Prudent Alternative 4 in USFWS Biological Opinion (BiOp) No. 81420-2008-F-1481-5 (USFWS 2008),
- ▶ Action 1.6.1 in the NMFS BiOp for the long-term Central Valley Project and State Water Project Operations Criteria and Plan (NMFS 2009), and
- ▶ Condition 7.1 in Longfin Smelt Incidental Take Permit No. 2081-2009-001-03 for State Water Project operations (CDFW 2009).

DWR also is proposing to conduct adaptive management actions at the Blacklock restoration site. Together, the proposed actions on Bradmoor, at Arnold, and at the Blacklock restoration site are referred to as the Proposed Project.

DWR initiated the Blacklock restoration project (Blacklock), restoring tidal inundation to an approximately 70-acre managed wetland site, to meet one of the requirements of the Suisun Marsh Preservation Agreement. The agreement was signed in 1987 (Reclamation et al. 1987), and subsequently was revised in 2005 and 2015 by DWR, Reclamation, DFG (now CDFW), and SRCD. The agreement includes mitigation requirements for restoration of tidal wetlands, and acquisition, management, and maintenance of conservation lands to meet habitat goals for the salt marsh harvest mouse (*Reithrodontomys raviventris halicoetes*). Restoration of the Blacklock site was completed in 2007, and the 10 years of required monitoring were completed in 2017.

The SMP was finalized in 2011 by the Suisun Marsh Principal Agencies, a group of agencies with primary responsibility for Suisun Marsh management. The Suisun Marsh Principal Agencies are USFWS, Reclamation, DWR, CDFW, NMFS, SRCD, and the Delta Stewardship Council. The SMP is intended to guide near-term and future actions related to restoring tidal wetlands and managed wetland activities. USFWS and Reclamation served as joint lead agencies under the National Environmental Policy Act and signed a Record of Decision for the SMP in April 2014. CDFW served as lead agency under CEQA. A final EIS/EIR was completed for the SMP, and the EIR was certified on December 22, 2011 (State Clearinghouse No. 2003112039).

DWR served as a responsible agency under CEQA for the SMP EIS/EIR. Thus, DWR will rely on the SMP EIS/EIR when acting on the aspects of the SMP (i.e., the original project under CEQA) that require DWR's approval, which include tidal restoration. DWR proposes to prepare an addendum to the SMP EIS/EIR to comply with CEQA and Section 15164 of the State CEQA Guidelines, covering the Proposed Project and the environmental effects of the tidal restoration activities that were evaluated in the SMP EIS/EIR.

2.2 PROJECT LOCATION

The project area is in the northeastern corner of Suisun Marsh (Figure 2-1) and Region 3 of the SMP. Bradmoor is bordered on the north and east by Denverton Slough, to the west by Nurse Slough, and to the south by Little Honker Bay. Arnold is southeast of Bradmoor and south of Little Honker Bay, and bordered to the west by Blacklock and Arnold (Figure 2-2). The southwestern border of Arnold includes remnant levee and tidal wetland bordering Blacklock, and the eastern border transitions into uplands. Elevations across the restoration sites range from approximately -5 feet to 110 feet North American Vertical Datum of 1988 (NAVD88). A private residence is immediately north of the Arnold property. Other surrounding properties currently are used for cattle grazing and waterfowl hunting. The restoration sites are accessed by two gravel roads, located at the intersection of Shiloh Road and Little Honker Bay Road.

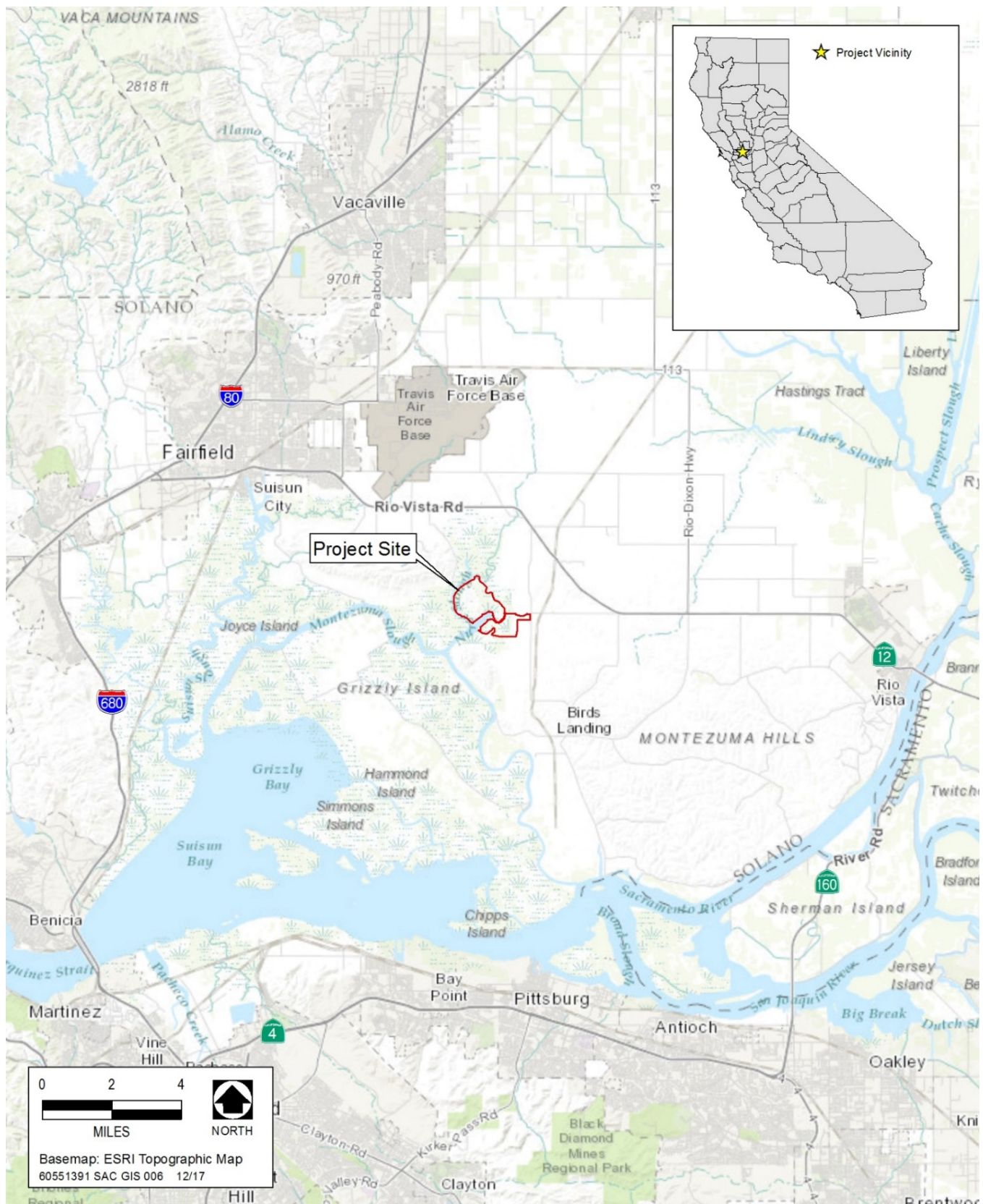
2.3 PROJECT SITE BACKGROUND

Bradmoor is composed of approximately 144 acres of uplands, 469 acres of managed wetlands, and 141 acres of tidal wetlands and open tidal waters. The island is divided into three separate properties, historically managed as individual duck clubs: Wildwing Duck Club, Flying D Club, and Overlook Club. A building complex associated with the Flying D Club, consisting of two wood-framed buildings, a modular home, and a shed with a partially enclosed carport, is on the southwestern slope of the uplands segment of Bradmoor. One large building and a small dock and boat launching facility associated with the Wildwing Duck Club are on the southwestern side of Bradmoor. The managed wetlands have infrastructure associated with waterfowl hunting and water management. Bradmoor has six water control structures (WCSs) and associated bulkheads, and 10 culverts. A cattle fence and gate are in the uplands.

Arnold has approximately 105 acres of uplands or developed areas, 138 acres of managed wetlands, and 20 acres of tidal wetlands and open tidal waters. The site historically was part of the larger Blacklock Ranch, which traditionally has been used for cattle grazing and waterfowl hunting. Existing infrastructure on the property includes an old boat ramp and dock, a dilapidated shack, a windmill, an aboveground water tank and water trough, a pumping structure and pipe, one WCS and bulkhead, one culvert, cattle gates, and fencing.

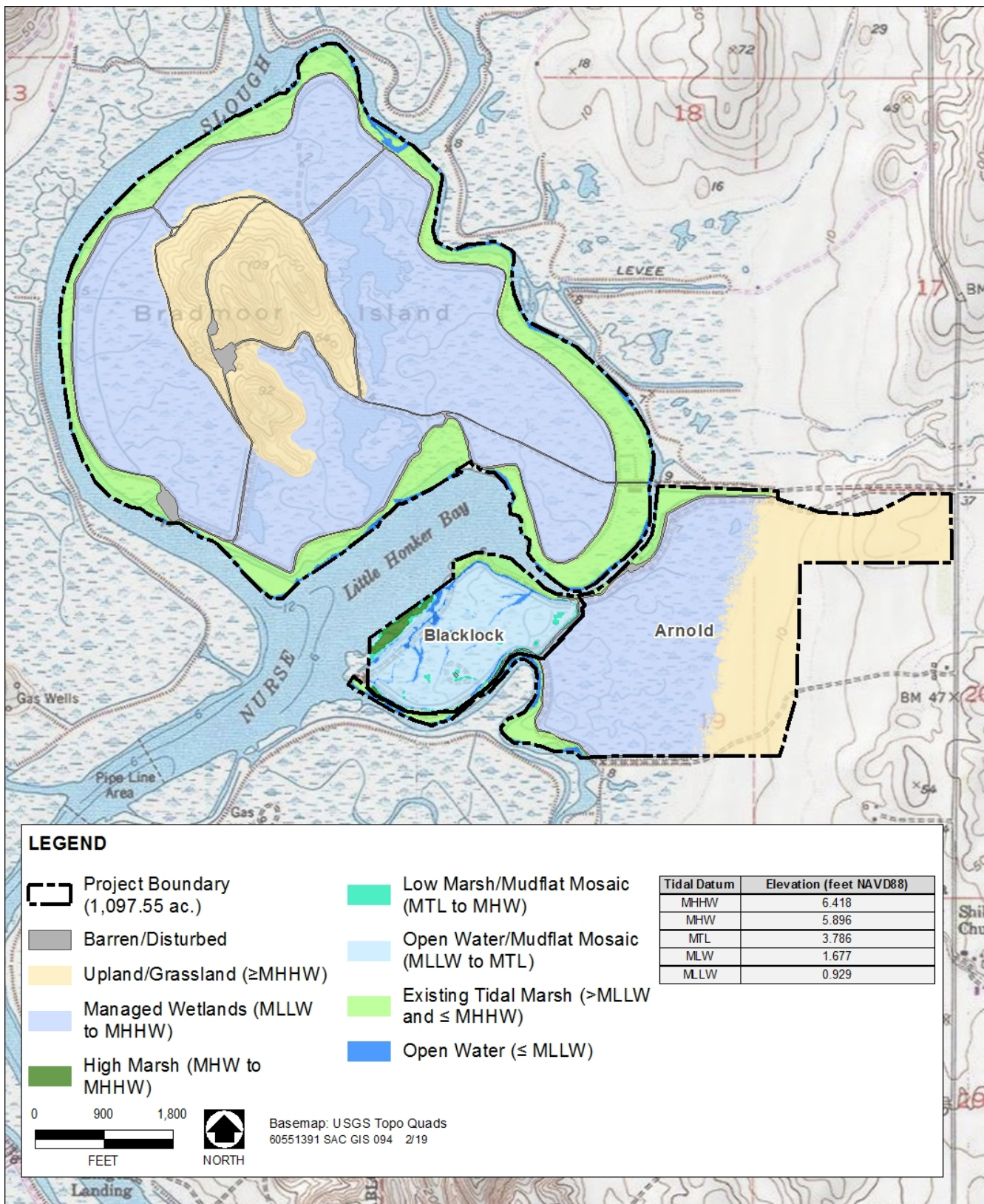
DWR is implementing an interim management plan for Bradmoor and Arnold to manage them before restoration. Management actions that are part of the interim management include maintenance of the levees and WCSs, water management (flooding, draining, and circulation), mosquito abatement through the Solano County Mosquito Abatement District, mowing and spraying of invasive vegetation, and mowing and grading of access roads as needed.

Grazing has occurred on the upland portions of Arnold and the adjacent Blacklock Ranch since the 1860s. The uplands are dominated by annual grasses, such as medusahead (*Taeniatherum caput-medusae*), Italian rye grass (*Festuca perennis*), and bromes (*Bromus* spp.). Grazing continues on Arnold through an agreement with the adjacent property owner of the Blacklock Ranch parcel. The combined 240-acre Arnold/Blacklock Ranch pasture has about 40 cows (up to 80 with calves) year-round, but the site currently lacks infrastructure to limit them to the uplands. The cattle's water source used to be a trough filled by a windmill-powered well at Arnold, but now the well is defunct and the current water source is an unnamed stream on Blacklock Ranch.



Source: Data compiled by AECOM in 2020

Figure 2-1. Vicinity Map



Source: Data compiled by AECOM in 2020

Figure 2-2. Project Area and Elevations

Blacklock is an approximately 70-acre tidal wetland restoration project that was completed in 2007 after two exterior levee breaches in 2006, one of which was unintentional. The site was historically part of the larger Blacklock Ranch. An old WCS remains on the remnant levee that connects to Arnold. The WCS is no longer in use and would not be accessible after restoration takes place at Arnold, and therefore would be removed as part of the Proposed Project while access still is available.

2.4 PROJECT GOALS AND OBJECTIVES

The Proposed Project would partially fulfill obligations to improve habitat conditions for special-status fish species, as set forth in the Operations Criteria and Plan BiOp and the Longfin Smelt Incidental Take Permit. In addition, Bradmoor and Arnold are identified as priority restoration projects under the Delta Plan and California EcoRestore Program. Project-specific goals and objectives were developed to guide restoration planning, so that the process would be directed toward specific restoration outcomes. These goals and objectives are listed in order from highest priority to lowest.

2.4.1 PROJECT GOALS

- ▶ Goal 1: The restoration project will benefit listed fish species that have the potential to occur on Bradmoor and Arnold and in surrounding waterways.
- ▶ Goal 2: The restoration project will benefit special-status wildlife species that have the potential to occur on Bradmoor and Arnold.
- ▶ Goal 3: The restoration sites will be self-sustaining over time and incorporate design features that anticipate the potential effects of climate change where feasible.
- ▶ Goal 4: The restoration project will be designed to facilitate monitoring of the habitats at Arnold and in surrounding areas.

2.4.2 PROJECT OBJECTIVES

- ▶ Increase available Delta Smelt and Longfin Smelt habitat, including enhancement of primary and secondary productivity.
- ▶ Enhance the quality of habitats to support more special-status and native wildlife.
- ▶ To the greatest extent practical, take advantage of the natural features of the project restoration sites to promote habitat resiliency to changes in future Suisun Marsh conditions.
- ▶ Avoid promoting conditions, such as noxious weed infestations, that are in conflict with the above project objectives.

2.5 PROPOSED PROJECT

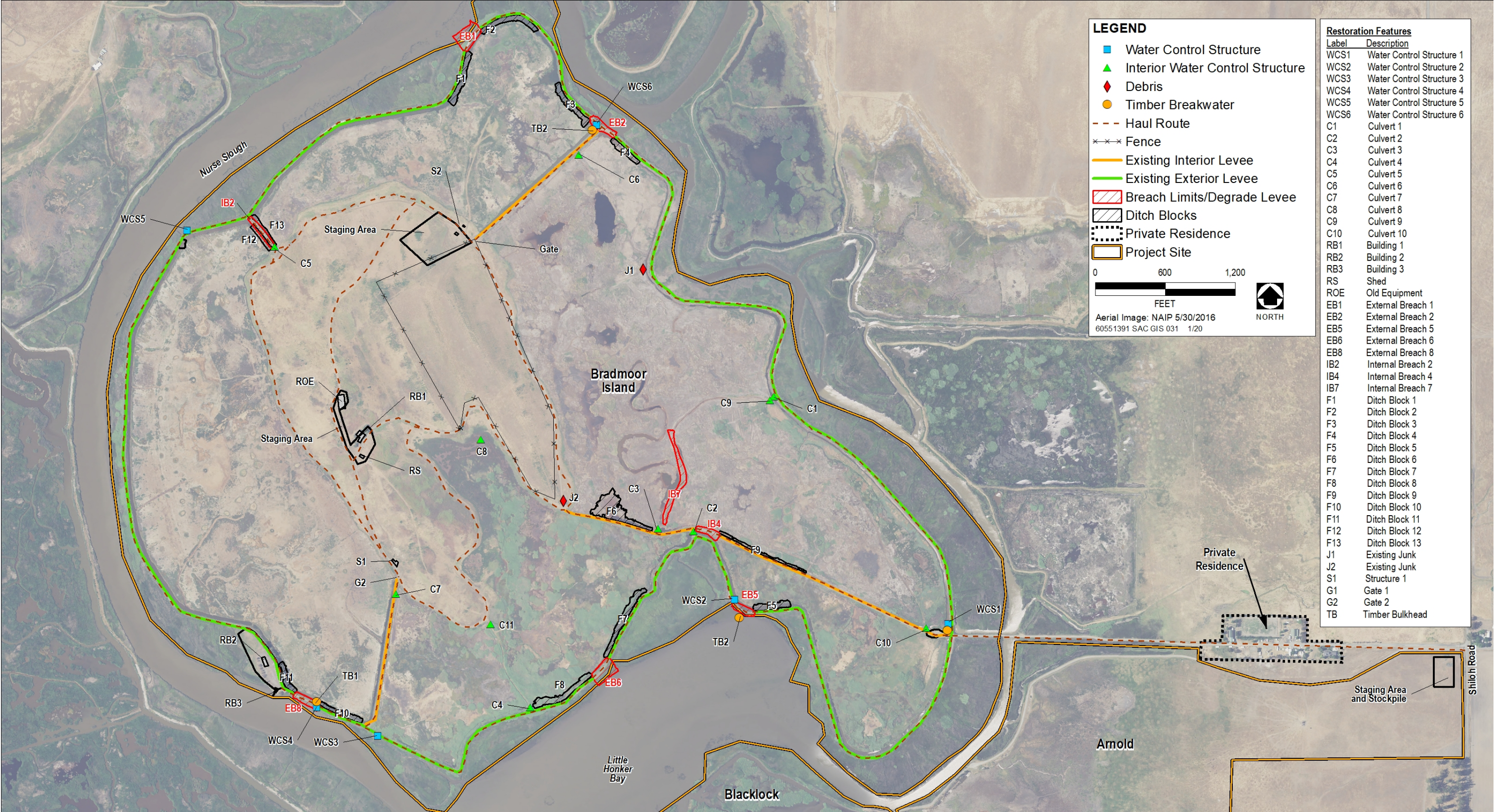
The Proposed Project would restore tidal hydrology to approximately 476 acres on Bradmoor and approximately 140 acres at Arnold by breaching levees in strategic locations, grading down sections of the levees, and filling ditches near the breach locations to the elevation of the adjacent marsh plain to create ditch blocks (Figure 2-3 and

Figure 2-4). The restored tidal wetlands are expected to provide on-site and regional habitat benefits to native fish and wildlife. The Proposed Project would result in creation (net gain) of approximately 9.07 acres of new waters and wetlands. DWR is executing an agreement with RWQCB to complete 4.9 acres of mitigation for impacts from the Tule Red Project, as required in the Board Order for that project (California Integrated Water Quality System [CIWQS] ID 818757). DWR intends to reserve the remaining 4.17 acres surplus creation of jurisdictional waters as mitigation for other DWR projects, pending requirements by resource agencies and associated agreements. The Proposed Project would convert privately owned land to new navigable waters accessible by the public. The Proposed Project would allow approximately 610 acres of new water-based public access for personal watercraft and would provide recreation opportunities, such as wildlife viewing, nature study, photography, hunting, and boat fishing. Any debris and infrastructure remaining on Bradmoor and Arnold, including WCSs and modular buildings, would be removed and disposed of before restoration. Grazing infrastructure (fencing and gates) on Bradmoor would be removed and grazing would be discontinued, while grazing infrastructure at Arnold would be enhanced to allow grazing to continue as part of long-term management. In addition, an old WCS on Blacklock would be removed. The total project area encompasses approximately 1,098 acres (Figure 2-2).

Restoration of Bradmoor (Figure 2-3) would consist of removing six WCSs (three of which are in breach locations and would be removed during breaching and three that would be removed and backfilled), creating seven breaches of varying length—five on the exterior levee (exterior breach [EB] 1, EB2, EB5, EB6, and EB8) and two on interior levees (interior breach [IB] 2 and IB4); and grading down a berm (IB7). At each breach (interior and exterior), fill would be placed in ditches adjacent to the existing levees, so that the ditch elevations would match the elevations of the adjacent marsh plain to create 13 ditch blocks (F1–F13). Remnants of a tidal slough through the lowest part of the island would be reconnected to Little Honker Bay through the proposed breach configuration.

Restoration of Arnold (Figure 2-4) would consist of removing two WCSs (one at Arnold and a remnant one on Blacklock), creating three breaches on the exterior levee (B1–B3), grading down sections of the exterior levee (G1–G4), and filling in ditches near the breaches to create four ditch blocks (F1–F4). As part of the restoration, a beach seine monitoring ramp would be installed to facilitate effectiveness monitoring of the interior of Arnold (Figure 2-4).

The Proposed Project would incorporate the appropriate environmental commitments (or equivalent measures) and mitigation measures identified in Section 2.5, “Environmental Commitments and Mitigation Measures,” of the SMP EIS/EIR and provided in Appendix A of this document.



Source: Data compiled by AECOM in 2020

Figure 2-3. Preliminary Restoration Site Plan for Bradmoor

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Source: Data compiled by AECOM in 2020

Figure 2-4. Preliminary Restoration Site Plan for Arnold

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2.6 GENERAL CONSTRUCTION METHODS AND ACTIVITIES

Project construction would be implemented between March 1, 2022 and December 31, 2023. Table 2-1 shows the anticipated construction schedule for Bradmoor and Arnold. All construction and demolition methods and activities would employ best management practices (BMPs), described in Section 2.9, “Environmental Commitments and Mitigation Measures.”

Table 2-1. Proposed Construction Timeline for Bradmoor and Arnold

Timing	Bradmoor	Arnold
2022–Site preparation and construction	<ul style="list-style-type: none"> • Drain and pump interior berm and culvert removal locations. • Remove structures and any debris from both sites. • Construct IB7 and IB2. • Manage <i>Phragmites australis</i> (mow and spray). • Remove culverts C5, C8, and C11. • Construct associated ditch blocks F12, F13, F6, and a portion of F9. 	<ul style="list-style-type: none"> • Drain and pump interior berm and culvert removal locations. • Remove culvert C1. • Deconstruct the water well. • Remove the boat dock and pile, old building, and any debris. • Construct cattle fencing and gate. • Construct the monitoring ramp. • Manage <i>Phragmites australis</i> (mow and spray).
2022–In-water work	<ul style="list-style-type: none"> • Remove and backfill three WCSs. 	<ul style="list-style-type: none"> • Remove any remaining infrastructure (e.g., culverts) • Grade levees, place ditch blocks, and complete breaches
2023	<ul style="list-style-type: none"> • Drain and pump interior berm and culvert removal locations. • Remove any remaining infrastructure and complete all remaining restoration features (IB4, all exterior breaches, and ditch filling). 	<ul style="list-style-type: none"> • Conduct monitoring and adaptive management.
	Clean up the site, stabilize the stockpile, and demobilize.	

Notes:

IB = interior breach; WCS = water control structure

All work would be done in accordance with work windows identified in Section 2.7, “Construction Schedule, Equipment, and Labor Force.”

Before tidal restoration, the interior restoration areas would be drained and pumped dry, consistent with annual duck club operations, to facilitate site modifications (e.g., culvert removal, interior breaches), and debris from decades of the property’s operation as managed wetlands would be removed. These activities would occur on land while the site is dry and would be contained in areas already disturbed by ongoing managed wetland maintenance.

Interior work would include culvert removal and construction of interior breaches, and may start as early as March 1. In-water work would involve removing WCSs, breaching and grading exterior levees, and filling ditches. In-water work would be performed between August 1 and November 30, with the exception of WCS removal and backfilling.

To maintain access to levee breaching sites at Arnold, in-water activities would start at the southeasternmost portion at G4 and F4 (shown in Figure 2-4), and grading and breaching would proceed in sequence from southeast to northwest. The remnant WCS at Blacklock also would be removed before B1 and G1 are constructed (e.g.,

while access to the WCS still is available). Similarly, breaching work on Bradmoor would begin on the western side at EB8 (shown in Figure 2-3), with equipment moving east toward EB5 and EB6, before concluding at EB1. Breaching and WCS removal would be performed from 3 hours before to 3 hours after low tide to minimize any impacts on fish and water quality.

To successfully target project goals and objectives, DWR would continue vegetation management, in accordance with the proposed Invasive Vegetation Management Plan (IVMP) provided in Appendix B, the monitoring and adaptive management plan as described in the SMP, and the environmental commitments for the Proposed Project provided in Appendix A. New colonization by undesirable plants is expected to be ongoing, following restoration activities. The project area would be monitored for undesirable invasive vegetation for 5 years after tidal restoration is completed as part of the Proposed Project. If invasive vegetation is found at the restoration sites, it would be assessed and appropriate management actions would be taken to help control it, consistent with the IVMP, incorporating relevant BMPs.

2.6.1 DEMOLITION AND DEBRIS REMOVAL

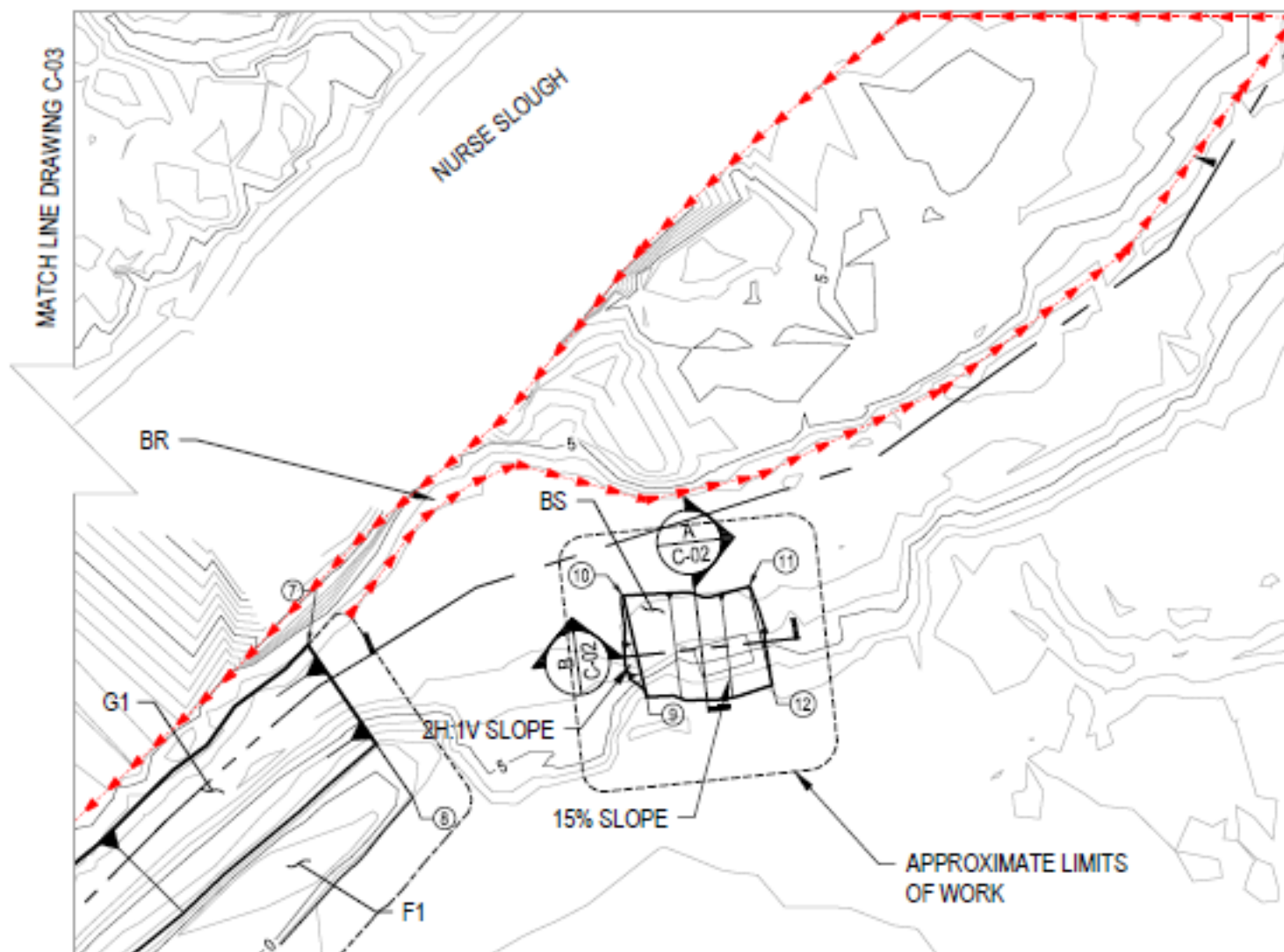
DWR would remove and properly dispose of approximately 2,830 cubic yards of debris that occupies just over a half acre in the project area, including abandoned equipment, water control systems, and other structures that could negatively affect the restoration sites on Bradmoor and at Arnold (Figure 2-3 and Figure 2-4). Buildings, remnant fencing, and structures would be dismantled on-site as feasible, removed, and transported to appropriately licensed waste facilities by haul truck. Estimates indicate that this would require approximately 38 one-way haul trips.

2.6.2 BEACH SEINE MONITORING RAMP CONSTRUCTION

An approximately 33- by 50-foot ramp with a 15 percent grade would be cut into the slope of the existing interior levee, to allow biological monitoring after restoration (Figure 2-5 and Figure 2-6). Approximately 60 cubic yards of levee material would be removed with a bulldozer or loader and graded. Geotextile fabric would be placed to discourage the growth of emergent vegetation on the ramp, and 4 inches of 0.75-inch-diameter aggregate base (40 cubic yards) would be placed on the ramp surface.

2.6.3 NEW FENCING

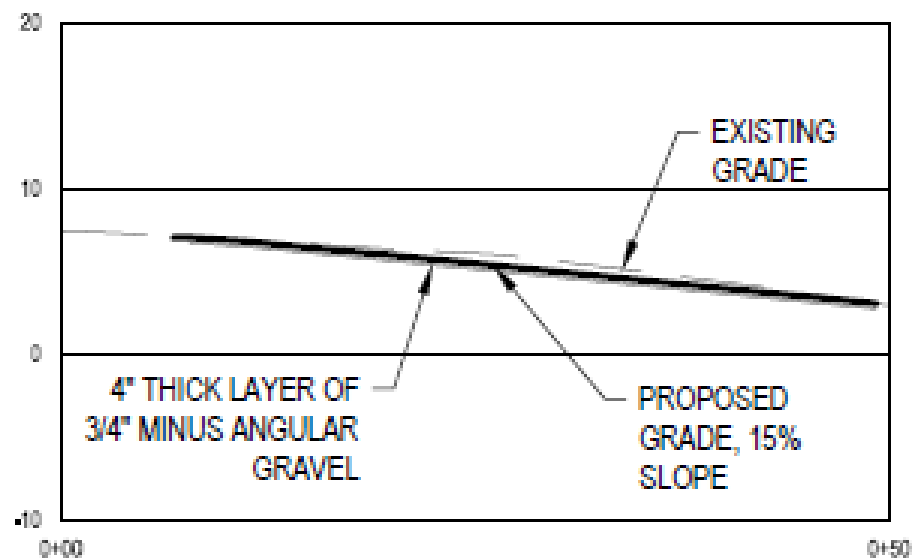
DWR plans to continue the current grazing regime on Arnold after installing new fencing and a gate along the property boundary. The fencing would divide the Blacklock Ranch from Arnold. Cattle would be allowed to continue accessing the Arnold upland pasture, under a lease agreement to provide habitat benefits. The new fencing would allow control of cattle movement on and off the property if needed for adaptive management. The barbed wire fencing would be approximately 4 feet tall, would extend for 1,200 linear feet, and would have wooden posts set 2 to 6 feet deep, with a maximum of 16 feet between posts. The cattle gate would be 16 feet wide and would be supported by H braces and steel posts at each end. An auger or post hole digger would be used to install the fence posts.



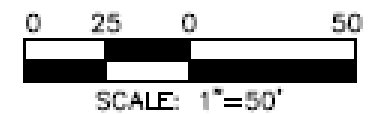
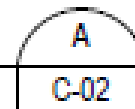
LAYOUT PLAN

SCALE: 1" = 50'

Figure 2-5. Beach Seine Monitoring Ramp Layout



BS TYPICAL SECTION
 SCALE 1" = 10'



Source: Data compiled by AECOM in 2020

Figure 2-6. Beach Seine Monitoring Ramp Typical Cross Section

2.6.4 STAGING AREAS AND STOCKPILE

Temporary staging areas (Figure 2-3 and Figure 2-4) would be used in upland areas for temporary storage of materials and equipment. Existing roads on already disturbed upland habitat would be used for transport. Staging areas would have stabilized entrances and exits, and would be located at least 100 feet from wetlands and water bodies to the maximum extent possible. Appropriate BMPs for erosion control would be implemented, including use of straw wattles and reseeded. A stockpile site would be co-located with one of the staging areas at Arnold (Figure 2-4).

2.6.5 WELL REMOVAL

All features associated with the well, including the windmill, water tanks, and pumps, would be demolished and removed. The contractor would pull or overdrill the well casing to the full depth of installation, and then would insert a tremie pipe to the bottom of the hole and grout the entire hole, from the bottom up. Groundwater displaced by the grout could be dispersed on the adjacent ground. Water contaminated with grout would be collected and disposed of appropriately at a licensed facility. Destruction of water wells would be performed in accordance with Solano County regulations and following the recommendations of a qualified geotechnical engineer and/or a certified C-57 driller.

2.6.6 INTERNAL SITE MODIFICATION

To avoid unnecessary in-water work, any modifications would be done before breaching and grading down of the exterior levees. Making modifications inside the properties would allow better tidal connections to historic remnant channels and previously divided portions of the property.

2.6.7 CULVERT REMOVAL

Bradmoor and Arnold have culverts and crossings in the ditches to allow easy access to the marsh plain from the levees. Bradmoor has 11 culverts and ditch crossings, and Arnold has one culvert and ditch crossing (Figure 2-3 and Figure 2-4). All culverts would be excavated and left open, except where a ditch block would be installed.

2.6.8 BREACHING OF INTERIOR LEVEES

Three interior levees would be breached to facilitate internal water circulation on Bradmoor. IB2 would be 350 feet long with a volume of 2,020 cubic yards removed, IB7 would be 863 feet long with 870 cubic yards removed, and IB4 would be 206 feet long with 1,100 cubic yards removed. Material from these breaches would be stockpiled for use elsewhere on-site or deposited directly into adjacent ditch-filling locations.

2.6.9 FILLING OF BORROW DITCHES

Borrow ditches next to exterior and interior levees promote water circulation in managed ponds, and historically the ditches were used as a source of material for levee construction and repair. To minimize creation of backwaters that could provide habitat for nonnative fish and invasive aquatic plants, portions of these interior borrow ditches would be brought up to the elevation of the existing marsh plain. Borrow ditches would be filled with materials obtained from on-site restoration features (IBs, EBs, and levee grading). Table 2-2 summarizes the estimated areas of ditch filling and ditch block creation. Figure 2-3 and Figure 2-4 show the locations of these features.

Table 2-2. Ditch Filling and Ditch Blocks for Restoration on Bradmoor and at Arnold

Borrow Ditch/Ditch Block	Area (square feet)	Fill Volume (cubic yards)
Bradmoor		
F1	23,900	3,750
F2	26,000	4,570
F3	22,000	2,900
F4	14,500	2,110
F5	17,200	3,450
F6	56,600	4,930
F7	31,600	3,660
F8	29,800	2,040
F9	16,200	2,310
F10	15,700	1,530
F11	14,100	460
F12	7,100	920
F13	9,800	2,020
Arnold		
F1	15,300	1,530
F2	27,800	3,010
F3	44,400	6,870
F4	44,500	5,830

Source: Data compiled by AECOM in 2020

2.6.10 REMOVAL OF WATER CONTROL STRUCTURES AND BULKHEADS

WCSs would be removed from the levees using an excavator. WCS parts include culverts, flashboard risers, flap/screw gates, bulkheads, and a wheel used to control water movement (Figure 2-7). Some WCSs would be removed as part of a breach (e.g., EB2, EB6, and EB8 on Bradmoor, and the Blacklock WCS) and others would be removed and backfilled in locations without planned breaches. The maximum depth of excavation would be -4 feet NAVD88, as the WCS depths would vary from -2 to -3.6 feet NAVD88.

Bradmoor has six WCSs. Three would be removed and backfilled, and the others would be removed as part of a breach. Removal of the WCSs to be backfilled would occur in 2022 to allow the material to dry before breaching the following year.

Temporary levee overbuilding on Bradmoor on the interior side may be required for removal of WCSs that are not at breach locations (WCS 1, 3, and 5). Material would be placed in the ditch, using an excavator to widen the levee for stability. Half of the culvert pipe would be removed at a time, starting on the interior side. The pipe would be severed while excavating it to remove the first half and would be backfilled; then the other half on the exterior side of the levee would be removed and backfilled with imported rock and covered with the fill that was removed from the excavation. Before breaching the exterior levees, the levee would be brought back to the original dimensions during 2023. At WCS 5, a temporary turnaround would be installed to facilitate removal (Figure 2-3).

On Bradmoor, one bulkhead (identified as “timber breakwater”) is not associated with a WCS (Figure 2-3 and Figure 2-7 [c and d]). This structure would be removed as part of construction of EB5. At Arnold, a single WCS and associated bulkhead would be removed, and the breach would be left open (Figure 2-7 [a and b]). Bulkheads are made of treated lumber and are anchored by wooden piles, pushed in to refusal. Lengths range from 10 to 100



Source: Data compiled by AECOM in 2020

Figure 2-7. Typical Water Control Structures and Timber Breakwater

feet. Figure 2-7 shows typical bulkheads on Bradmoor and at Arnold. To avoid creating navigation hazards, bulkheads would be removed by pulling piles or snapping them off 3 feet below the mudline. All additional wooden debris created by demolition of bulkheads would be removed and hauled off-site for disposal at an appropriately licensed facility.

The design of the Blacklock restoration project originally included removing the southern WCS along Arnold. However, this action did not occur during restoration construction and the WCS remains in place. Before grading levee elevations down and breaching exterior levees at Arnold, the remaining WCS at Blacklock would be excavated and left open as a breach.

2.6.11 LEVEE GRADING AT ARNOLD AND EXTERIOR LEVEE BREACHING

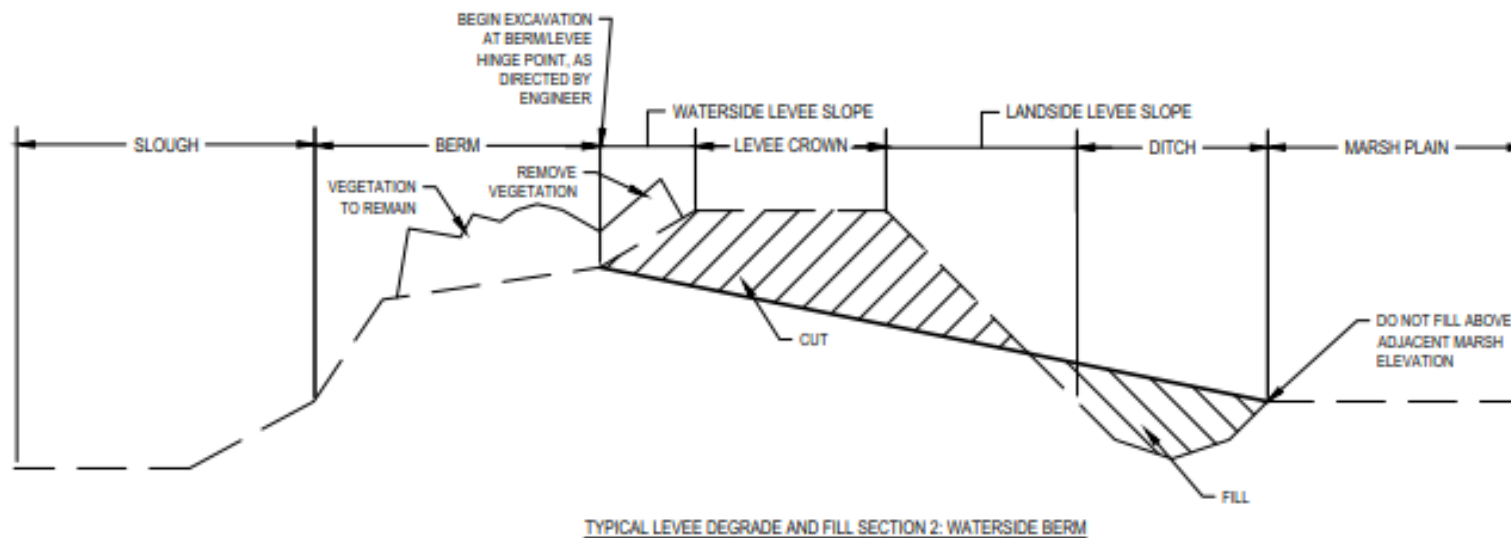
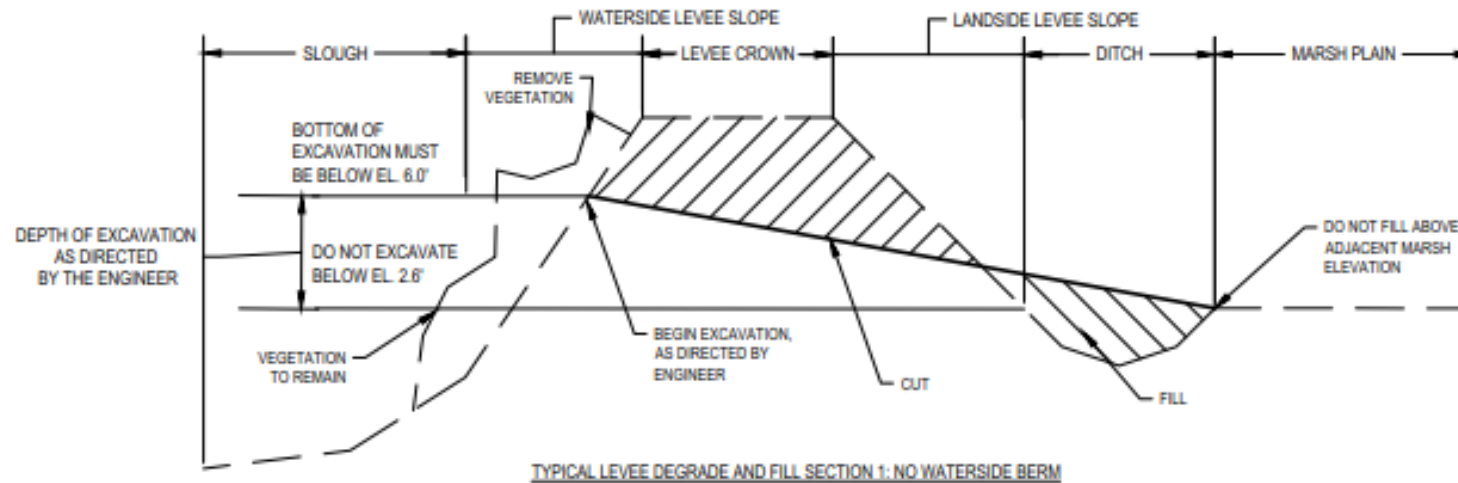
Levees would be graded and exterior levees breached after removal of the WCSs. Both levee grading and exterior levee breaching would occur at Arnold, while only exterior breaching would occur on Bradmoor. Material from the levee breaching and grading would be used to finish filling ditches to create ditch blocks nearby (Table 2-2).

Temporary turnarounds would be required to access exterior features for construction. Temporary ramps would be on top of ditch blocks, within the footprint of the ditch block. To minimize impacts, the ramps would be created in areas where ditch filling or ditch block creation are located. Following exterior breaches, the access ramps would be regraded to design elevation.

To maintain access to levee breaching sites at Arnold, in-water activities would start at the southeasternmost portion (by G4), and grading and breaching would proceed in sequence from southeast to northwest. Similarly, breaching work on Bradmoor would begin on the western side at EB8, with equipment moving east toward EB5 and EB6 before concluding at EB1. Exterior breaching would be performed from 3 hours before to 3 hours after low tide to minimize any impacts on fish and water quality.

Levee grading at Arnold would be done using an excavator, and levee material would be pushed into the adjacent borrow ditch to bring it to the elevation of the marsh plain, and then would be compacted. Excess fill would be placed on top of the ditch fill at a continuous slope to a maximum elevation of 6 feet NAVD88 (below mean higher high water [MHHW]). This method is believed to help expedite tidal restoration and allow more water exchange within the restoration site while providing high marsh habitat for sea level rise accommodation and wildlife habitat.

The top elevations and slopes of the graded-down levees would be determined at the discretion of the engineer in the field and would be based on the elevation of the tidal berm and the marsh plain. The maximum elevation of these levees would be 6 feet NAVD88, and the minimum would be the elevation of the adjacent marsh plain. The width of the graded-down levees would vary from 25 to 50 feet. Tidal berms on the slough side of the levee would not be disturbed and would help the engineer to determine appropriate elevations. Figure 2-8 shows examples of levee grading designs, based on the elevation and slope of the levee and adjacent tidal berm. Figure 2-4 shows the locations at Arnold where levees would be graded, and Table 2-3 lists these locations.



Source: Data compiled by AECOM in 2020

Figure 2-8. Typical Levee Grading Sections

Table 2-3. Levee Grading for Arnold Restoration

Levee Section	Length (feet)	Area (square feet)	Volume Cut (cubic yards)
G1	640	24,900	2,170
G2	440	18,400	2,270
G3	970	35,400	3,660
G4	1,370	35,600	6,790

Source: Data compiled by AECOM in 2020

2.6.12 EXTERIOR LEVEE BREACHING

Exterior levee breaches would be trapezoidal and created with an excavator. Material from the breaches would be transported to nearby ditch block locations to be placed and compacted. Bradmoor would have five exterior breaches, and Arnold would have three. Table 2-4 lists the approximate dimensions, and Figure 2-4 and Figure 2-5 show the locations of the exterior levee breaches.

Table 2-4. Exterior Levee Breaches for Bradmoor and Arnold Restoration

Levee Section	Length (feet)	Bottom Elevation (feet NAVD88)	Area (square feet)	Volume Cut (cubic yards)
Bradmoor				
EB1	210	0	30,100	7,630
EB2	130	-1	15,100	4,630
EB5	210	0	10,500	3,040
EB6	200	0	26,500	8,030
EB8	230	0	13,500	3,900
Arnold				
B1	120	-1	7,600	2,250
B2	70	-1	3,300	1,080
B3	80	-1	5,800	1,680

Note: EB = exterior breach; NAVD88 = North American Vertical Datum of 1988

Source: Data compiled by AECOM in 2020

Any fill remaining after the creation of ditch blocks would be placed at the designated stockpile location at Arnold (Figure 2-4).

2.6.13 SIGN INSTALLATION FOR KAYAK TRAILS

New kayak routes to Bradmoor, Arnold and Blacklock would allow access via kayak or other small watercraft for wildlife viewing, fishing, and other recreational activities without risking damage to sensitive resources. Interpretive and “No trespassing” signs would be installed on Bradmoor and at Arnold and Blacklock to inform the public about the restoration project and to limit disturbance at restoration sites. Three interpretive signs would be installed near EB5 on Bradmoor, near B1 at Arnold, and near the existing breaches at Blacklock. Two “No trespassing” signs would be installed, north of EB8 on Bradmoor and northeast of B1 at Arnold. Figure 2-9 shows the locations where the signs would be installed and the kayak trail route.



Source: Data compiled by DWR 2020

Figure 2-9. Kayak Trail Route from Belden's Landing to Bradmoor and Arnold

2.6.14 STOCKPILE STABILIZATION

After completion of restoration activities, any excess material from excavation or grading would be placed in the designated stockpile area at Arnold (Figure 2-4). The excess material is expected to total approximately 3,050 cubic yards. Fill stockpiled at Arnold would be no more than 3 feet high. The stockpile site then would be seeded, mulched, and stabilized in accordance with applicable BMPs to minimize the potential for erosion. The stockpile then would be available to be beneficially re-used for levee maintenance elsewhere in Suisun Marsh, consistent with the SMP.

2.6.15 VEGETATION MANAGEMENT

New colonization by undesirable plant species is expected to be ongoing during and immediately following restoration construction. The project area would be monitored for undesirable invasive vegetation during tidal restoration activities and for 5 years after these activities are completed as part of the Proposed Project. When invasive vegetation is found at the restoration sites, DWR would assess the invasive species and appropriate management actions would be taken in an attempt to control it, consistent with the IVMP (Appendix B) and incorporating relevant BMPs (Appendix A).

2.7 CONSTRUCTION SCHEDULE, EQUIPMENT, AND LABOR FORCE

Project construction activities would begin no earlier than March 1, 2022, following site dewatering, and would be completed by December 31, 2023. In-water work, including levee breaching, would occur between August 1 and November 30 to minimize impacts on listed fish species. Table 2-5 summarizes the work window for each work activity.

Table 2-5. Work Windows

Year	Work Activity	Work Window
2022	Remove structures and any debris from both sites.	N/A
	Construct IB7 and IB2 and fill adjacent ditches.	N/A
	Construct cattle fencing and gate.	N/A
	Construct the monitoring ramp at Arnold.	N/A
	Remove and backfill three WCSs on Bradmoor.	August 1–November 30
	Remove the Blacklock WCS.	August 1–November 30
	Grade levees, fill ditches, and complete breaches at Arnold.	August 1–November 30
2023	Construct all exterior breaches on Bradmoor and construct remaining ditch fill.	August 1–November 30
	Clean up site, stabilize stockpile, and demobilize	N/A
2023–2029	Assess the property for invasive vegetation for 5 years post-construction and manage as needed following the IVMP.	N/A

Notes:

IB = interior breach; IVMP = Invasive Vegetation Management Plan ; N/A = not applicable; WCS = water control structure

Implementing the Proposed Project would require various types of hand tools and heavy equipment, including rubber tire and tracked excavators, tracked mini-dumpers, bulldozers, rollers, loaders, drill rigs, pickup trucks, and other light-duty vehicles. Conditions in the field during construction may influence the type of equipment best suited for the work, which ultimately would be chosen by the construction contractor. Table 2-6 lists the construction equipment anticipated for restoration activities.

Table 2-6. Construction Durations, Equipment, and Labor Force

Site	Activity	Duration	Labor	Equipment
Arnold	Dewater site. Remove culvert C1, debris, buildings, equipment, fencing, and boat ramp.	March 1–December 31, 2022: 10–20 days	Average: 6 Maximum: 8	1–2: 426 rubber-tired backhoes 1–2: tracked mini-dumps 1: support pickups, 4 x 2-3/4 ton 1–5: trash pumps 1–5: portable generators
	Deconstruct water well.	March 1–December 31, 2022: 1–5 days	Average: 2 Maximum: 3	1: drill rig 1–2: support pickups, 4 x 2-3/4 ton
	Grade ditch crossing and monitoring platform.	March 1–December 31, 2022: 4–10 days	Average: 8 Maximum: 9	1: 325L excavator 1: tracked mini-dump 1: D-8N bulldozer 1: water truck 1: support pickup, 4 x 2-3/4 ton 1: transfer truck (gravel import) 1: smooth drum roller operator (same as bulldozer operator)
	Establish and stabilize stockpile/staging area 1.	March 1–December 31, 2022: 10–20 days	Average: 11 Maximum: 17	1–2: HL955 loaders 1–5: transfer trucks 1: support pickup, 4 x 2-3/4 ton 1–2: low-beds (for equipment mobilization)
	Grade B1, B2, B3, G1, G2, G3, G4, F1, F2, F3, F4, and WCS BL.	August 1– November 30, 2022: 30–60 days	Average: 10 Maximum: 14	1–2: 325L excavators 1–2: tracked mini-dumps 1–2: D-8N bulldozers 1: water truck 1–2: support pickups, 4 x 2-3/4 ton 1–3: trash pumps 1–3: portable generators
	Establish and stabilize stockpile/staging area 2.	June 1–December 31, 2023: 5–15 days	Average: 7 Maximum: 9	1–2: HL955 loaders 1: 815F sheepsfoot compactor operator 1: support pickup, 4 x 2-3/4 ton 1–3: low-beds (for equipment mobilization)
Bradmoor	Establish and stabilize stockpile/staging areas.	March 1–December 31, 2022: 10–20 days	Average: 11 Maximum: 17	1–2: HL955 loaders 1–5: transfer trucks 1: support pickup, 4 x 2-3/4 ton 1–2: low-beds (for equipment mobilization)
	Dewater site. Remove culverts, debris, buildings, equipment, and fencing.	March 1–December 31, 2022: 20–60 days	Average: 8 Maximum: 12	1–4: trash pumps 1–2: 426 rubber tire backhoe 1–2: tracked mini-dump 1–2: support pickup 4 x 2-3/4 ton 1–2: flatbed 2-ton truck 1–10: trash pumps 1–10: portable generators 1: portable trailer
	Grade IB2, IB7, F12, F13, F6, and part of F9.	March 1–December 31, 2022: 5–15 days	Average: 9 Maximum: 10	1–2: 325L excavator 1–2: tracked mini-dump 1–2: D-8N bulldozer 1: water truck 1–2: support pickup 4 x 2-3/4 ton
	Excavate WCSs 2, 4, and 6, and EB1, EB2, EB5, EB6, and EB8.	August 1– November 30, 2023: 40–80 days	Average: 14 Maximum: 20	2–3: 325L excavators 2–3: tracked mini-dumps 2–3: D-8N bulldozers 1: water truck 1–3: support pickups, 4 x 2-3/4 ton 1–3: trash pumps 1–3: portable generators 1: portable trailer

Notes: EB = exterior breach; IB = interior breach; WCS = water control structure

2.8 POST-CONSTRUCTION CONDITIONS

Upon completion of the Proposed Project, the interior portions of the Bradmoor and Arnold restoration sites would be reconnected with tidal waters from the surrounding waterways, creating new tidal wetland habitat. The Proposed Project is expected to result in the creation (net gain) of approximately 9.07 acres of new waters and wetlands. DWR is executing an agreement with the RWQCB to complete 4.9 acres of mitigation for impacts from the Tule Red Project, as required in the Board Order for that project (CIWQS ID 818757). DWR intends to reserve the remaining 4.17 acres surplus creation of jurisdictional waters as mitigation for other DWR projects, pending requirements by resource agencies and associated agreements. Tables 2-7a; 2-8a; 2-9a; and 2-10a summarize the type conversion within existing habitat types that would occur after restoration activities. Tables 2-7b; 2-8b; 2-9b; and 2-10b summarize the overall habitat areas estimated for pre- and post-restoration scenarios, and the net gain or loss of habitat type from existing conditions to restoration outcomes.

Habitat acreage and wetland-type conversions resulting from the Proposed Project were calculated based on a digital elevation model that was developed using topography surveys, DWR bathymetry, University of California at Davis topography surveys, and 2014 Solano County light detection and ranging (LiDAR) data. DWR determined that LiDAR data on the tidal berms were inaccurate because the data, due to vegetation interference, showed elevations 0.5 foot to 5 feet higher than survey points. DWR collected additional elevation points in various locations on the tidal berms on Bradmoor and at Arnold (Figure 2-10) and determined that although the LiDAR data showed the area as upland, all points were between 3 and 6.1 feet NAVD88. Based on the survey data and analysis, the tidal berms were classified as tidal wetland.

The Proposed Project ultimately would create approximately 616.91 acres of new tidal wetlands and would enhance approximately 238.18 acres of existing tidal wetlands. Together, these actions would result in a mosaic of approximately 855.09 acres of tidal wetlands and associated subtidal habitats in an area known to have a high diversity of native fish. Furthermore, the design of the Proposed Project would provide food web benefits to native and listed fish species on-site and in the region, and would therefore meet project goals.

2.9 ENVIRONMENTAL COMMITMENTS AND MITIGATION MEASURES

DWR would incorporate applicable environmental commitments and mitigation measures from the SMP EIS/EIR into the Proposed Project, with the exception of CDFW and USFWS-approved Environmental Commitments and conservation measures for protection of salt marsh harvest mouse, as provided in Appendix A. These environmental commitments are also summarized in Chapter 2 of the SMP EIS/EIR, with the exception of the new measures. Mitigation measures from the SMP EIS/EIR also would be applied, as necessary, to minimize potential adverse effects, and are discussed further in the impact assessments.

2.10 PERMITS, APPROVALS, AND REGULATORY REQUIREMENTS

As the lead agency, DWR has the principal responsibility for approving and carrying out the Proposed Project, and for ensuring that the requirements of CEQA and all other applicable regulations are met. Table 2-11 lists the agencies that also may have authority over portions of the Proposed Project.

Table 2-7a. Bradmoor Island Existing Habitat, Restoration Outcome, and Net Conversion by Existing Habitat Type

Habitat Classification	Existing (acres)	Post-Restoration Outcome (acres)								Net Conversion of Existing Habitat Type (acres)
		Open Water	Open Water/Mudflat Mosaic	Low Marsh/Mudflat Mosaic	High Marsh	Existing Tidal Marsh	Managed Wetland	Upland/Grassland	Barren/Disturbed	
Subtidal/Open Water	15.25	15.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Existing Tidal Marsh	125.74	1.08	0.00	0.00	0.00	124.66	0.00	0.00	0.00	1.08
Managed Wetland	468.82	55.13	407.19	5.44	1.06	0.00	0.00	0.00	0.00	468.82
Upland/Grassland	122.28	0.12	0.00	0.54	0.33	0.00	0.00	121.29	0.00	0.99
Barren/Disturbed	22.13	0.79	2.14	2.51	0.97	0.00	0.00	15.72	0.00	22.13
Total	754.22	72.37	409.33	8.49	2.36	124.66	0	137.01	0	493.02

Source: Compiled by AECOM in 2020

Table 2-7b. Bradmoor Island Total Estimated Habitat Areas Pre- and Post-Restoration and Gain/Loss of Habitat Area by Type

Habitat Classification	Existing (acres)	Post-Restoration Outcome (acres)	Gain/Loss in Project Area (acres)
Subtidal/Open Water	15.25	72.37	57.12
Open Water/Mudflat Mosaic	0.00	409.33	409.33
Low Marsh/Mudflat Mosaic	0.00	8.49	8.49
High Marsh	0.00	2.36	2.36
Existing Tidal Marsh	125.74	124.66	(1.08)
Managed Wetland	468.82	0.00	(468.82)
Upland/Grassland	122.28	137.01	14.73
Barren/Disturbed	22.13	0.00	(22.13)
Total	754.22	754.22	0

Source: Compiled by AECOM in 2020

Table 2-8a. Arnold Slough Existing Habitat, Restoration Outcome, and Net Conversion by Existing Habitat Type

Habitat Classification	Existing (acres)	Post-Restoration Outcome (acres)								Net Conversion of Existing Habitat Type (acres)
		Open Water	Open Water/Mudflat Mosaic	Low Marsh/Mudflat Mosaic	High Marsh	Existing Tidal Marsh	Managed Wetland	Upland/Grassland	Barren/Disturbed	
Subtidal/Open Water	4.54	4.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Existing Tidal Marsh	15.76	0.13	0.00	0.58	0.00	15.05	0.00	0.00	0.00	0.71
Managed Wetland	137.90	2.30	113.47	16.71	5.42	0.00	0.00	0.00	0.00	137.90
Upland/Grassland	102.15	0.04	0.00	0.63	0.00	0.00	0.00	101.48	0.00	0.67
Barren/Disturbed	3.13	0.12	0.00	0.87	0.00	0.00	0.00	0.78	1.36	1.77
Total	263.48	7.13	113.47	18.79	5.42	15.05	0.00	102.26	1.36	141.05

Source: Compiled by AECOM in 2020

Table 2-8b. Arnold Slough Total Estimated Habitat Areas Pre- and Post-Restoration and Gain/Loss of Habitat Area by Type

Habitat Classification	Existing (acres)	Post-Restoration Outcome (acres)	Gain/Loss in Project Area (acres)
Subtidal/Open Water	4.54	7.13	2.59
Open Water/Mudflat Mosaic	0.00	113.47	113.47
Low Marsh/Mudflat Mosaic	0.00	18.79	18.79
High Marsh	0.00	5.42	5.42
Existing Tidal Marsh	15.76	15.05	(0.71)
Managed Wetland	137.90	0.00	(137.90)
Upland/Grassland	102.15	102.26	0.11
Barren/Disturbed	3.13	1.36	(1.77)
Total	263.48	263.48	(0.00)

Source: Compiled by AECOM in 2020

Table 2-9a. Blacklock Restoration Outcome by Existing Habitat and Net Conversion of Existing Habitat Type

Habitat Classification	Existing (acres)	Post-Restoration Outcome (acres)								Net Conversion of Existing Habitat Type (acres)
		Open Water	Open Water/Mudflat Mosaic	Low Marsh/Mudflat Mosaic	High Marsh	Existing Tidal Marsh	Managed Wetland	Upland/Grassland	Barren/Disturbed	
Subtidal/Open Water	6.33	6.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Open Water/Mudflat Mosaic	59.81	0.01	59.80	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Low Marsh/Mudflat Mosaic	3.09	0.01	0.00	3.08	0.00	0.00	0.00	0.00	0.00	0.01
High Marsh	2.46	0.00	0.00	0.00	2.46	0.00	0.00	0.00	0.00	0.00
Existing Tidal Marsh	5.20	0.00	0.00	0.00	0.00	5.20	0.00	0.00	0.00	0.00
Managed Wetland	1.12	0.46		0.66		0.00	0.00	0.00	0.00	1.12
Upland/Grassland	0.87	0.01	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.01
Barren/Disturbed	1.04	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.04	1.00
Total	79.92	6.82	59.80	3.74	2.46	5.20	0.00	1.86	0.04	2.15

Source: Compiled by AECOM in 2020

Table 2-9b. Blacklock Total Estimated Habitat Areas Pre- and Post-Restoration and Gain/Loss of Habitat Area by Type

Habitat Classification	Existing (acres)	Post-Restoration Outcome (acres)	Gain/Loss in Project Area (acres)
Subtidal/Open Water	6.33	6.82	0.49
Open Water/Mudflat Mosaic	59.81	59.80	(0.01)
Low Marsh/Mudflat Mosaic	3.09	3.74	0.65
High Marsh	2.46	2.46	0.00
Existing Tidal Marsh	5.20	5.20	0.00
Managed Wetland	1.12	0.00	(1.12)
Upland/Grassland	0.87	1.86	0.99
Barren/Disturbed	1.04	0.04	(1.00)
Total	79.92	79.92	(0.00)

Source: Compiled by AECOM in 2020

Table 2-10a. Project Summary Restoration Outcome by Existing Habitat and Net Conversion of Existing Habitat Type

Habitat Classification	Existing (acres)	Post-Restoration Outcome (acres)								Net Conversion of Existing Habitat Type (acres)
		Open Water	Open Water/Mudflat Mosaic	Low Marsh/Mudflat Mosaic	High Marsh	Existing Tidal Marsh	Managed Wetland	Upland/Grassland	Barren/Disturbed	
Subtidal/Open Water	26.12	26.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Open Water/Mudflat Mosaic	59.81	0.01	59.80	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Low Marsh/Mudflat Mosaic	3.09	0.01	0.00	3.08	0.00	0.00	0.00	0.00	0.00	0.01
High Marsh	2.46	0.00	0.00	0.00	2.46	0.00	0.00	0.00	0.00	0.00
Existing Tidal Marsh	146.70	1.21	0.00	0.58	0.00	144.91	0.00	0.00	0.00	1.79
Managed Wetland	607.84	57.89	520.66	22.81	6.48	0.00	0.00	0.00	0.00	607.84
Upland/Grassland	225.30	0.17	0.00	1.17	0.33	0.00	0.00	223.63	0.00	1.67
Barren/Disturbed	26.30	0.91	2.14	3.38	0.97	0.00	0.00	17.50	1.40	24.90
Total	1,097.62	86.32	582.6	31.02	10.24	144.91	0	241.13	1.4	636.22

Source: Compiled by AECOM in 2020

Table 2-10b. Project Summary Total Estimated Habitat Areas Pre- and Post-Restoration and Gain/Loss of Habitat Area by Type

Habitat Classification	Existing (acres)	Post-Restoration Outcome (acres)	Gain/Loss in Project Area (acres)
Subtidal/Open Water	26.12	86.32	60.20
Open Water/Mudflat Mosaic	59.81	582.60	522.79
Low Marsh/Mudflat Mosaic	3.09	31.02	27.93
High Marsh	2.46	10.24	7.78
Existing Tidal Marsh	146.70	144.91	(1.79)
Managed Wetland	607.84	0.00	(607.84)
Upland/Grassland	225.30	241.13	15.83
Barren/Disturbed	26.30	1.40	(24.90)
Total	1,097.62	1,097.62	(0.00)

Source: Compiled by AECOM in 2020

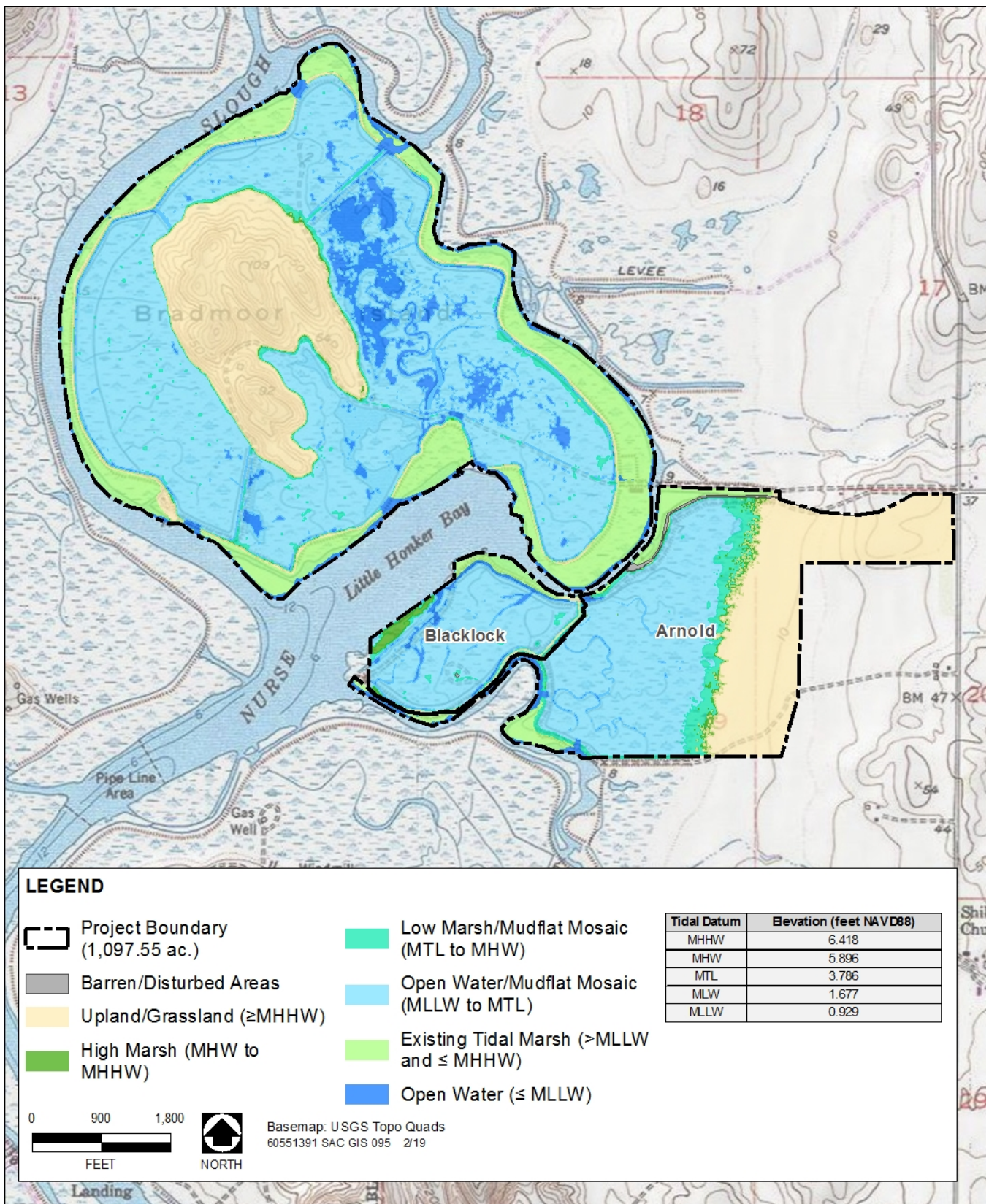
Table 2-11. Regulatory Agencies and Approvals

Agency	Approval/Permit
U.S. Army Corps of Engineers	Section 404 permit under the Clean Water Act and Section 10 of the Rivers and Harbors Act for activities within wetlands and waters of the United States (Nationwide Permit 27)
U.S. Coast Guard	Coordination with the U.S. Army Corps of Engineers on Section 10 of the Rivers and Harbors Act; aids to navigation
U.S. Fish and Wildlife Service	ESA Section 7 consultation; review of compliance by the Proposed Project with the existing programmatic BiOp for the SMP
National Marine Fisheries Service	ESA Section 7 consultation; review of compliance by the Proposed Project with the existing programmatic BiOp for the SMP
California Department of Fish and Wildlife	California Endangered Species Act compliance, California Fish and Game Code Section 2081 incidental take permit, Streambed Alteration Agreement, and California Fish and Game Code Section 1600 for activities in the Secondary Management Area
California State Lands Commission	Memorandum of Understanding
State Water Resources Control Board	NPDES Construction General Permit and Stormwater Pollution Prevention Plan approval under Section 402 of the Clean Water Act
San Francisco Bay Regional Water Quality Control Board	Water quality certification/waste discharge requirements to control pollutant discharges to water bodies under Clean Water Act Section 401 certification
State Historic Preservation Office	Consultation under Section 106 of the National Historic Preservation Act
San Francisco Bay Conservation and Development Commission	Suisun Marsh development permit
Delta Stewardship Council	Consultation regarding consistency determination for Delta Plan covered actions; consistency determined by DWR through self-certification

Notes: BiOp = biological opinion; DWR = California Department of Water Resources; ESA = Endangered Species Act;

NPDES = National Pollutant Discharge Elimination System; SMP = Suisun Marsh Plan

Source: Compiled by AECOM in 2020



Source: Data compiled by AECOM in 2020

Figure 2-10. Conceptual Estimate of Post-Restoration Outcome Based on Existing Elevation Data

3 SUPPLEMENTAL ENVIRONMENTAL REVIEW

3.1 INTRODUCTION

This chapter examines the changes to the environmental setting (where appropriate), evaluates the potential changes to environmental impacts, and identifies whether the impacts of the Proposed Project fall within the scope of the previously certified SMP EIS/EIR. Furthermore, this chapter summarizes the impact conclusions and then presents a specific resource analysis. The following environmental resource topics are analyzed in detail in this chapter:

- ▶ Water Supply, Hydrology, and Delta Water Management
- ▶ Water Quality
- ▶ Geology and Groundwater
- ▶ Flood Control and Levee Stability
- ▶ Sediment Transport
- ▶ Transportation and Navigation
- ▶ Air Quality
- ▶ Noise
- ▶ Greenhouse Gas Emissions and Climate Change
- ▶ Fish
- ▶ Recreational Resources
- ▶ Vegetation and Wetlands
- ▶ Wildlife
- ▶ Land Use and Delta Plan Policies
- ▶ Utilities and Public Services
- ▶ Visual/Aesthetic Resources
- ▶ Cultural Resources
- ▶ Public Health and Environmental Hazards
- ▶ Growth-Inducing Impacts, including Population and Housing
- ▶ Cumulative Impacts

3.2 IMPACT CONCLUSIONS

The Proposed Project, as presented through the analysis in this addendum, would not result in any new significant environmental effects or any substantial increases in the severity of environmental effects identified in the certified Final SMP EIS/EIR. Furthermore, the Proposed Project would not require mitigation measures that would differ considerably from those identified in the SMP EIS/EIR. The level of overall activities analyzed as part of the SMP EIS/EIR for restoration projects and the location are comparable to those under the Proposed Project. The potential environmental impacts associated with the Proposed Project already were identified and adequately addressed in the SMP EIS/EIR. All mitigation measures included in the SMP EIS/EIR were adopted. Throughout this addendum, the mitigation measures, where applicable, would not differ considerably from those disclosed in the SMP EIS/EIR and would be adopted for the Proposed Project, where appropriate. In addition, the environmental commitments described in the SMP EIS/EIR would be adopted, as appropriate, for the Proposed

Project. Based on further evaluation and because of a reduced project area, fewer impacts on cultural resources would occur compared to the SMP EIS/EIR.

Table 3-1 summarizes impact determinations and the need for mitigation measures for restoration projects by resource area, based on the analysis in this addendum and compared to the SMP EIS/EIR. Appendix A provides a list of the environmental commitments and BMPs from the SMP EIS/EIR that are incorporated throughout the analysis in this addendum.

Table 3-1. Impacts of Restoration Project by Resource Area of the Proposed Project Compared to the Final SMP EIS/EIR

Resource	Significance after Mitigation (Proposed Project/Final SMP EIS/EIR) ¹	Would Require Substantially Different or New Mitigation Measures for the Proposed Project?
Water Supply, Hydrology, and Delta Water Management	LTS/LTS	No
Water Quality	LTS/LTS	No
Geology and Groundwater	LTS/LTS	No
Flood Control and Levee Stability	LTS/LTS	No
Sediment Transport	LTS/LTS	No
Transportation and Navigation	LTS/LTS	No
Air Quality	LTS with Mitigation/LTS with Mitigation	No
Noise	LTS/LTS with Mitigation	No
Greenhouse Gas Emissions and Climate Change	LTS/LTS	No
Fish	LTS/LTS	No
Recreational Resources	LTS/Not Applicable	No
Vegetation and Wetlands	LTS/LTS	No
Wildlife	LTS/LTS	No
Land Use and Delta Plan Policies	LTS/LTS	No
Utilities and Public Services	LTS with Mitigation/LTS with Mitigation	No
Visual/Aesthetic Resources	LTS/LTS	No
Cultural Resources	LTS/SU with Mitigation	No
Public Health and Environmental Hazards	LTS with Mitigation/LTS with Mitigation	No
Growth-Inducing Impacts, Including Population and Housing	NI ²	No
Cumulative Impacts	LTCC/CC	No

Notes:

NI = No Impact; LTS = Less than Significant; SU = Significant and Unavoidable; LTCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable

¹ The impact determinations summarized in this table reflect the most severe impact determination.

² The SMP EIS/EIR did not evaluate these specific impacts listed in the CEQA *Appendix G Environmental Checklist Form* because activities under the SMP would not result in direct or indirect population growth, the construction of homes, or the displacement of people.

3.3 RESOURCES

The analysis in this addendum focuses on the changes to impacts on the environment that could occur by implementing the Proposed Project under the SMP EIS/EIR. The scope of analysis contained in this chapter addresses each environmental resource area that previously was analyzed in the SMP EIS/EIR. The following sections summarize the SMP EIS/EIR and present the Proposed Project analysis of specific resource areas.

3.4 WATER SUPPLY, HYDROLOGY, AND DELTA WATER MANAGEMENT

Water supply, hydrology, and Delta water management that could be affected by the Proposed Project and the type and severity of potential impacts on these resources are consistent with those evaluated in the SMP EIS/EIR.

Bays and sloughs in Region 3 of the SMP include Little Honker Bay and Nurse, Denverton, and Luco sloughs. Managed wetland units flood and drain primarily into relatively large to medium-size tidal sloughs and Little Honker Bay in this region of the Marsh (Reclamation 2011).

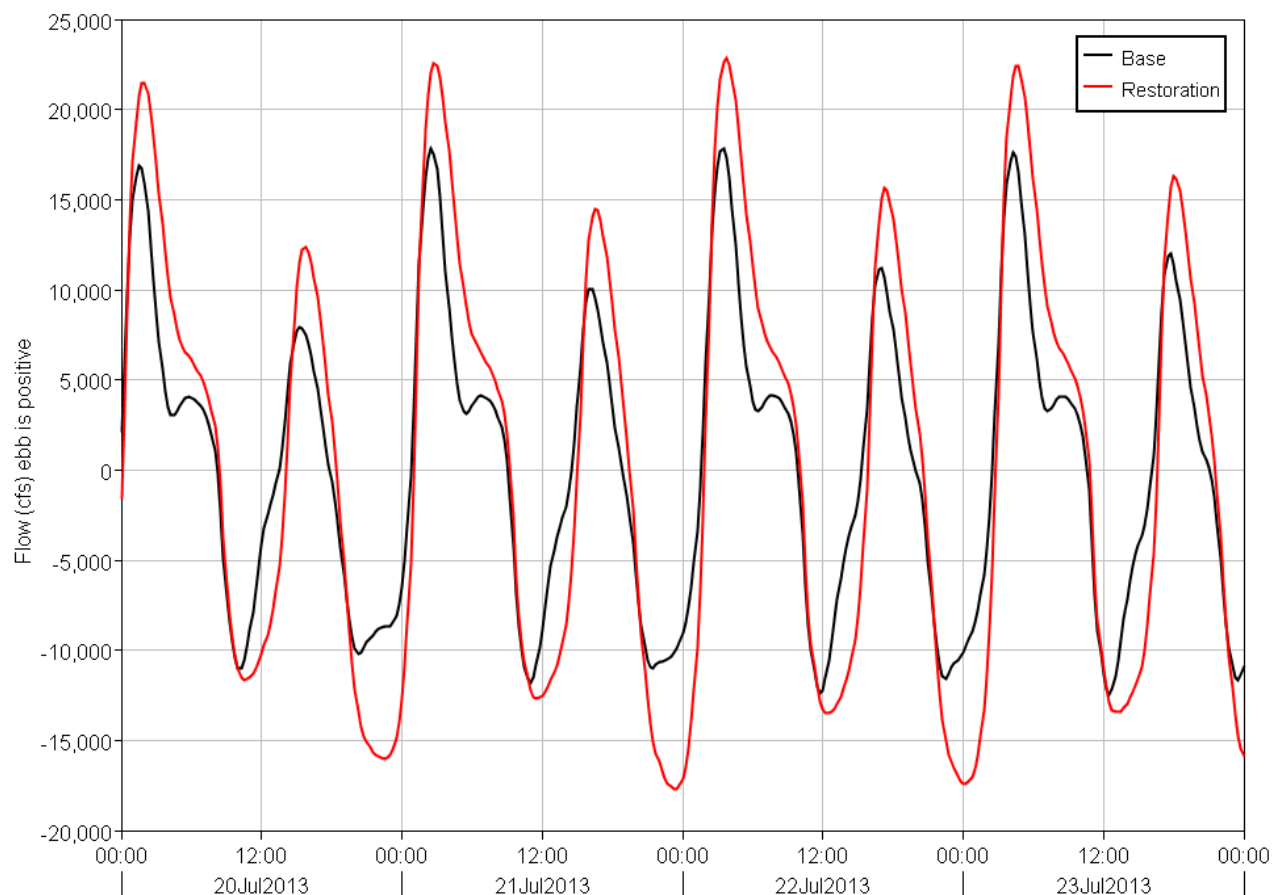
As described in the *Modeling of Local and Regional Impacts of the Proposed Arnold and Bradmoor Island Tidal Marsh Restorations, Suisun Marsh, California* (RMA 2018) (Appendix C), the RMA Bay-Delta numerical model was applied to evaluate local and regional flow and water quality impacts of the proposed Bradmoor Island and Arnold Slough tidal marsh restoration projects for the dry/critically dry period of January through December 2013. This modeling identified changes to water velocities and water stage in local channels.

The SMP EIS/EIR states that a change in average channel velocity to less than 2 feet per second (ft/s) or an increase of more than 1 ft/s in an existing channel would be considered a substantial change in tidal velocities and may result in local sediment scour and deposition. According to the project-specific modeling (Appendix C) (RMA 2018), velocity increases would occur in Nurse Slough, located south of the restoration site. At the location in the channel where the highest velocities would occur, peak ebb tide velocities would increase about 0.9 ft/s, from a baseline of 2.6 ft/s to 3.5 ft/s after restoration (see Figure 3-1). Because this would be below the threshold of 1 ft/s established in the SMP EIS/EIR, this increase would not be considered significant.

Because of the expanded area subject to tidal action, the Nurse Slough tidal prism (volume of water moving through Nurse Slough on flood and ebb tides) would increase by approximately 56 percent (Figure 3-1). This significant and beneficial increase would be an important factor in achieving the Proposed Project's goals and would not generate an adverse environmental effect.

As discussed in the SMP EIS/EIR, the changes in tidal elevation (stage) could affect the timing of water available to managed wetlands. Although the total amount of water available for diversion would not change, changes in tidal elevation could have a small effect on the timing of water availability because of the intertidal location of most managed wetlands in the Marsh. The RMA Bay-Delta model showed that the monthly average MHHW elevation would be reduced by 0.1 foot or less, and the monthly average mean lower low water (MLLW) elevation would increase by 0.06 foot or less. This minor change in tidal elevation would not substantially affect the beneficial use of the water for fish and wildlife in the managed wetlands and would not affect the amount of water supply available for other uses. No new or more severe impact from changes to tidal stage would occur beyond that described in the SMP EIS/EIR.

Consistent with the findings in the SMP EIS/EIR, the impacts of the Proposed Project on water supply, hydrology, and Delta water management would be less than significant. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to water supply, hydrology, and Delta water management. The analysis of potential impacts on water supply, hydrology, and Delta water management in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.



Source: RMA 2018

Figure 3-1. Nurse Slough Flows for Base and Restoration Cases in July 2013

3.5 WATER QUALITY

The SMP EIS/EIR evaluated the effects of implementing the SMP on water quality resulting from habitat restoration activities in the Marsh. The analysis presented in the SMP EIS/EIR addressed both short-term effects related to construction activities and longer-term effects associated with the operation of restored habitat areas.

3.5.1 TURBIDITY

As concluded in the SMP EIS/EIR, remobilization of sediments into the water column caused by restoration activities, such as levee breaching, levee grading, or temporary levee overbuilds, could lead to temporary, localized increases in turbidity. BMPs, as described in Chapter 2 of the SMP EIS/EIR, calling for the use of erosion control materials (e.g., baffles, fiber rolls, or hay bales; temporary containment berms) and erosion control

measures such as straw application or hydroseeding with native grasses on disturbed slopes are expected to minimize the impacts that may occur from increased mobilization of sediments when construction occurs in areas above the water line. Other measures that are implemented during construction as part of the required stormwater pollution prevention plan (SWPPP) or as required by the RWQCB as permit conditions also would contribute to minimizing the potential effects on water quality associated with increased turbidity and sediment mobilization. Because of the short duration of restoration actions, limited extent of local construction activities, implementation of the appropriate BMPs, and environmental commitments to minimize and control erosion, these turbidity impacts would be less than significant. No new or more severe temporary impacts beyond those identified in the SMP EIS/EIR would occur to water quality.

3.5.2 DISSOLVED OXYGEN AND SALINITY

Long-term impacts of the Proposed Project on water quality include changes to dissolved oxygen (DO) and salinity resulting from the conversion of managed wetland to tidal marsh and open water. Tidal restoration is expected to have a beneficial impact on water quality in Marsh channels because it would increase nutrients and primary production in the Marsh. This in turn would increase levels of DO and therefore improve overall water quality. The proposed changes to the Proposed Project would further increase tidal flow into the restoration area, thereby minimizing and avoiding low DO conditions.

The SMP EIS/EIR assumed that a 10 percent change in the baseline salinity value would not be considered significant in an estuarine tidal slough or channel unless the baseline salinity was approaching the maximum monthly objective. Water quality objectives in the Marsh vary by month and location. For Suisun Marsh objectives, the lowest salinity (measured as electrical conductivity [EC] in microsiemens per centimeter [$\mu\text{S}/\text{cm}$]) objective is 8,000 $\mu\text{S}/\text{cm}$ in February and March, so an increase of more than 800 $\mu\text{S}/\text{cm}$ in February or March could be considered significant. For the upper Delta water supply intakes, the salinity objective is 1,000 $\mu\text{S}/\text{cm}$, so the 10 percent guideline would be a change in salinity of more than 100 $\mu\text{S}/\text{cm}$. This guideline is intended to protect the water quality for managed wetland habitat as well as the salinity at Delta drinking water intakes and agricultural diversions.

The SMP EIS/EIR found that restoration of tidal wetlands in the Marsh would increase the tidal flows throughout the Marsh and could increase the salinity in the channels between Suisun Bay and the new tidal wetlands. The magnitude of the salinity effects would depend on the location (and breach connection) of the new tidal wetlands and the size (acreage) of the new tidal wetlands. The modeling performed and the results provided in Appendix A of the SMP EIS/EIR (5,000 to 7,000-acre tidal restoration scenario) found that maximum changes in monthly average salinity in the Marsh resulting from habitat restoration would be less than 10 percent.

The changes in DO and salinity levels resulting from the Proposed Project would be less severe than the changes identified in the SMP EIS/EIR. In 2018, DWR performed additional tidal hydrodynamic simulations of the Proposed Project and its effect on the Delta system (Appendix C) (RMA 2018). The analysis was performed for the dry/critically dry period of January through December 2013, for which hydrodynamics, salinity, residence time, and particle exposure time were modeled.

Salinity impacts from the Proposed Project would include decreases or very small increases in monthly averaged salinity at locations east of Collinsville. Salinity increases of 3 to 4 percent would occur at Collinsville during summer and early fall. Salinity increases would occur at Belden's Landing, particularly when the Suisun Marsh

salinity control gates are operating, because of decreased net flow in Montezuma Slough. Table 3-2 summarizes the modeling results for salinity (RMA 2018).

Table 3-2. Salinity (EC) Modeling Results for the Proposed Project

	Belden's Landing			Sacramento River at Mallard Island			Collinsville		
	Base EC (µS/cm)	Change from Base (µS/cm)	% Change from Base	Base EC (µS/cm)	Change from Base (µS/cm)	% Change from Base	Base EC (µS/cm)	Change from Base (µS/cm)	% Change from Base
Apr 2013	4,426	245	5.5%	1,845	-19.3	-1.0%	567	19	3.4%
May 2013	2,588	396	15.3%	3,223	-59	-1.8%	1,104	9	0.8%
June 2013	6,096	246	4.0%	4,839	-33	-0.7%	1,816	75	4.1%
July 2013	9,421	177	1.9%	7,100	-28	-0.4%	2,983	117	3.9%
Aug 2013	12,120	193	1.6%	8,160	-32	-0.4%	3,542	117	3.3%
Sept 2013	12,884	102	0.8%	7,660	-26	-0.3%	3,347	104	3.1%
Oct 2013	13,936	190	1.4%	10,160	-36	-0.4%	5,156	113	2.2%
Nov 2013	8,156	526	6.4%	11,553	-143	-1.2%	6,356	-52	-0.8%
Dec 2013	7,049	440	6.2%	10,671	-170	-1.6%	5,728	-78.3	-1.4%
	Antioch			Jersey Point			San Andreas Landing		
	Base EC (µS/cm)	Change from Base (µS/cm)	% Change from Base	Base EC (µS/cm)	Change from Base (µS/cm)	% Change from Base	Base EC (µS/cm)	Change from Base (µS/cm)	% Change from Base
Apr 2013	395	-1.7	-0.4%	249	-0.3	-0.1%	201	-0.1	-0.1%
May 2013	622	-10.7	-1.7%	276	-1.5	-0.5%	218	-0.2	-0.1%
June 2013	1,086	-8	-0.7%	362	-3.1	-0.9%	199	-0.4	-0.2%
July 2013	2,079	-1	0.0%	756	-2	-0.2%	250	-0.4	-0.2%
Aug 2013	2,671	4	0.1%	1127	1	0.1%	359	0.3	0.1%
Sept 2013	2,335	5	0.2%	997	2	0.2%	338	0.4	0.1%
Oct 2013	3,130	-2	-0.1%	962	-4	-0.4%	290	-0.7	-0.3%
Nov 2013	3,754	-51	-1.4%	1196	-13.7	-1.1%	355	-2.0	-0.6%
Dec 2013	3,450	-69	-2.0%	1163	-22.3	-1.9%	421	-4.3	-1.0%
	SWP			CVP			Victoria Canal		
	Base EC (µS/cm)	Change from Base (µS/cm)	% Change from Base	Base EC (µS/cm)	Change from Base (µS/cm)	% Change from Base	Base EC (µS/cm)	Change from Base (µS/cm)	% Change from Base
Apr 2013	493	-0.1	0.0%	548	-0.2	0.0%	356	0.0	0.0%
May 2013	328	0.1	0.0%	332	0.0	0.0%	362	0.3	0.1%
June 2013	333	-0.4	-0.1%	387	-0.3	-0.1%	305	-0.1	0.0%
July 2013	298	-1	-0.3%	293	-0.8	-0.3%	240	-0.4	-0.2%
Aug 2013	432	0	-0.1%	400	-0.6	-0.1%	292	-0.2	-0.1%
Sept 2013	498	0	0.0%	483	0.0	0.0%	348	0.0	0.0%
Oct 2013	418	-1	-0.1%	434	-0.4	-0.1%	342	-0.4	-0.1%
Nov 2013	506	-2.3	-0.5%	536	-1.7	-0.3%	408	-1.7	-0.4%
Dec 2013	589	-4.8	-0.8%	665	-3.4	-0.5%	464	-4.0	-0.9%

Notes:

% = percent; µS/cm = microsiemens per centimeter; EC = electrical conductivity; CVP = Central Valley Project; SWP = State Water Project

Source: RMA 2018

The modeling for the Proposed Project indicates that the percent change may exceed 10 percent at Belden's Landing for a brief period in spring if the Suisun Marsh salinity control gates are in operation. Operation of the salinity control gates causes decreased net flow in Montezuma Slough and a dramatic reduction in local salinity, and this was not part of the baseline scenario that was used in the model for comparison. The highest salinity increase was a 15.3 percent increase in salinity (2,984 $\mu\text{S}/\text{cm}$) at Belden's Landing in May 2013, but the salinity was well below the EC objective (11,000 $\mu\text{S}/\text{cm}$) from Water Rights Decision 1641 (SWRCB 2000) and was localized. Locations outside Suisun Marsh showed a slight decrease in salinity.

Modeling results indicate that the Proposed Project would decrease or create minimal increases in monthly average salinity concentrations at locations east of Collinsville. Salinity increases of 3 to 4 percent would be expected at Collinsville during summer and early fall. Salinity increases would be expected at Belden's Landing, particularly when the Suisun Marsh salinity control gates are operating, because of decreased net flow in Montezuma Slough.

The model results show small changes in the Delta during September. Salinity increases in Nurse Slough and around Belden's Landing, while salinity decreases by as much as 9 percent between the head of Montezuma Slough and Nurse Slough. In November, the peak salinity increases in Suisun Marsh are larger and shifted west out of Nurse Slough. Salinity decreases through the central and south Delta range from approximately 0.3 to 1.6 percent. Changes to salinity from the Proposed Project would be within the parameters considered in the SMP, and no new or more severe impacts beyond those identified in the SMP EIS/EIR would occur.

3.5.3 INVASIVE VEGETATION MANAGEMENT

As described in Section 2.6.14 and the attached IVMP (Appendix B), DWR would continue to manage undesirable invasive plants with appropriate management actions, including hand removal, mowing, and, if necessary, spraying herbicides. Hand removal and mowing would not disturb soils and would cause minimal resuspension of silt, having little or no impact on water quality. Improper use of herbicides, however, could have significant impacts on water quality. To avoid potential impacts on water quality, any chemical application would be conducted by a certified chemical applicator, in accordance with State requirements, manufacturer's instructions, standard BMPs recommended by the SRCD, and the RWQCB's General National Pollutant Discharge Elimination System (NPDES) Permit for Residual Aquatic Pesticide Discharges for Algae and Aquatic Weed Control Applications (Order No. 2013-0002-DWQ, NPDES No. CAG990005).

3.5.4 SUMMARY

Implementing the following environmental commitments identified for water quality in the SMP EIS/EIR (described in Appendix A of this addendum) and those identified in the IVMP (Appendix B) would reduce potential adverse impacts to less-than-significant:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-2: Access Points/Staging Areas
- ▶ EC-3: Erosion and Sediment Control Plan
- ▶ EC-4: Stormwater Pollution Prevention Plan
- ▶ EC-9: Hazardous Materials Management Plans

Consistent with the findings in the SMP EIS/EIR, less-than-significant impacts would occur on water quality from implementing the Proposed Project. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to water quality. The analysis of potential water quality impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.6 GEOLOGY AND GROUNDWATER

Geology and groundwater resources that could be affected by the Proposed Project and the type and severity of potential impacts on these resources are consistent with those evaluated in the SMP EIS/EIR. Based on the environmental commitments in the SMP EIS/EIR (provided in Appendix A) and the expected construction practices and outcomes of restoration activities, the SMP EIS/EIR determined that restoration would have a less-than-significant impact related to geology, seismicity, soils, minerals, and groundwater.

3.6.1 SURFACE FAULT RUPTURE, SEISMIC GROUND SHAKING, OR LIQUEFACTION

The Kirby Hills Fault runs through Bradmoor in a north-south direction, and the Vaca Fault runs through Arnold and Blacklock in a north-south direction. Both faults are considered potentially active, meaning that they have exhibited evidence of movement over the last 2.6 million years (during the Quaternary Period). The Cordelia and Green Valley faults are approximately 12 miles west of the project site, and both are considered active (i.e., exhibiting evidence of movement within the last 11,700 years) (Jennings and Bryant 2010). Therefore, the project site is in a seismically active area. The Proposed Project would reduce the risk of property damage from seismic activities because levees would no longer function to protect property from inundation. The on-site buildings that are present would be demolished and removed, and no new buildings would be constructed as part of the Proposed Project, thereby reducing the potential for damage to buildings from seismic events. Impacts associated with seismic hazards from the Proposed Project would be within the scope of the seismic hazards impacts that were identified in the SMP EIS/EIR.

3.6.2 LANDSLIDES

The central portion of Bradmoor consists of a knoll of upland habitat that rises considerably (to 110 feet NAVD88) above the surrounding terrain. However, the project area is not within or adjacent to a mapped landslide hazard area, as shown in Figure 3-2 of the SMP EIS/EIR. Furthermore, the Proposed Project would not include construction of any structures that would be occupied, and the existing buildings at the project site would be demolished and removed. Therefore, the Proposed Project would not expose people or structures to new landslide hazards. Impacts associated with landslide hazards from the Proposed Project would be within the scope of the landslide hazards impacts that were identified in the SMP EIS/EIR.



Sources: O'Rear and Moyle 2011; data compiled by AECOM based on CaSIL 2001 and Calwater 2004

Figure 3-2. Locations of University of California, Davis, Suisun Marsh Fish Study Sampling Sites

3.6.3 UNSTABLE SLOPES FROM CUT AND FILL ACTIVITIES

As discussed in Section 2.6.11, the top elevations and slopes of some existing levees at Arnold would be graded down or breached. Levee alterations would be designed and constructed consistent with standard engineering practices, considering the elevation of the tidal berm and the adjacent marsh plain. Soils excavated from the existing levees would be beneficially re-used on-site to fill in the existing borrow ditches adjacent to the levees. This would create consistent slopes to marsh plain elevation or ditch blocks, which would reduce potential erosion and improve tidal function in the restored tidal wetlands. Similarly, the beach seine monitoring ramp and stockpiles would be designed and constructed based on the soil properties, according to standard engineering practices. Therefore, project-related activities would not create unstable cut or fill slopes. Impacts associated with construction on unstable soils by the Proposed Project would be within the scope of the soils impacts that were identified in the SMP EIS/EIR.

3.6.4 ACCELERATED SOIL EROSION

Soils at the project site are clay-rich and are not highly erodible. In addition, wetland vegetation on the restoration sites would help reduce runoff, and avoid and minimize potential introduction of suspended sediment into the water column. Furthermore, DWR would implement an erosion and sediment control plan, consistent with the current engineering standards (Appendix A) and would be required to implement a SWPPP for Clean Water Act compliance, for activities that would disturb an area greater than 1 acre. In addition, restoration sites would be managed to establish vegetation before breaching, which would further limit the potential for soil erosion. Therefore, project activities would not result in accelerated soil erosion. Impacts associated with soil erosion from the Proposed Project would be within the scope of the soils impacts that were identified in the SMP EIS/EIR.

3.6.5 LOSS OF TOPSOIL

Ground disturbance would be confined to the minimum area necessary for project purposes, and, where feasible, topsoil would be removed and stockpiled for on-site re-use. The amount of topsoil lost because of project activities would be reduced to the extent feasible; in consideration of the comparatively small loss of topsoil and the overall project outcome of restoring, enhancing, and preserving marshland ecology (including an intact soil profile, where originally present) over a large area. Thus, project-related impacts would be less than significant. Impacts associated with loss of topsoil from the Proposed Project would be within the scope of the soils impacts that were identified in the SMP EIS/EIR.

3.6.6 REDUCTION IN AVAILABILITY OF NATURAL GAS AND NON-FUEL MINERAL RESOURCES

Based on a review of natural gas data provided by the California Division of Oil, Gas, and Geothermal Resources (DOGGR 2018), the western half of Bradmoor and the southwestern tip of Blacklock are within the Kirby Hills Gas Field. Three plugged natural gas wells and three dry holes¹ are on Bradmoor. Two dry holes are on Blacklock (east of the Kirby Hills Gas Field boundary). The nearest actively producing natural gas well, which is in the Kirby Hills Gas Field, is approximately 0.75 mile south of Blacklock. Because the data reviewed show that all of the natural gas wells at the project site have been plugged and abandoned, and that all of the exploratory wells at

¹ Dry holes either did not produce natural gas, or they did not produce this commodity in paying quantities.

the project site and in the immediate vicinity were dry holes, any new commercially viable sources of natural gas are unlikely to be present at the project site. Furthermore, as shown in Figure 3-2 of the SMP EIS/EIR, no known aggregate mineral resources are in the project area. Therefore, project activities would have no impact on mineral resources. Impacts associated with loss of mineral resources from the Proposed Project would be within the scope of the mineral resources impacts that were identified in the SMP EIS/EIR.

3.6.7 POTENTIAL FOR ALTERED SALINITY OR CHANGES TO SUBSURFACE GROUNDWATER ELEVATIONS IN SHALLOW SUISUN MARSH GROUNDWATER

The project site overlies a portion of the Fairfield–Suisun Groundwater Subbasin. This subbasin encompasses the SMP planning area and the cities of Suisun City and Fairfield. Few public groundwater wells are in the vicinity of the project area, and data from these wells has focused primarily on groundwater elevations rather than groundwater quality. Therefore, groundwater quality data in the project vicinity is limited. Groundwater elevation data indicate that aside from seasonal groundwater elevation changes because of drawdown from agricultural irrigation in summer and subsequent replenishment from winter rainfall, groundwater elevations generally are stable from year to year (SCWA 2018.) In the Suisun City area northwest of the project site at the edge of the Marsh, groundwater is not used for domestic or irrigation purposes and is not considered to be a viable source for domestic water because of tidal inflows that affect water quality. Groundwater in the area is brackish and would be unsuitable for use without prohibitively expensive treatment (City of Suisun City 2015:HWQ-7).

The existing groundwater well on the project site, which is no longer functioning, would be demolished and removed, in accordance with State standards as described in *Water Well Standards: State of California. Bulletin 74-81* (DWR 1981), and *California Well Standards: Bulletin 74-90* (DWR 1990). Project-related restoration activities would have no effect on groundwater levels. Restoring tidal connectivity and increasing the acreage of tidal wetland in the Marsh would increase the area exposed to saline and brackish surface water. In normal years, groundwater moves from inland areas toward the Marsh, where it provides freshwater flushing; thus, in most years, restoration likely would have little to no effect on groundwater salinity. In dry periods, when inland recharge is substantially diminished, some potential may exist for increased infiltration of saline waters into the shallow subsurface in the Marsh. This would represent a return from the Marsh's present condition to a more natural hydrologic pattern. Aquifer stratigraphy in the Marsh is not well documented, and thus whether shallow infiltration could affect the producing aquifer is unclear. However, no active municipal or agricultural supply wells are on the project site, and no new wells would be drilled as part of the Proposed Project. Therefore, restoration activities would have a less-than-significant impact on local groundwater conditions.

Implementing the following environmental commitments identified for geology and groundwater in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to a less-than-significant level:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-2: Access Points/Staging Areas
- ▶ EC-3: Erosion and Sediment Control Plan
- ▶ EC-4: Stormwater Pollution Prevention Plan

Consistent with the findings in the SMP EIS/EIR, impacts of the Proposed Project on geology and groundwater would be less than significant. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to geology and groundwater. The analysis of potential geology and groundwater impacts in

the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.7 FLOOD CONTROL AND LEVEE STABILITY

Flood control and levee stability that could be affected by the Proposed Project and the type and severity of potential impacts are consistent with those evaluated in the SMP EIS/EIR.

The Proposed Project will not create any new exterior levees, and thus no levee improvements would be necessary. During project construction, existing levees may be subject to ground-shaking and increased ground pressures from heavy equipment or fill placement. This additional loading may exceed the potential for the existing levee material or levee foundation material to support the levee section (i.e., shear strength) and may cause rapid settling or fracture of the levee section. As described in Chapter 2 of the SMP EIS/EIR, specific project proponents would control construction equipment access and fill placement to maintain acceptable loading, based on the shear strength of the foundation material.

In addition, levee breaching and grading levee elevations down to adjacent marsh plain would create additional tidal channels and wetland habitat. This would be a beneficial change relative to flooding because the channels would have a greater carrying capacity during storm events.

According to the *Modeling of Local and Regional Impacts of the Proposed Arnold and Bradmoor Island Tidal Marsh Restorations, Suisun Marsh, California* (RMA 2018), the Proposed Project would result in a 0.1 foot or less change to the high-water tide stage. This would be an approximately 2 percent change in the vertical difference between high and low tides, estimated by the model and shown in the RMA report (Appendix C). This change would be minimal and consistent with the restoration impacts analyzed in the SMP EIS/EIR.

Implementing the following environmental commitments identified for flood control and levee stability in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to a less-than-significant level:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-3: Erosion and Sediment Control Plan

Consistent with the findings in the SMP EIS/EIR, impacts of the Proposed Project on flood control and levee stability would be less than significant. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to flood control and levee stability. The analysis of potential flood control and levee stability impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.8 SEDIMENT TRANSPORT

Conditions related to sediment transport that could be affected by the Proposed Project and the type and severity of potential impacts are consistent with those evaluated in the SMP EIS/EIR.

Ground-disturbing activities, such as earthwork and demolition of the existing structures, could result in the loss of topsoil and erosion. Each new levee breach would experience local scour, as increased volumes of water passed

through the opening on tidal cycles and during flood and heavy runoff events. Some adjacent channels would scour and increase their conveyance areas to supply additional tidal water volumes to the new habitats. In addition, the restoration areas would have greater capacity to trap or accept deposited sediments. An increase in average channel velocity resulting in a velocity more than 2 ft/s or an increase of more than 1 ft/s in an existing channel would result in a significant impact on channel scouring because such increased tidal velocities may result in local sediment scour of fine silt, clay, or sand or cause vegetation disruption. The Bay-Delta Model (RMA 2018) estimated that an increase in tidal velocity of 0.9 ft/s would occur (Appendix C). Therefore, associated channel velocities would remain below the significance threshold, and no significant impact would occur. No new or more severe water quality impact would occur, beyond that identified in the SMP EIS/EIR.

According to the *Modeling of Local and Regional Impacts of the Proposed Arnold and Bradmoor Island Tidal Marsh Restorations, Suisun Marsh, California*, at the point in the channel where highest velocities would occur, peak ebb tide velocities would increase from approximately 2.6 to 3.5 ft/s with implementation of the Proposed Project (RMA 2018) (Appendix C). Thus, sediment transport impacts from the Proposed Project would be consistent with the findings in the SMP EIS/EIR. Regionally, the channels in the Marsh would adjust to accommodate the higher restored tidal flow and would reach a new sedimentation equilibrium over time.

Implementing the following environmental commitments identified for sediment transport in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to a less-than-significant level:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-3: Erosion and Sediment Control Plan
- ▶ EC-4: Stormwater Pollution Prevention Plan (SWPPP)

Consistent with the findings in the SMP EIS/EIR, impacts of the Proposed Project on sediment transport would be less than significant. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to sediment transport. The analysis of potential sediment transport impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.9 TRANSPORTATION AND NAVIGATION

Transportation and navigation resources that could be affected by the Proposed Project and the type and severity of potential impacts on these resources are consistent with those evaluated in the SMP EIS/EIR.

As described in the SMP EIS/EIR, Solano County maintains several roads in the interior Marsh that serve rural developments, managed wetlands, agricultural operations, and other uses. The primary regional roadway serving Bradmoor and Arnold is State Route 12, a rural major arterial to the east and north. The project site can be accessed via some combination of the local roadways, including Little Honker Bay Road and Shiloh Road. The restoration sites are accessed by two gravel roads, located at the intersection of Shiloh Road and Little Honker Bay Road.

Restoration-related construction work would be temporary and would result in sporadic increases in traffic on roadways in the project vicinity. However, the Proposed Project would not result in substantial changes in traffic after restoration construction is completed. For construction impacts, this analysis used the Institute of

Transportation Engineers (ITE) (1988) criterion for assessing temporary construction impacts. To account the large percentage of heavy trucks associated with typical construction projects, ITE recommends a threshold level of 50 or more new peak-direction (one-way) trips during the peak hour. The Proposed Project's peak truck trip volume (38 trips, spread over the construction period of 20–60 days) plus worker commutes (12 per day) would be substantially less than the ITE criterion of 50 per hour one-way trips. Thus, truck and worker traffic would not conflict with an applicable plan, ordinance, or policy, establishing measures of effectiveness for the performance of the circulation system. The Proposed Project would be implemented over the entire 2-year period between 2022 and 2023, avoiding the potential for traffic or navigation impacts to be concentrated in any one area in the project vicinity. The majority of project construction activities would occur on Bradmoor and at Arnold; therefore, no traffic flow would be interrupted significantly on any roadway. Construction-related traffic increases would be minimal relative to roadway capacity, would be temporary, and would occur in an area with low levels of existing traffic.

In addition, this evaluation considered the Transportation and Circulation Element of the *Solano County General Plan* (Solano County 2008). The Proposed Project would not add sufficient trips to degrade existing operations and would not conflict with the County's applicable congestion management program (Solano County 2008), including the level of service standards and travel demand measures, or other standards established by the County for designated roads or highways.

With respect to traffic safety, haul trucks and workers would use existing roads, and no new access roads or other transportation infrastructure would be needed. The paved roads that would be used have been designed to carry high volumes of heavy-duty vehicles, and the Proposed Project would not require changes to the existing roadway design or introduce incompatible uses or traffic hazards. Thus, the safety of the local transportation network would not be affected by hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

In addition, the Proposed Project would not require any road closures. Therefore, traffic flow would not be interrupted significantly on any roadway. Construction-related traffic increases would be minimal relative to roadway capacity and would be temporary. Thus, restoration activities would not impair or interfere with emergency access to local roads and would not result in traffic delays that could increase emergency response times substantially or reduce emergency vehicle access.

Similarly, no public transit, bicycle, or pedestrian facilities are near the project site. Construction-related traffic would be minimal and would not interfere with any transit routes or service, or with the operation of public transit, bicycle, or pedestrian facilities. Therefore, the Proposed Project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, nor would it otherwise decrease the performance of such facilities.

With respect to waterway navigations, Suisun Marsh waterways occasionally are used by emergency service providers. In-channel project work, such as levee breaching, is unlikely to impede access in the major waterways surrounding the site. Construction equipment is not expected to impede emergency access provided over levee roads. On completion of project construction, no changes in emergency access or response times would occur. As described in the environmental commitments in the SMP EIS/EIR, DWR would coordinate with the U.S. Coast Guard and the Solano County Marine Patrol before beginning any activities that may impede their boats, to ensure that response times in the project vicinity would not be affected.

Bradmoor is bordered on the north and east by Denverton Slough, to the west by Nurse Slough, and to the south by Little Honker Bay. Arnold is southeast of Bradmoor and south of Little Honker Bay and is bordered to the west by Blacklock (Figure 2-2). As discussed in Section 2.6.12, the Proposed Project would convert privately owned land to restored marsh and provide access to new navigable waters, accessible by the public (Figure 2-9). This would involve providing public access to an estimated 609 acres of new navigable estuarine waterways traversable by small watercraft, via a nearby launch at Belden's Landing, that would include additional recreation opportunities (e.g., wildlife viewing, nature study, photography, hunting, and boat fishing).

Implementing the following environmental commitments identified for transportation and navigation in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to a less-than-significant level:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-2: Access Points/Staging Areas

Consistent with the findings in the SMP EIS/EIR, no significant impacts on transportation and navigation would result from implementing the Proposed Project. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to transportation and navigation. The analysis of potential transportation and navigation impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.10 AIR QUALITY

Air quality could be affected by the Proposed Project, and the type and severity of potential air quality impacts are consistent with those evaluated in the SMP EIS/EIR. This section describes the current environment as it pertains to air quality and the impacts of restoration activities required on Bradmoor and at Arnold as well as the impacts of adaptive management actions at the Blacklock restoration site on existing air quality in the region.

The current setting and environmental conditions with respect to air quality are similar to those described in the SMP EIS/EIR. The project site is in Solano County, which is part of the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB's boundaries have not changed since the 2011 SMP EIS/EIR, and the climate, meteorology, and precipitation are similar to those parameters described in the SMP EIS/EIR. From year to year, precipitation and average wind speeds vary; however, the overall climate in the region has not changed substantially.

Individual air pollutants at certain concentrations may adversely affect human or animal health, reduce visibility, damage property, and reduce the productivity or vigor of crops and natural vegetation. Since 2011, the U.S. Environmental Protection Agency (EPA) has revised the ambient air quality standards to reflect new health risks and scientific data for particulate matter of 2.5 microns in diameter or less (PM_{2.5}) and ozone. In December 2012, EPA strengthened the annual PM_{2.5} National Ambient Air Quality Standards (NAAQS) from 15 to 12 micrograms per cubic meter. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 parts per million. Although current air pollutant levels within the SFBAAB have changed from 2011 based on changes in land use development, emissions technology, and emission standards, any substantial changes in mass emissions levels and ambient air concentrations are reflected in the current attainment designations of the region, with respect to NAAQS and California Ambient Air Quality Standards (CAAQS).

Irrespective of the more stringent NAAQS and changes in regional emissions, attainment designations for the region are the same as they were when the SMP EIS/EIR was approved. SFBAAB is designated as either in attainment or unclassified for most criteria air pollutants, with the exception of ozone, PM_{2.5}, and particulate matter 10 microns in diameter or smaller (PM₁₀); these pollutants are designated as nonattainment for either the State or national standards (BAAQMD 2017a).

The project site is within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The BAAQMD CEQA Air Quality Guidelines (Guidelines) is an advisory document that provides lead agencies, consultants, and project applicants with recommended procedures for addressing air quality in environmental documents. Since 2011, BAAQMD has updated its previous 1999 CEQA Guidelines to include new and more stringent quantitative thresholds for operation and construction-related criteria air pollutants and precursors, toxic air contaminants (TACs), odors, and greenhouse gases (GHGs) (BAAQMD 2017b). Although the CEQA Guidelines document has been updated since the SMP EIS/EIR, at the time of the air quality analysis for the SMP EIS/EIR, the BAAQMD had proposed draft revised Thresholds of Significance for evaluation of air quality impacts that were approved as part of the 2011 Air Quality Guidelines (BAAQMD 2010). Recommendations in the BAAQMD CEQA Guidelines are advisory and should be followed by local governments at their own discretion. Thus, the BAAQMD CEQA Guidelines may inform environmental review for development projects in the Bay Area, but they do not commit local governments or BAAQMD to any specific course of regulatory action. The thresholds for criteria air pollutants were developed through a quantitative examination of the efficacy of fugitive dust mitigation measures and a quantitative examination of regional nonattainment emissions. The draft revised Thresholds of Significance proposed by the BAAQMD in 2010 were used for the SMP EIS/EIR analysis and are consistent with the current BAAQMD recommended Thresholds of Significance in the 2017 BAAQMD CEQA Guidelines. Another update to the BAAQMD CEQA Guidelines currently is underway.

3.10.1 GENERATION OF CRITERIA AIR POLLUTANT EMISSIONS

The SMP EIS/EIR assessed short-term construction emissions and long-term operational emissions for restoration activities, using the Urban Land Use Emissions Model (URBEMIS) 2007 (version 9.2.4), which was the model recommended at the time in the BAAQMD CEQA Guidelines. Because restoration and management activities had the potential to occur simultaneously, they were modeled as such to determine the maximum potential impact of the SMP implementation on air quality. The air quality analysis in support of the SMP used project-specific data inputs for construction equipment and the construction schedule.

Heavy construction equipment emissions were modeled using the California Emissions Estimator Model (CalEEMod), Version 2016.3.2. CalEEMod is the currently recommended model to evaluate impacts in place of the older URBEMIS model that was used for the SMP EIS/EIR analysis. Project-specific construction information (such as types, number, and horsepower of construction equipment; debris removal; and number and length of off-site motor vehicle trips) was input into the CalEEMod model in place of model defaults. The total criteria air pollutant emissions from the Proposed Project's construction activities are shown in Table 3-3. Additional modeling details and assumptions are provided in Appendix D.

Table 3-3. Summary of Modeled Average Daily Construction-Related Emissions of Criteria Air Pollutants and Precursors

Construction Year	Construction-Related Criteria Air Pollutant Emissions (tons)				
	ROG	NO _x	CO	PM ₁₀ ^a	PM _{2.5} ^a
2022	0.627	5.382	5.423	0.247	0.239
2023	0.327	2.784	2.686	0.122	0.115
Total (tons)	0.955	8.166	8.110	0.369	0.354
Average Daily Emissions (pounds per day)^b	5.0	43.1	42.8	1.9	1.9
BAAQMD significance threshold	<i>54</i>	<i>54</i>	-	82	<i>54</i>
Exceeds Threshold?	No	No	No	No	No

Notes:

ROG = reactive organic gases; NO_x = oxides of nitrogen; CO = carbon monoxide; PM₁₀ = respirable particulate matter with a diameter of 10 microns or less; PM_{2.5} = respirable particulate matter with a diameter of 2.5 microns or less; BAAQMD = Bay Area Air Quality Management District

a. PM₁₀ and PM_{2.5} emissions shown are for exhaust only, per BAAQMD recommended emissions thresholds for construction activities, and because fugitive dust will not be produced on-site because of soil moisture content.

b. Average daily emissions based on total construction-related emissions divided by number of construction work days.

Source: Modeled by AECOM in 2019 (see Appendix D for modeling details)

Post-restoration vegetation management would occur after construction activities are completed and would consist of vegetation control and management. No heavy equipment would be used, and air pollutant emissions would be from worker vehicle trips. Emissions for post-restoration vegetation management were modeled using spreadsheet calculations containing mobile emissions factors that were taken from EMFAC2017, an emissions inventory model that calculates emissions inventories for different vehicle fleets operating on roads in different counties in California. The total criteria air pollutant emissions from the Proposed Project's vegetation maintenance activities are shown in Table 3-4. Additional modeling details and assumptions are provided in Appendix D.

Table 3-4. Summary of Modeled Average Daily Ongoing Operational Maintenance-Related Emissions of Criteria Air Pollutants and Precursors

	Operational Criteria Air Pollutant Emissions				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
Total (tons per year)	0.000	0.001	0.002	0.001	0.000
Average Daily Emissions (pounds per day)^a	0.02	0.15	0.19	0.10	0.03
BAAQMD Daily Significance Threshold	<i>54</i>	<i>54</i>	-	82	<i>54</i>
BAAQMD Annual Significance Threshold	<i>10</i>	<i>10</i>	-	15	<i>10</i>
Exceeds Threshold?	No	No	No	No	No

Notes:

ROG = reactive organic gases; NO_x = oxides of nitrogen; CO = carbon monoxide; PM₁₀ = respirable particulate matter with a diameter of 10 microns or less; PM_{2.5} = respirable particulate matter with a diameter of 2.5 microns or less; BAAQMD = Bay Area Air Quality Management District

a. Average daily emissions based on total construction-related emissions divided by number of construction work days.

Source: Modeled by AECOM in 2019 (see Appendix D for modeling details)

Project construction would result in the temporary increase in emissions of criteria air pollutants. Although the Proposed Project would include a greater amount of construction equipment than was proposed in the SMP EIS/EIR, average daily emissions during project construction and post-construction vegetation management would not exceed the BAAQMD-recommended quantitative Thresholds of Significance (see Tables 3-3 and 3-4, respectively). BAAQMD recommends that all construction projects implement BMPs to reduce fugitive dust, PM₁₀, and PM_{2.5}. These BMPs are discussed in Appendix A, “Environmental Commitments,” and Mitigation Measure AQ-MM-3. Therefore, fugitive dust emissions associated with proposed construction activities are assumed to be minimal and not typical of construction-related fugitive dust emissions.

The SMP EIS/EIR incorporated mitigation measures AQ-MM-1 through AQ-MM-3 to reduce potential impacts to a less-than-significant level, and also included an environmental commitment to air quality BMPs (detailed below) to further reduce potential impacts on air quality. Mitigation measure AQ-MM-1 would require that site preparation only occur on one parcel at a time within the SMP planning area; as this relates to implementation of all projects under the SMP, it would not be applicable to the Proposed Project. Mitigation measures AQ-MM-2 and AQ-MM-3 would be applicable to the Proposed Project. Mitigation measure AQ-MM-2 would limit construction activity to ensure that emissions generated during construction would not exceed the BAAQMD Threshold of Significance for oxides of nitrogen (NO_x) and would require implementation of measures to limit NO_x emissions from construction equipment. Mitigation measure AQ-MM-3 would require implementation of the BAAQMD standard mitigation measures. Although implementation of the Proposed Project would require more total construction equipment than was assumed in the SMP EIS/EIR analysis and mitigation measure AQ-MM-2, emissions generated by construction activities without implementation of mitigation still would be below the BAAQMD Thresholds of Significance. The Proposed Project would be implemented in accordance with the requirements of mitigation measures AQ-MM-2 and AQ-MM-3, and the environmental commitments of the SMP EIS/EIR, further reducing temporary construction-related emissions.

Limited maintenance, monitoring, and management tasks may continue at the project site after construction activities are completed, but they would be limited to periodic mobile trips throughout the year. The level of activity for management and maintenance would not exceed the BAAQMD operational Thresholds of Significance (see Table 3-4).

Consistent with federal regulations and the findings in the SMP EIS/EIR, the Proposed Project emissions estimates also were compared with general conformity Thresholds of Significance. As described in the SMP EIS/EIR, the de minimus thresholds applicable to the Proposed Project are 100 tons per year of ROG, NO_x, PM_{2.5}, and carbon monoxide (CO). Neither construction nor operations-related emissions from the Proposed Project would exceed these de minimus thresholds.

3.10.2 DIESEL HEALTH RISK ASSOCIATED WITH THE PROPOSED PROJECT ACTIVITIES

As described in the SMP EIS/EIR, construction would generate diesel particulate matter (DPM) emissions from the use of off-road, diesel-powered equipment. For this analysis, DPM from diesel-fueled engines is considered to be less than or equal to 10 microns in diameter. Therefore, PM₁₀ represents the upper limit for DPM emissions associated with project construction.

Health risk is a function of the concentration of contaminants in the environment and the duration of exposure to those contaminants. Concentrations of mobile-source DPM emissions typically are reduced by approximately 60 percent at an approximately 300 feet distance (Zhu and Hinds 2002). The nearest sensitive receptor is a residence on Little Honker Bay Road west of Shiloh Road, approximately 250 feet from the nearest construction area; in addition, construction activities would be dispersed throughout the entire 1,097-acre project area, and therefore the majority of construction activities would take place substantially farther than 300 feet from the nearest residences. The risks estimated for an exposed individual would be higher if a fixed exposure occurs over a longer period.

The SMP EIS/EIR found that the health impacts associated with exposure to diesel exhaust from implementing activities would be less than significant because diesel particulate emission rates would be low, the emissions would be distributed over a large geographic area rather than clustered near any individual sensitive receptors, and construction activities would occur sporadically over a 30-year period and would not result in long-term emissions of diesel exhaust in the project area.

Health effects from TACs often are described in terms of individual cancer risk, which is based on a 30-year lifetime exposure to TACs (OEHHA 2015). Project construction activities would occur over 2 years. As shown in Table 3-3, emissions of NO_x and particulate matter (PM) during project construction would not exceed the BAAQMD's recommended Thresholds of Significance and would be further reduced by implementation of Mitigation Measures AQ-MM-2 and AQ-MM-3, and the environmental commitment to air quality BMPs. Consistent with the findings in the SMP EIS/EIR, because of the intermittent and temporary nature of construction activities, and the dispersive properties of TACs, as well as the fact that PM emissions would be far less than the BAAQMD emission Thresholds of Significance, short-term construction activities would not expose sensitive receptors to DPM emission levels that would result in a health hazard. Therefore, the impact would be less than significant. Similarly, operational maintenance activities would occur on an intermittent basis and would include only mobile trips that would contribute emissions dispersed throughout the trip route and account less than one-hundredth of one percent of the total vehicle-miles traveled in Solano County.

3.10.3 CONSTRUCTION-RELATED ODOR

The SMP EIS/EIR identified a potential temporary increase in odors that would be generated by construction-related activities. This analysis determined that environmental commitments would minimize the potential for odor generation, and any temporary generation of odors would not be any more objectionable than naturally occurring odors around the Marsh. The Proposed Project would be consistent with the activities proposed in the SMP EIS/EIR, and construction-related odor impacts would be less than significant.

Overall, impacts related to criteria air pollutant emissions would be within the scope of the impacts that were identified in the SMP EIS/EIR, would be below the existing BAAQMD-recommended thresholds, and would remain less than significant. As described above, Mitigation measures AQ-MM-2 and AQ-MM-3 would be implemented for the Proposed Project. Implementation of these mitigation measures, identified for air quality in the SMP EIS/EIR, would further reduce the above-described less-than-significant impacts. The specific mitigation measures from the SMP EIS/EIR are as follows:

- ▶ **Mitigation Measure AQ-MM-2: Reduce Construction NO_x Emissions.** The project proponent will ensure that construction emissions do not exceed the BAAQMD's construction threshold of 54 pounds per day for

NO_x. Tables 5.7-8 and 5.7-10 in the SMP EIS/EIR show appropriate levels of construction equipment that can be operating at any given time in the Marsh. Such measures include, but are not limited to, the following:

- Implement off-road equipment mitigation, including installing first-tier diesel particulate filters and installing diesel oxidation catalysts to reduce NO_x emissions by 40 percent.
- ▶ **Mitigation Measure AQ-MM-3: Implement All Appropriate BAAQMD Mitigation Measures.** The project proponent will implement BAAQMD standard mitigation measures where appropriate and feasible. These measures include:
 - Cover all haul trucks transporting soil, sand, or other loose materials off-site.
 - Remove all visible mud or dirt track-out onto adjacent public roads.
 - Minimize idling times either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of the California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all points.
 - Maintain all construction equipment in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition before operation.
 - Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Implementing the following environmental commitments identified for air quality in the SMP EIS/EIR (described in Appendix A of this addendum) would further reduce potential adverse impacts to a less-than-significant level:

- ▶ EC-10: Air Quality Best Management Practices
 - EC-10-1: Basic Control Measures
 - EC-10-2: Enhanced Control Measures
 - EC-10-3: Additional Air Quality Best Management Practices

Consistent with the findings in the SMP EIS/EIR, impacts on air quality from the Proposed Project would be less than significant with implementation of the mitigation measures from the SMP EIS/EIR. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to air quality. The analysis of potential impacts on air quality in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support approval of the Proposed Project.

3.11 NOISE

The existing noise setting and the type and severity of potential noise impacts are consistent with those evaluated in the SMP EIS/EIR.

3.11.1 NOISE LEVEL MEASUREMENTS AND NOISE STANDARDS

As described in the SMP EIS/EIR, the project area is surrounded by rivers and agricultural lands. Ambient noise levels are affected by distant traffic and river navigation in the project vicinity. Because of the rural and agricultural nature of the land surrounding the project area, ambient noise levels are expected to be quite low—at or below 55 A-weighted decibels (dBA) equivalent continuous sound level (L_{eq}), 50 dBA L_{eq} , and 45 dBA L_{eq} during the daytime, evening, and nighttime hours, respectively.

Solano County has established policies and regulations concerning the generation and control of noise that could adversely affect its citizens and noise-sensitive land uses. The Noise Element of the County's General Plan contains planning guidelines relating to noise and identifies goals and policies to support achievement of those goals. The Noise Element guidelines relate primarily to land use compatibility with noise sources that are not regulated at the local level, such as traffic, aircraft, and trains. The General Plan includes noise thresholds for permanent facilities and construction-related activities. The maximum allowable noise level from construction equipment typically is 75 dBA at 50 feet. Solano County's Land Use Noise Compatibility Guidelines in the General Plan indicate that less than 70 community noise equivalent level (CNEL) is the normally acceptable standard for water-based recreational uses and that less than 60 CNEL is the normally acceptable standard for residential uses (Solano County 2008).

Solano County's Noise Ordinance is the primary enforcement tool for regulating local noise sources, such as mechanical equipment and construction activity (Solano County 2017). Section 28.1-30, "Interior Noise Standards," indicates that the allowable interior noise standards for residential dwelling units in residential zones or for noise generated by sources outside residential dwelling units is 45 dBA during both daytime and nighttime. Section 28.1-40, "Exterior Noise Standards," indicates that the exterior noise standards for residential and agricultural zones or areas are 55 dBA during the daytime (7 a.m. to 7 p.m.) and 50 dBA during the nighttime (7 p.m. to 7 a.m.). Section 28.1-50, "Specific Noise Regulations," states that construction and demolition activities in a residential district or within a radius of 500 feet are allowed only between 7 a.m. and 6 p.m. from Monday through Friday, and between 8 a.m. and 5 p.m. on Saturday. The noise created by construction activity is not to cause the noise level to exceed a maximum noise at the receiving property line of more than 90 dBA at any time; and any construction that exceeds noise levels of 45 dBA during the daytime and nighttime, and noise levels of 55 dBA during the daytime (7 a.m. to 7 p.m.) and 50 dBA during the nighttime (7 p.m. to 7 a.m.) is to occur between 9 a.m. and 4 p.m. from Monday through Friday.

The ordinance also requires that construction or demolition activity during the times otherwise prohibited may be allowed if the activity is found to be in the public interest. The request for such allowance must be in writing and must set forth detailed facts showing that the public interest will be served by the grant of such an allowance. If the allowance is requested in connection with construction or demolition activities to be undertaken in connection with a land division, use permit, or other discretionary entitlement, the request needs to be submitted as part of the application for such entitlement and must be acted on by the official or decision-making body taking action on such application, after considering the recommendation of the noise control officer. If the allowance is being requested in connection with a building permit, demolition permit, or grading permit and is not in connection with a discretionary entitlement, the request has to be considered and acted on by the noise control officer before the construction or demolition permit is issued.

3.11.2 COMPARISON OF PROJECT NOISE TO THE APPLICABLE NOISE STANDARDS

The Proposed Project would generate temporary and short-term construction noise, primarily from demolition of structures, breaches of varying length on the exterior and interior levees, grading sections of the exterior levees down, and filling in ditches near the breaches. As part of the restoration, a beach seine monitoring ramp would be installed to facilitate effective monitoring on the interior of Arnold. Noise associated with construction activities and pumping operations would be highly localized. Noise from trucks would not be localized and would occur on roads used to access the project site. Noise from project-related truck use may contribute to traffic noise. Because of the small number of construction vehicles that would be used and the sporadic nature of project implementation, project-related traffic noise would be minor.

Restoration noise was estimated using the Federal Highway Administration (FHWA) Roadway Construction Noise Model (FHWA 2006), and a list of construction equipment is shown in Table 3-3. The construction equipment would generate unmitigated noise levels of approximately 81–84 dBA (Bradmoor), and 78–84 dBA (Arnold) at a distance of 50 feet (Table 3-3). Assuming standard spherical spreading loss (-7.5 decibels [dB] per doubling of distance on soft ground), the noise levels at the nearest noise-sensitive uses were estimated to be 45 dBA L_{eq} for site restoration and other construction activities on Bradmoor, and 66 dBA L_{eq} for site restoration and other construction activities at Arnold (Table 3-5). These unmitigated noise levels would exceed the County's threshold of 55 dBA L_{eq} for site restoration and other construction activities at Arnold.

Table 3-5. Calculated Noise Levels at the Nearest Noise-Sensitive Uses

Receiver	Shortest Distance (feet) between Noise-Sensitive Uses and Proposed Construction Areas		Noise Level, dB L_{eq}			
			Exterior		Interior	
			Ambient Noise (assumed)	Maximum Project Construction Noise ^a	Project Noise, Doors/Windows Open ^b	Project Noise, Doors/Windows Closed ^c
Residential Area on Little Honker Bay Road, West of Shiloh Road	From Bradmoor	1,800	55	45	30	20
	From Arnold	250	55	66	51	41

Notes:

dB = decibels; L_{eq} = energy-equivalent noise level (the sound energy averaged over a continuous 15-minute to 1-hour period)

a. Assuming no reduction for the levee shielding.

b. 15 dB reduction for doors/windows open (EPA 1974).

c. 25 dB reduction for doors/windows closed (EPA 1974).

Source: Data compiled by AECOM in 2018

However, these results overstate actual noise exposure because they do not consider noise attenuation associated with ground and atmospheric absorption. Actual construction noise levels would be substantially less because of the area's topography and the presence of earthen levees that project approximately 10 feet higher than the line of sight between the noise source (construction equipment at the site) and the receiver (the nearest home). An earthen berm (such as a levee or railroad berm) can provide noise attenuation up to 15 dBA, if it is several feet higher than the line of sight between the noise source and the receiver (FHWA 2011). Therefore, because of the location of the levees in relation to the noise source and nearby homes, project construction noise levels at the nearest noise-sensitive uses were estimated to be approximately 30 dBA L_{eq} for site restoration and other construction activities on Bradmoor, and 51 dBA L_{eq} for site restoration and other construction activities at Arnold (Table 3-5).

Furthermore, Section 28.1-50 of the County's Noise Ordinance exempts excavation and other construction activities between 7 a.m. and 6 p.m. from Monday through Friday, and between 8 a.m. and 5 p.m. on Saturday. Site restoration and other project-related construction activities would not extend into the nighttime hours (7 p.m. to 7 a.m.), and thus would not exceed the applicable nighttime threshold of 45 dBA. Also, DWR would require the construction contractor to implement standard construction measures (described below) to reduce noise impacts. These measures would include limiting construction to daytime hours as required by the Noise Ordinance, locating stationary equipment (e.g., generators, compressors) as far as possible from noise-sensitive uses, rerouting construction truck traffic away from houses in selected locations as feasible, and minimizing equipment idling time. Therefore, because project noise levels would comply with the applicable daytime and nighttime noise exposure limits established by the Solano County General Plan (Solano County 2008) and Noise Ordinance, the construction noise impacts would be less than significant.

Haul trucks would generate noise on the County roads as they haul material to and from the project area and transport backfill. As described in Section 2.6.1, DWR would remove and properly dispose of approximately 2,830 cubic yards of debris, abandoned equipment, and other structures that could negatively affect the restoration sites on Bradmoor and at Arnold. Buildings, remnant fencing, and structures would be removed and transported by truck to appropriately licensed waste facilities.

This work would require approximately 38 one-way truck trips for the Proposed Project. A maximum of 12 workers per day would commute in passenger vehicles from their places of residence.

Table 3-6 shows the roadways (that likely would be used by haul trucks) and construction traffic noise levels at 50 feet away from the noise source, based on FHWA's Roadway Construction Noise Model (FHWA 2006). The peak truck-trip noise generation would occur when excavated/fill material is being exported from and imported to the project area.

Table 3-6. Construction Truck Traffic Noise Levels at the Nearest Noise-Sensitive Uses

Roadway	Segment	Distance (feet)	Noise Level, dB L _{eq}			
			Existing Traffic Noise (assumed)	Construction Traffic Noise	Existing plus Construction Traffic Noise	Increase, dB
Route—Levee Haul Road to 28th Street (or reverse)						
Litter Honker Bay Road	From project site to Shiloh Road	50	55	50	56	1
Litter Honker Bay Road	From Shiloh Road to Olsen Road/Highway 12	50	55	50	56	1

Notes:

dB = decibels; L_{eq} = energy-equivalent noise level.

The dB increase values presented in bold values are discussed in the text and occur in areas with low baseline traffic levels.

Source: Data compiled by AECOM in 2018

The analysis assumed peak truck trip volume (38 trips, spread over the construction period of 20 to 60 days) plus worker commutes (12 per day). Also, the analysis assumed that construction would occur during an 8-hour workday (7 a.m. to 3 p.m.), and that construction trucks would operate continuously throughout the day. Therefore, based on an even distribution of truck trips throughout the 8-hour workday, the Proposed Project would result in a peak traffic volume of less than one truck trip per hour. Construction worker commute trips

would occur once during the morning commute and once during the afternoon commute. Therefore, peak worker trips would be approximately 12 trips per hour.

Table 3-6 shows the predicted noise levels for 90 truck trips per day. Construction truck traffic would generate unmitigated noise levels of approximately 50 dBA L_{eq} (Table 3-7) at 50 feet from the roadway centerline. The distance of 50 feet was chosen based on field reconnaissance and measurement of the distances from the roadways to backyard areas and open areas of the residences along Little Honker Bay Road. Therefore, traffic noise levels in these areas would not exceed the threshold of 55 dBA L_{eq} . No noise impact would occur.

Table 3-7. Summary of Modeled Daily Construction-Related Emissions of Greenhouse Gas Emissions

Construction Year	MT CO ₂ e/year
2022	1,090
2023	582
Total (MT CO₂e)	1,673
Average Annual (MT CO₂e/year)	836

Notes:

MT CO₂e = metric tons of carbon dioxide equivalent

MT CO₂e/year = metric tons of carbon dioxide equivalent per year

Source: Modeled by AECOM in 2019 (see Appendix D for modeling details)

3.11.3 COMPARISON OF PROJECT NOISE TO THE EXISTING NOISE ENVIRONMENT

The following discussion evaluates project noise, including earthwork for restoration and other construction activities, and transport of construction equipment, earthen material, and workers in comparison to existing ambient noise levels.

Excavation and grading equipment at the restoration site would generate unmitigated noise levels of approximately 84 dBA at a distance of 50 feet (Table 3-3). Assuming a standard spherical spreading loss (-7.5 dB per doubling of distance in soft ground), the noise levels at the nearest noise-sensitive uses were estimated to be 45 dBA L_{eq} for site restoration and other construction activities on Bradmoor, and 66 dBA L_{eq} for site restoration and other construction activities at Arnold (Table 3-6). However, as described above, these results overstate actual noise exposure because they do not consider the elevation difference that blocks the line of sight between the construction areas and the receivers (the nearest homes). Based on FHWA (2011) data, the elevation difference in this area would provide an estimated noise attenuation up to 15 dBA. Therefore, because of the location of the railroad berm in relation to the noise source and nearby homes, construction noise levels at the nearest noise-sensitive receptors would be approximately 30 dBA L_{eq} for site restoration and other construction activities on Bradmoor, and 51 dBA L_{eq} for site restoration and other construction activities at Arnold (Table 3-6). Because of the rural and agricultural nature of the land surrounding the project area, ambient noise levels are expected to be quite low—at or below 55 dBA L_{eq} , 50 dBA L_{eq} , and 45 dBA L_{eq} during the daytime, evening, and nighttime hours, respectively. The estimated project-related construction noise level of 30 to 51 dBA L_{eq} at noise-sensitive uses closest to the site would not increase the exterior ambient noise levels.

Furthermore, DWR would implement standard construction measures (described below) to reduce noise impacts. These measures would include limiting construction to daytime hours as required by the County's Noise

Ordinance, locating stationary equipment (e.g., generators, compressors) as far as possible from the noise-sensitive uses, rerouting construction truck traffic away from houses in selected locations as feasible, and minimizing equipment idling time.

Haul truck noise levels would be approximately 50 dBA L_{eq} (Table 3-6) and would cause existing traffic noise levels of 55 dBA L_{eq} (Table 3-7) to increase by 1 dB along the haul routes. However, this level of increase would not be perceptible. Furthermore, DWR would implement standard construction measures to reduce noise impacts. These measures would be similar to those described in Section 2.5, “Environmental Commitments and Mitigation Measures,” of the SMP EIS/EIR (also described below), and would include limiting hauling to daytime hours, as required by the Noise Ordinance, and avoiding residential areas where practicable. By implementing these measures, the noise impact from the additional haul trucks would be less than significant.

By implementing these standard construction measures, the impact of noise from site restoration and haul trucks (and from the adaptive management actions at the Blacklock restoration site) would be less than significant.

Implementing the following environmental commitments identified for noise in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to a less-than-significant level:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-2: Access Points/Staging Areas
- ▶ EC-5: Noise Compliance

Consistent with the findings in the SMP EIS/EIR, no significant noise impacts would result from implementing the Proposed Project. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to noise. The analysis of potential noise impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.12 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

The Proposed Project could generate GHG emissions, and the type and severity of potential impacts related to GHG are consistent with those evaluated in the SMP EIS/EIR.

This section describes the current environment as it pertains to GHGs and climate change, the impacts of the restoration activities required on Bradmoor and at Arnold related to GHG and climate change, and the impacts of the adaptive management actions at the Blacklock restoration site related to GHG and climate change, and the Proposed Project’s ability to provide anticipated beneficial impacts in response to climate change as considered in Section 5.9 of the SMP EIS/EIR.

The current setting and environmental conditions with respect to GHGs and climate change are similar to those described in the SMP EIS/EIR. The project site is in Solano County, under the jurisdiction of the BAAQMD. The BAAQMD CEQA Air Quality Guidelines (Guidelines) is an advisory document that provides lead agencies, consultants, and project applicants with recommended procedures for addressing air quality and GHG emissions analysis in environmental documents. Since 2011, the BAAQMD has updated its previous 1999 CEQA Guidelines. In accordance with the BAAQMD recommendations, the SMP EIS/EIR quantified GHG emissions, disclosing that GHG emissions would occur during project construction.

The GHG emissions estimate for the SMP EIS/EIR was generated using URBEMIS 2006 (version 9.2.4), the model that was recommended at that time in the BAAQMD CEQA Guidelines. For this addendum, emissions estimates for the Proposed Project's short-term construction activities were modeled using CalEEMod, Version 2016.3.2, the currently recommended model to evaluate impacts, in place of the older URBEMIS model that was used for the SMP EIS/EIR. A summary of the methodology of the analysis for the SMP EIS/EIR and of that for the Proposed Project is presented in Section 3.10, "Air Quality." The data inputs and modeling approaches used for GHG emissions estimates were the same as those described for criteria air pollutants.

The SMP EIS/EIR estimated that approximately 276.3 tons of carbon dioxide (CO₂) per year would be generated from restoration activities and approximately 322.5 tons of CO₂ per year would be generated from management activities. However, these estimates were generated using the outdated URBEMIS emissions model. As shown in Table 3-7, based on emissions modeling using the CalEEMod emissions model, the Proposed Project would generate approximately 1,673 metric tons of carbon dioxide equivalent (MT CO₂e) over the 2 years of construction, or an average of about 836 MT CO₂e per year for the 2-year construction period.

The BAAQMD has not adopted a Threshold of Significance for construction-related GHG emissions. As a point of reference, the BAAQMD operation-related Threshold of Significance for GHG emissions is 1,100 MT CO₂e/year, which applies to long-term generation of emissions. GHG emissions from project construction would be temporary and would be less than the long-term operation-related threshold recommended by BAAQMD. In addition, as identified in the SMP EIS/EIR, construction emissions likely would be offset through changes in net GHG sources and sinks because the Proposed Project would be a tidal restoration habitat project and would become a sink for CO₂. Therefore, generation of GHG emissions from construction activities would not result in a cumulatively significant impact, which is consistent with the analysis in the SMP EIS/EIR.

Post-restoration vegetation management would require intermittent mobile trips that would generate approximately 1.23 MT CO₂e/year (see Appendix D for modeling details). As noted above, the BAAQMD operation-related Threshold of Significance applicable to long-term generation of GHG emissions is 1,100 MT CO₂e/year. GHG emissions from the Proposed Project's post-restoration vegetation management would be temporary and would be less than the long-term operation-related threshold recommended by BAAQMD.

Consistent with the SMP, the Proposed Project would help maintain and restore natural wetland processes that would enhance ecosystem function. This would increase the capacity of the project area to adapt to changes induced by climate change and would result in a beneficial impact related to loss of wetland habitat, ecosystem health, and flood risk associated with climate change-induced sea level rise.

Consistent with the findings in the SMP EIS/EIR, impacts from the Proposed Project related to GHG emissions and climate change would be less than cumulatively considerable to the significant cumulative impact of global climate change. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to GHG emissions and climate change impacts. The analysis of potential impacts on GHG emissions and climate change in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support approval of the Proposed Project.

3.13 FISH

Fish resources that could be affected by the Proposed Project and the type and severity of potential impacts on fish are consistent with those evaluated in the SMP EIS/EIR.

As summarized in the SMP EIS/EIR, implementing the SMP (including the Proposed Project) would primarily involve levee breaching and grading levee elevations down to restore managed wetlands to tidal wetlands, and vegetation management. These actions may affect fish and fish habitat in Suisun Marsh. Environmental commitments in the SMP EIS/EIR, including avoidance and minimization measures such as using construction work windows, would be implemented to reduce impacts on water quality and fish in the immediate construction area. Therefore, levee breaching and grading levee elevations down would result in less-than-significant impacts. Creating subtidal and low intertidal wetland habitat through tidal restoration would provide resting and foraging habitat for special-status fish species, and aquatic food web benefits. Special-status fish species also would indirectly benefit from increased primary production (i.e., plankton and other plant food sources), flushed from mid- and high-intertidal wetlands into Little Honker Bay and the connecting sloughs.

The SMP EIS/EIR included a plan outlining the need for and intent of monitoring and adaptive management, and general considerations for project proponents. As described in the adaptive management and monitoring plan, DWR would be responsible for monitoring as described in project planning documents. The approach for each restoration action would be determined by the specific lead agency and would be based on the SMP EIS/EIR, project-specific design components, any new information (including that obtained during implementation of the adaptive management and monitoring plan), and other factors. Adaptive management for the proposed project would include fish monitoring.

As described in the SMP EIS/EIR, the following listed and special-status native species occur in Suisun Marsh:

- ▶ Central Valley steelhead (*Oncorhynchus mykiss*)
- ▶ Sacramento River winter-run Chinook Salmon (*Oncorhynchus tshawytscha*)
- ▶ Central Valley spring-run Chinook Salmon (*O. tshawytscha*)
- ▶ Central Valley fall-/late fall-run Chinook Salmon (*O. tshawytscha*)
- ▶ Delta Smelt (*Hypomesus transpacificus*)
- ▶ Longfin Smelt (*Spirinchus thaleichthys*)
- ▶ Sacramento Splittail (*Pogonichthys macrolepidotus*)
- ▶ Green Sturgeon (*Acipenser medirostris*)

The SMP EIS/EIR includes information regarding the status, life history, distribution, and description of any designated critical habitat for these listed and special-status species. The information in the SMP EIS/EIR is current, except for the federal listing for Longfin Smelt, which now is considered to be a candidate for listing. Adult and juvenile Chinook Salmon, steelhead, and Green Sturgeon are known to migrate through Suisun Bay and major sloughs of Suisun Marsh; juveniles are known or have the potential to occur in these waters and in the smaller sloughs and tidal wetlands of the Marsh. Delta Smelt, Longfin Smelt, and Sacramento Splittail are found throughout the Marsh. Subtidal, low-intertidal, low-marsh, mid-marsh, and high-marsh areas all provide habitat for special-status fish species (Reclamation et al. 2011:Section 6.1). The SMP EIS/EIR (in Tables 6.1-4 and 6.1-5) describes life-stage timing for these species in Suisun Marsh and their salinity and velocity tolerances. This information is current; however, Longfin Smelt (adults and juveniles) and Delta Smelt (estuarine-rearing adults

and juveniles) may be found year-round in the project area, including the summer months. In general, juvenile native species use the Marsh as a rearing area in winter and spring, while nonnative species use the Marsh in summer and the early fall months when the water is warmer. The number of native fish found in Suisun Marsh has declined over the years (Moyle et al. 2016; Nobriga and Rosenfield 2016; Reclamation et al. 2011:Section 6.1).

3.13.1 PROJECT-SPECIFIC EXISTING CONDITIONS

The University of California (UC) Davis Center for Watershed Sciences continues to conduct research and monitoring in Suisun Marsh, activities that began under the direction of Dr. Peter Moyle in 1976. DWR has sponsored these efforts through funding since their inception. Data from 2012–2016 UC Davis fish sampling at two stations (DV2 and DV3) in nearby Denverton Slough (Figure 3-2) were used to characterize the fish communities expected in the tidal portions of the project area. The methods used to sample fish in Suisun Marsh are documented in the Suisun Marsh Fish Study Report, conducted for 2015 (O’Rear and Moyle 2017). The first fish sampling method used in Denverton Slough was an otter trawl. The trawl method is very effective at sampling smaller open water and bottom-dwelling species; however, it is not effective at sampling larger species that can swim faster than the trawl and shallow-water shore-dwelling species. The second fish sampling method used at the two Denverton Slough sites was the beach seine, which allowed sampling of shallow-water species and some faster-swimming species.

The Denverton Slough trawl data show the 24 species sampled from 2012 to 2016, 11 of which were native and 13 of which were nonnative (Table 3-8). A total of 4,859 fish were caught (Table 3-8). Three of the four species identified as Pelagic Organism Decline (POD) species were caught in these trawls; Delta Smelt, which is federally listed as endangered, was the only POD species not found in any Denverton Slough trawl. The most abundant species caught in Denverton Slough trawls in the period from 2012 to 2016 was the native Sacramento Splittail; 1,800 individuals were caught (Table 3-8). The second most abundant fish was the nonnative, popular game fish Striped Bass (*Morone saxatilis*); 802 fish were caught.

The Denverton Slough seine data show a total of 26 species sampled from 2012 to 2016. Of these, 13 species were native and 13 were nonnative (Table 3-9). A total of 11,404 fish were caught in seines (Table 3-9). Three of the four species identified as POD species were caught in these seines; the federally listed endangered Delta Smelt was the only POD species not found in any Denverton Slough seines. The most abundant species caught in Denverton Slough seines in 2012 to 2016 were the nonnative Mississippi Silverside (*Menidia audens*); 8,017 individuals were caught (Table 3-9). The second most abundant fish was another nonnative species, Striped Bass; 1,553 fish were caught. The most abundant native species caught in Denverton Slough seines in 2012 to 2016 was the native Sacramento Splittail; 428 individuals were seined (Table 3-9).

Pelagic invertebrates are an important part of productivity in Suisun Marsh, and several species of caridean shrimp, mysids, rotifers, and calanoid copepods, and several species of amphipods (*Corophium* spp.) are common (Hennessy 2009; O’Rear and Moyle 2010). Benthic invertebrates also play an important role in productivity in the project area. Benthic invertebrates that occur in Suisun Marsh include cladocera, amphipods, polychaete worms (*Polychaeta*), several marine mollusks, and a freshwater species of clam (*Corbicula fluminea*) that is present when river inflow is unusually high. In more brackish portions of Suisun Marsh, the invasion of the overbite clam (*Corbula amurensis*) in the late 1980s caused a fundamental shift in the benthic community. Across the San Francisco Bay Estuary as a whole, these clams filter a volume of water equivalent to the entire North Bay one to

two times per day (Schroeter et al. 2006); however, the center of distribution of the overbite clam and other benthic species varies with freshwater flow and the resulting annual salinity regime. Because of these environmental variations, the composition of the benthic invertebrate community at any particular location in the estuary can change substantially from year to year.

Table 3-8. Denverton Slough Fish Sampling Trawl Data by Year

Species	Year					Total
	2012	2013	2014	2015	2016	
American Shad	0	7	41	7	44	99
Black Bullhead	2	1	1	0	0	4
Black Crappie	18	32	111	134	20	315
Channel Catfish	2	0	0	0	0	2
Common Carp	27	25	34	20	4	110
Delta Smelt	0	0	0	0	0	0
Golden Shiner	0	0	1	0	0	1
Goldfish	0	1	0	0	0	1
Longfin Smelt	0	1	0	1	2	4
Mississippi Silverside	0	7	0	6	11	24
Pacific Herring	0	0	2	0	0	2
Prickly Sculpin	43	16	15	4	36	114
Sacramento Blackfish	0	1	1	0	0	2
Sacramento Pikeminnow	0	0	0	0	1	1
Sacramento Splittail	119	173	205	731	572	1,800
Sacramento Sucker	5	11	4	0	1	21
Shimofuri Goby	47	78	4	21	113	263
Shokihaze Goby	3	0	1	0	1	5
Staghorn Sculpin	3	0	1	0	0	4
Starry Flounder	4	3	1	1	4	13
Striped Bass	127	43	93	192	347	802
Threadfin Shad	0	7	24	43	47	121
Threespine Stickleback	4	8	4	0	11	27
Tule Perch	40	81	140	125	143	529
White Catfish	220	119	160	60	10	569
White Sturgeon	0	0	0	0	0	0
Yellow Goby	4	2	5	4	11	26
Total	668	616	848	1,349	1,378	4,859

Changes in the benthos can have major effects on the availability of food for pelagic organisms (Baxter et al. 2008). The incredible filtering capacity of overbite clam is thought to have virtually eliminated the spring phytoplankton bloom (Kimmerer and Orsi 1996) and the summer/fall chlorophyll bloom, and to have caused a shift from a pelagic food web to a benthic one (Thompson 1998). However, the abundance of overbite clam in Suisun Marsh seems to be limited to the major sloughs (Baumsteiger et al. 2017).

Table 3-9. Denverton Slough Fish Sampling Seine Data by Year

Species	Year					Total
	2012	2013	2014	2015	2016	
American Shad	2	5	5	13	17	42
Black Crappie	8	8	11	6	0	33
California Halibut	0	0	0	1	0	1
Channel Catfish	1	0	0	0	0	1
Chinook Salmon	1	0	0	3	6	10
Common Carp	14	17	13	10	0	54
Delta Smelt	0	0	0	0	0	0
Goldfish	4	1	0	0	0	5
Longfin Smelt	1	1	0	0	0	2
Mississippi Silverside	1,644	792	1,469	2,120	1992	8,017
Pacific Herring	0	1	3	0	0	4
Prickly Sculpin	3	7	7	21	9	47
Rainwater Killfish	0	0	0	0	3	3
Sacramento Pikeminnow	0	1	0	1	3	5
Sacramento Splittail	88	13	93	110	124	428
Sacramento Sucker	1	1	0	0	0	2
Shimofuri Goby	14	74	83	123	77	371
Shokihaze Goby	0	0	1	0	0	1
Staghorn Sculpin	6	3	7	0	0	16
Starry Flounder	0	0	0	2	1	3
Striped Bass	502	113	269	200	469	1,553
Threadfin Shad	16	116	35	30	197	394
Threespine Stickleback	15	24	61	60	21	181
Tule Perch	5	8	12	16	9	50
Western Mosquitofish	1	0	3	0	2	6
White Catfish	47	1	0	0	1	49
Yellow Goby	18	22	50	12	24	126
Total	2,391	1,208	2,122	2,728	2,955	11,404

In addition to invertebrates collected in annual UC Davis Suisun Marsh Fish Study otter trawls, CALFED funded a benthic invertebrate study on Suisun Marsh that was implemented by UC Davis, with one year (2004) of data gathered. The most abundant taxa of the benthic communities observed in the study were the overbite clam and several species of segmented worm (Oligochaeta). These were most abundant in the western portion of Suisun Marsh. Overall, the benthic community that was sampled is dominated by filter feeders and detritivores (O'Rear and Moyle 2010). In addition to the samples collected from benthic invertebrate communities in the Marsh, various species of marine shrimp (Caridea) have been caught in otter trawls throughout the sampling years. Five species of caridean shrimp that have been caught are common prey items for fish: *Crangon franciscorum*, *C. nigricauda*, *C. nigromaculata*, *Heptacarpus stimpsoni*, and *Palaemon macrodactylus* (O'Rear and Moyle 2010).

3.13.2 PROJECT-SPECIFIC IMPACTS

The SMP EIS/EIR identified 40 different potential impacts on fish resources, determining that all of those potential impacts would be less than significant or beneficial. Table 3-10 shows the fish resource impacts that were considered.

Table 3-10. Impacts on Fish Considered in the SMP EIS/EIR

FISH-1: Construction-Related Temporary Impairment of Fish Survival, Growth, and Reproduction by Accidental Spills or Runoff of Contaminants (Heavy Metals)
FISH-2: Construction-Related Temporary Reduction of Special-Status Fish Rearing Habitat Quality or Quantity through Increased Input and Mobilization of Sediment
FISH-3: Short-Term Impairment of Delta Smelt Passage and Reduced Availability of Spawning and Rearing Habitat Resulting from Changes in Channel Morphology and Hydraulics Attributable to Restoration Activities
FISH-4: Short-Term Impairment of Chinook Salmon Passage and Reduced Availability of Rearing Habitat Resulting from Changes in Channel Morphology and Hydraulics Attributable to Restoration Activities
FISH-5: Short-Term Impairment of Steelhead Passage and Reduced Availability of Rearing Habitat Resulting from Changes in Channel Morphology and Hydraulics Attributable to Restoration Activities
FISH-6: Short-Term Impairment of Green Sturgeon Passage and Reduced Availability of Holding and Rearing Habitat Resulting from Changes in Channel Morphology and Hydraulics Attributable to Restoration Activities
FISH-7: Short-Term Impairment of Sacramento Splittail Passage and Reduced Availability of Rearing Habitat Resulting from Changes in Velocity Attributable to Restoration Activities
FISH-8: Short-Term Impairment of Longfin Smelt Passage and Reduced Availability of Rearing Habitat Resulting from Changes in Velocity Attributable to Restoration Activities
FISH-9: Temporary Reduction of Delta Smelt Habitat Quantity or Quality through Removal and Destruction of Cover Attributable to Restoration Activities
FISH-10: Temporary Reduction of Chinook Salmon Habitat Quantity or Quality through Removal and Destruction of Cover as a Result of Restoration Activities
FISH-11: Temporary Reduction of Steelhead Habitat Quantity or Quality through Removal and Destruction of Cover as a Result of Restoration Activities
FISH-12: Temporary Reduction of Green Sturgeon Habitat Quantity or Quality as a Result of Restoration Activities
FISH-13: Temporary Reduction of Sacramento Splittail Habitat Quantity or Quality through Removal and Destruction of Cover as a Result of Restoration Activities
FISH-14: Temporary Reduction of Longfin Smelt Habitat Quantity or Quality through Removal and Destruction of Cover as a Result of Restoration Activities
FISH-15: Improved Fish Habitat Due to Increased Dissolved Oxygen Concentrations in Tidal Channels Attributable to Restoration Activities
FISH-16: Salinity-Related Reduction of Delta Smelt Survival, Growth, Movement, or Reproduction Attributable to Restoration Activities
FISH-17: Salinity-Related Reduction of Chinook Salmon Survival, Growth, or Movement as a Result of Restoration Activities
FISH-18: Salinity-Related Reduction of Steelhead Survival, Growth, or Movement as a Result of Restoration Activities
FISH-19: Salinity-Related Reduction of Green Sturgeon Survival, Growth, or Movement as a Result of Restoration Activities
FISH-20: Salinity-Related Reduction of Sacramento Splittail Survival, Growth, Movement, or Reproduction as a Result of Restoration Activities
FISH-21: Salinity-Related Reduction of Longfin Smelt Survival, Growth, Movement, or Reproduction as a Result of Restoration Activities
FISH-22: Disturbance, Injury, or Mortality of Individual Fish Resulting from Work Adjacent to Bodies of Water
FISH-23: Change in Fish Species Composition Attributable to Changes in Salinity or Water Quality from Managed or Natural Wetland Modifications
FISH-24: Change in Benthic Macroinvertebrate Composition Attributable to Changes in Channel Morphology and Hydraulics as a Result of Tidal Restoration
FISH-25: Change in Primary Productivity as a Result of Tidal Restoration
FISH-28: Construction-Related Mortality of Fish from Stranding ²

Notes:

1. Grayed cells indicate impacts for which no further project-specific analysis is required
2. FISH-28 is for managed wetlands but applies to the Proposed Project because the impact would be the same as that described in the SMP EIS/EIR.

Fish stranding impacts identical to FISH-28 could occur for restoration when WCSs on Bradmoor are removed. Fish rescue would be conducted by a biologist, if necessary after consultation with CDFW.

For the majority of these potential impacts on fish, the Proposed Project would not have impacts greater in magnitude or duration than those presented in the SMP EIS/EIR, and no further analysis is required. For example, this applies to breaching-related impacts that would be similar regardless of the location of the project. To address the project-specific potential impacts requiring additional analysis, this addendum provides further analysis of:

- ▶ effects related to tidal hydrology (i.e., tidal exchange and current velocity) on habitat for listed and special-status fish species (FISH-3 through FISH-8), and
- ▶ DO and salinity-related effects on survival, growth, movement, or reproduction of listed and special-status fish species (FISH-15 through FISH-21).

In addition, this addendum provides an analysis of impacts on fish not considered in the SMP EIS/EIR: invasive vegetation management in tidal waters.

3.13.2.1 TIDAL HYDROLOGY–RELATED EFFECTS

The SMP EIS/EIR analyzed the short-term and temporary impacts of restoration-related changes on channel morphology, hydrology, and current velocity, as described in Section 3.5, “Water Quality,” of this addendum. This section expands on those discussions to present a more specific analysis of the long-term habitat alteration that listed and special-status fish could experience. The Proposed Project would alter fish habitat through the restoration of tidal waters; an increase in food web inputs to Little Honker Bay and Nurse Slough; and changes to tidal exchange and salinity in Little Honker Bay, Nurse Slough, Montezuma Slough, and adjoining wetlands.

The Proposed Project would restore tidal hydrology to approximately 476 acres on Bradmoor and approximately 140 acres at Arnold. Much of the restored area would be suitable habitat for fish. In addition, this new tidal wetland area would greatly increase the inputs of nutrients and potential forage items (e.g., detritus, phytoplankton, and invertebrates) for fish into Little Honker Bay and Nurse Slough. The Proposed Project would increase the tidal prism or flood volume of the project area by more than 50 percent, increasing current velocities, improving DO, and increasing the bulk transport of plankton and invertebrates. Juvenile salmonids and Green Sturgeon are much stronger swimmers than many nonnative species (e.g., catfishes, carp, and Black Crappie) and may be able to take advantage of higher current velocities when drift feeding, particularly where in-water structures provide velocity breaks. Delta Smelt and Longfin Smelt likely would move out of higher-velocity habitats to take advantage of newly created, more productive habitat in the smaller sloughs and wetlands where tidal action has been restored. At the same time, restoration of full tidal action also should reduce the habitat suitability for freshwater invasive species that utilize managed wetlands on Bradmoor and at Arnold. Overall, the changes to tidal hydrology caused by the Proposed Project would have long-term beneficial effects on habitat for listed and special-status fish species.

3.13.2.2 DISSOLVED OXYGEN AND SALINITY EFFECTS

As described in Section 3.5, “Water Quality,” harmful low DO levels in Suisun Marsh under baseline conditions are related primarily to annual discharges of poor-quality water from adjacent managed wetlands, such as impounded seasonal waterfowl ponds that have residence times on the order of months (Reclamation et al. 2011: Section 5.2). When these are waters discharged into sloughs with minimal tidal flushing, DO in the sloughs can decrease substantially. Tidal restoration of portions of the Marsh would reduce the likelihood of such low DO conditions. Converting managed wetland to tidal wetland has the potential to increase DO levels in adjoining portions of the estuary, thereby improving overall water quality conditions and resulting in a beneficial effect on fish.

As described in the SMP EIS/EIR, special-status fish species of Suisun Marsh have a wide range of salinity tolerances; thus, salinity changes would need to be large to have significant effects on survival, growth, and movement. Simulations of salinity (i.e., electrical conductivity) were performed for the 2013 calendar year to assess the potential impacts of the Bradmoor and Arnold restorations on local and regional salinity (RMA 2018). As described in Section 3.5, “Water Quality,” salinity impacts of the Proposed Project would include decreases or very small increases in monthly average salinity at locations east of Collinsville. Salinity increases of 3 to 4 percent are expected to occur at Collinsville during summer and early fall, as projected by modeled changes to electrical conductivity (Table 3-2). Salinity would increase at Belden’s Landing, particularly during operation of the Suisun Marsh salinity control gates, because of the decrease in net flow in Montezuma Slough (Table 3-2). In fall, salinity would increase in Nurse Slough and around Belden’s Landing and would decrease by as much as 9 percent between the head of Montezuma Slough and Nurse Slough (RMA 2018). In November, increases in peak salinity in Suisun Marsh would be larger and would shift west out of Nurse Slough.

As described in Section 3.5, monthly salinity changes of 10 percent were established for determining the significance of impacts in the SMP EIS/EIR². The modeling for the Proposed Project (RMA 2018) indicated that the percent change may exceed 10 percent at Belden’s Landing for a brief period in spring, a change that is attributed to operation of the Suisun Marsh salinity control gates, as described in Section 3.5. The maximum differences between the simulated baseline and Proposed Project conditions at the different modeled locations are very small relative to the sensitivity of local fish species that typically are present in Suisun Marsh. Table 3-11 summarizes salinity tolerances for special-status fish species that may use Suisun Marsh.

Longfin Smelt, Delta Smelt, and Sacramento Splittail have levels of tolerance that vary among life stages, with spawning, eggs, and juveniles requiring lower levels of salinity than older fish (Table 3-11). The Proposed Project would decrease salinities (measured as EC) by up to 2 percent in the Delta (upstream from Antioch) during the winter and spring months (RMA 2018), and may incrementally increase the size of suitable spawning areas for these species. For salmonids, this incremental reduction of salinity also may increase areas of suitable foraging during smolt outmigration, which occurs in the late fall and winter months. Adult and juvenile Green Sturgeon have a broad salinity tolerance and would not be affected by project-related salinity changes.

² A 10 percent change in the baseline salinity value would not be considered significant in an estuarine tidal slough or channel unless the baseline salinity was approaching the maximum monthly objective. A 10 percent (or 5 or 20 percent) change in baseline salinity has been considered significant in some previous salinity impact analyses. However, if the baseline monthly salinity is relatively low, the significance criteria would be relatively small. A small change in salinity is not likely to cause concern. On the other hand, salinity that increases by a substantial fraction of the monthly salinity objective potentially would be harmful.

Table 3-11. Salinity Tolerances for Special-Status Fish at Various Life Stages

Species	Adult Tolerance	Larvae/Early Juvenile Tolerance	Spawning	Egg
Longfin Smelt	0 to 53,100 $\mu\text{S/cm}$	2,150 to 29,900 $\mu\text{S/cm}$	0 to 1,000 $\mu\text{S/cm}$	0 to 1,000 $\mu\text{S/cm}$
Delta Smelt	0 to 29,200 $\mu\text{S/cm}$	600 to 3,400 $\mu\text{S/cm}$	0 to 1,000 mS/cm	0 to 8,900 mS/cm
Chinook Salmon	0 to 49,000 $\mu\text{S/cm}$	~ 0 $\mu\text{S/cm}$	Occurs outside Estuarine waters	
Steelhead	0 to 49,000 $\mu\text{S/cm}$	~ 0 $\mu\text{S/cm}$	Occurs outside Estuarine waters	
Sacramento Splittail	0 to 35,000 $\mu\text{S/cm}$	0 to 13,900 $\mu\text{S/cm}$	0 to $\mu\text{S/cm}$	0 to 9,000 $\mu\text{S/cm}$
Green Sturgeon	0 to 49,000 $\mu\text{S/cm}$	1,000 $\mu\text{S/cm}$ for larvae, up to 49,000 $\mu\text{S/cm}$ as juveniles grow	Occurs outside Estuarine waters	

Notes:

Values are converted from parts per thousand (ppt) to electrical conductivity, assuming a temperature of 25°C.

$\mu\text{S/cm}$ = microsiemens per centimeter

Therefore, salinity-related effects of restoration activities on fish survival, growth, movement, or reproduction would be minimal, and may have an overall beneficial effect for special-status fish species. These effects would be within the scope of the impacts identified in the SMP EIS/EIR and therefore would be less than significant.

3.13.2.3 WATER CONTROL STRUCTURE REMOVAL

As described in Sections 2.6.10 and 2.6.11, the Proposed Project would remove some WCSs while using temporary levee overbuilds on the internal side of levees, to provide a safe working environment and reduce water quality and sedimentation impacts during their removal. This activity was not analyzed in the SMP EIS/EIR. Although these temporary levee overbuilds overall would be limited to areas that are nontidal or muted tidal and serve to contain resuspended sediment and protect the water quality of nearby areas, removal of water control structures would cause localized turbidity and resuspend some sediment which in turn could affect fish. The majority of water control structure removal (including the placement of temporary levee overbuilds) would take place on the internal managed pond side of levees. Work on the tidal side of levees would be avoided to the greatest extent feasible and, if required by permit conditions, would be done during low tide when feasible, to avoid or reduce potential impacts. Any impacts on fish as a result of changes in water quality are expected to be similar to, but in greatly reduced magnitude than, the breaching events analyzed in the SMP EIS/EIR under impact FISH-1 and FISH-2.

Compliance with water quality standards and implementation of the erosion control BMPs would ensure that turbidity and suspended sediment levels would meet established water quality objectives for the Marsh. Water control structure removal in fully tidal areas would be avoided to the greatest extent feasible. If work in tidal areas occurs, the in-water work windows provided in Appendix A of this addendum would be observed, working during low tides when feasible, and other BMPs to reduce impacts on water quality impacts would be implemented. Water quality impacts on fish resulting from these activities would be less than significant.

3.13.2.4 INVASIVE VEGETATION MANAGEMENT

As described in the SMP EIS/EIR, the DWR would include measures in the project construction specifications to minimize the potential for introduction of new noxious weeds and the spread of weeds previously documented in the project area. Invasive vegetation management would occur to a limited extent after restoration is completed, as described in Section 2.6.14 and in Appendix B. During that time, vegetation management may occur in tidally influenced areas, and thus may affect water quality in these areas and in turn result in potential impacts on special-status fish that may be present in the vicinity. This vegetation management may include hand removal, mechanical removal (i.e., mowing), or herbicide application. Although hand and mechanical removal could affect nearby waters by introducing vegetative debris or could temporarily increase turbidity by disturbing areas of mud or silt, such impacts would be brief, localized, and much smaller in magnitude compared to other ground disturbing actions that would cause the water quality impacts analyzed in the SMP EIS/EIR, such as levee breaching and grading. Herbicide application methods would be protective of water quality and aquatic organisms, as described in the water quality section. DWR would only use herbicides approved by EPA, following label instructions and EPA-approved protocols. EPA has evaluated the use of these chemicals in various ecosystems and has determined their use to be safe. All herbicide applications would occur during low tide to maximize plant coverage. The non-wetted portion of the plant would be targeted, to minimize the risk of water contamination, and herbicide applications would not occur in tidal mud flats. Only herbicides labeled for aquatic use would be applied in tidal areas. In addition, herbicides in tidal areas would be applied in accordance with the General NPDES Permit for Residual Aquatic Pesticide Discharges for Algae and Aquatic Weed Control Applications (Order No. 2013-0002-DWQ, NPDES No. CAG990005). With implementation of the proposed BMPs, impacts on fish resulting from invasive vegetation management would be less than significant.

3.14 RECREATIONAL RESOURCES

Recreational resources that could be affected by the Proposed Project and the type and severity of potential impacts on these resources are consistent with those evaluated in the SMP EIS/EIR.

As stated in the SMP EIS/EIR, restoration activities that would affect the waterside of exterior levees temporarily could disrupt recreational boating, personal watercraft use, and fishing in the area. In-channel or near-channel work may require the temporary blocking of a portion of the channel to reduce the risk of boating hazards. Restoration activities are not proposed to occur in established recreation areas. The project site historically has been used by waterfowl hunting clubs on private lands, with no public use or access to lands or waterways.

The Proposed Project would add new estuarine recreation opportunities to previously inaccessible areas of Suisun Marsh by converting managed wetlands to navigable waters. This would involve providing public access to an estimated 609 acres of new navigable estuarine waterways, traversable by small watercraft from a nearby launch at Belden's Landing. DWR would install interpretive signs and no-trespassing signs on the Arnold and Bradmoor properties to protect sensitive marsh habitat and to only allow access consistent with navigable waters. Figure 2-9 shows the proposed locations for sign installations and the kayak trail route. Boaters would view the signs from their watercraft but would not be allowed to disembark from their watercraft because of safety concerns and the potential for negative impacts on sensitive plant and wildlife (including protected and endangered species) and their habitats.

Implementing the following environmental commitments identified for recreation in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to less-than-significant:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-7: Recreation Best Management Practices

Consistent with the findings in the SMP EIS/EIR, no significant impacts on recreation would result from implementing the Proposed Project..

3.15 VEGETATION AND WETLANDS

Vegetation and wetland resources that could be affected by the Proposed Project and the type and severity of potential impacts on these resources are consistent with those evaluated in the SMP EIS/EIR.

Proposed activities that could affect vegetation consist primarily of breaching tidal levees at several strategic locations around Bradmoor and Arnold to restore tidal hydrology in managed wetlands; grading levee elevations down; and filling ditches near the breach locations to the elevation of the adjacent marsh plain to create ditch blocks. Additional activities that could affect vegetation or wetlands include breaching and grading interior levees/berms; placing material on the backslope of levees; installing temporary levee overbuilds; temporary stockpiling and sidelaying of soil, construction materials, or other debris; and removing old infrastructure, such as water control structures, modular buildings, and fences and gates in the project area. The potential effects of the Proposed Project on vegetation and wetland resources would be consistent with the impacts that were evaluated in the SMP EIS/EIR (Table 3-12). Furthermore, the Proposed Project would minimize the impacts on special-status plant species and prevent the establishment of invasive plants. These activities would not introduce any new impacts and would not increase the severity of the previously documented impacts.

Table 3-12. Impacts on Vegetation and Wetland Resources Considered in the SMP EIS/EIR

Impact VEG-1: Short-Term Loss or Degradation of Tidal Wetlands and Tidal Perennial Aquatic Communities in Slough Channels Downstream of Restoration Sites as a Result of Increased Scour
Impact VEG-2: Loss or Degradation of Tidal Wetlands Adjacent to Restoration Sites as a Result of Levee Breaching/Grading
Impact VEG-3: Loss of Managed Wetlands as a Result of Tidal Wetland Restoration
Impact VEG-4: Loss of Upland Plant Communities and Associated Seasonal Wetland Habitat as a Result of Tidal Wetland Restoration
Impact VEG-5: Spread of Noxious Weeds as a Result of Restoration Construction
Impact VEG-6: Loss of Special-Status Plants or Suitable Habitat as Result of Tidal Wetland Restoration
Impact VEG-7: Degradation of Native Plant Species and Spread of Invasive Plant Species as a Result of Increased Public Access
Impact VEG-8: Loss or Degradation of Tidal Native Plant Species as a Result of Tidal Muting

Special-status plants were included in the SMP EIS/EIR evaluations, based on the presence of suitable habitat and the species' potential to occur within land cover types identified in the study area (see Table 6.2-3 of the SMP EIS/EIR). The SMP EIS/EIR concluded that the following special-status plant species have the potential to occur in tidal or managed wetlands in the plan area and could be directly or indirectly affected by the SMP and tidal restoration projects:

- ▶ Hispid bird's-beak (*Chloropyron molle* ssp. *hispidum*) (formerly *Cordylanthus mollis* ssp. *hispidus*)
- ▶ Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*)
- ▶ Suisun Marsh aster (*Symphyotrichum lentum*)

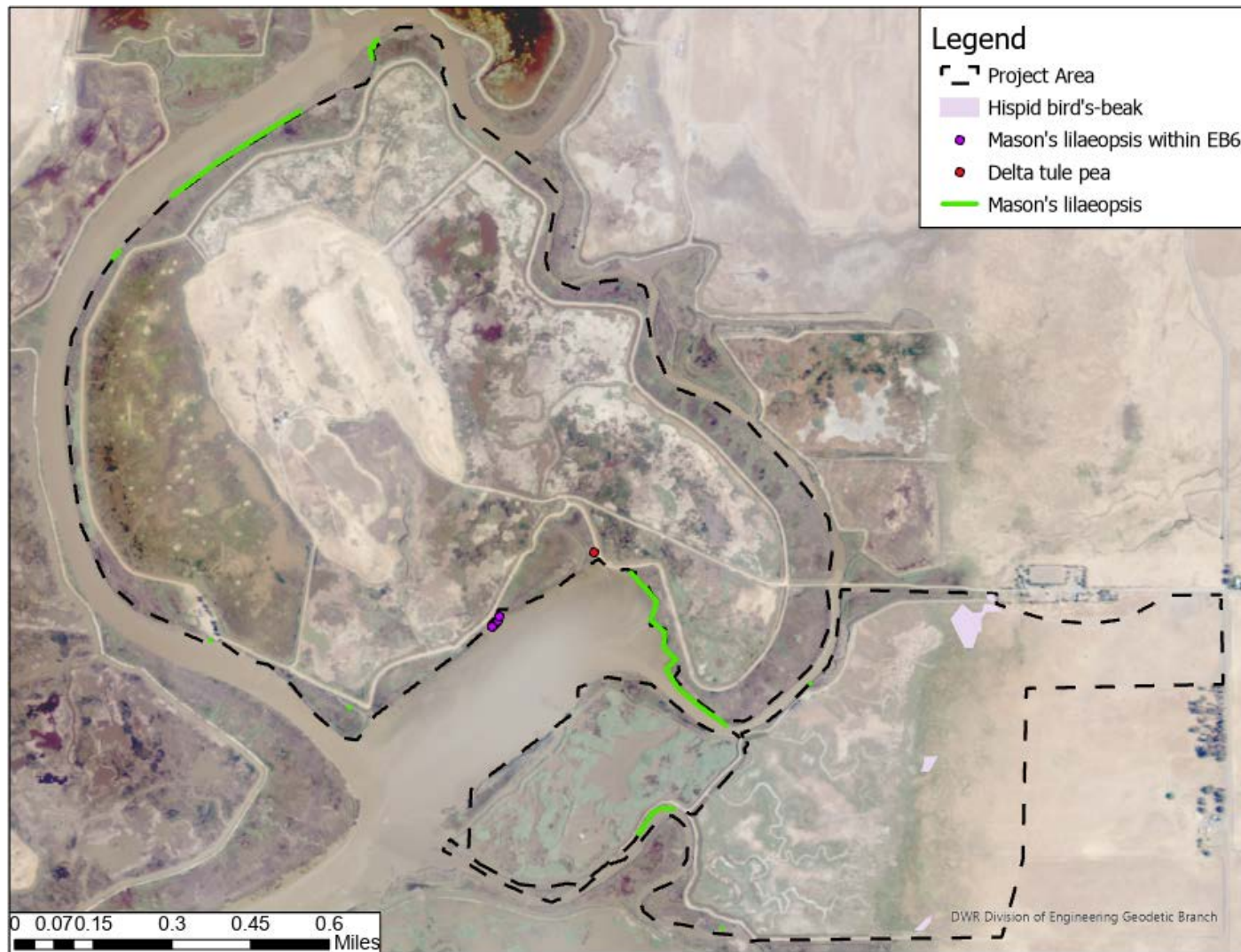
- ▶ Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*)
- ▶ Mason's lilaeopsis (*Lilaeopsis masonii*)
- ▶ Delta mudwort (*Limosella subulata*) (synonym: *Limosella australis*)

The conclusion in the SMP EIS/EIR was based on information in the California Natural Diversity Database and the USFWS and California Native Plant Society databases, as well as past special-status plant surveys that were conducted in the region; however, no special-status plant surveys were conducted specifically for the SMP EIS/EIR. To assess potential impacts on special-status plant populations from the Proposed Project, special-status plant surveys in the project area were conducted by a team of CDFW and DWR biologists on June 18 and June 20, 2018. The surveys documented four special-status plant species in the project area: hispid bird's-beak, Delta tule pea, Mason's lilaeopsis, and Delta mudwort (Figure 3-3). Potential impacts on these four species were analyzed in the SMP EIS/EIR, which included appropriate mitigation measures and environmental commitments to avoid or minimize potential impacts.

Land cover types documented in the SMP EIS/EIR that could be directly or indirectly affected by the SMP include bays, sloughs, tidal wetlands, managed wetlands, riparian areas, uplands, seasonal wetlands, vernal pools, and developed areas. Of those habitat types, tidal wetlands, managed wetlands, and uplands represent the majority area by land cover types within the boundaries of the Proposed Project, and all but vernal pools are present in the project area. As described in the SMP EIS/EIR, tidal wetland restoration projects would result in the loss or conversion of managed wetland or other land cover types to tidal wetlands. Restoration activities would include construction of habitat levees, benches, and other features that would be constructed before levee breaching and would provide some of the habitat functions and values found in managed wetlands. In addition, as the tidal wetlands become established, they would increase a variety of wetland functions and values that would provide habitat and food sources to benefit tidal wetland-dependent species, including the special-status plant species present in the project area.

Implementation of the Proposed Project would result in the conversion of approximately 616.91 acres of managed wetland, upland, and barren habitat to mostly tidal wetland, with some subtidal/open water habitat. Nearly all the existing tidal wetlands on the levee exteriors would remain unchanged. However, an estimated 1.21 acres of existing tidal marsh would be converted to subtidal/open water and 0.58 acre to tidal low marsh/mudflat mosaic at the breach locations. In addition, approximately 9.07 acres of uplands/grassland or disturbed/developed areas would be converted to surface waters and wetland habitat. A detailed breakdown of the Proposed Project's estimated restoration outcome by habitat type is summarized in Section 2.8. The habitat conversions described above are consistent with the impact analyzed and presented in the SMP EIS/EIR for vegetation and wetlands (see Table 6.2-1 of the SMP EIS/EIR).

Implementation of the Proposed Project may affect, but is not likely to affect population of Mason's lilaeopsis on Bradmoor Island because breach EB6 has Mason's lilaeopsis, which would be removed during construction. However, the population in the area is robust and take of the lilaeopsis would be addressed with CDFW. The other special-status plant species that occur in the project area do not have physical activities that would occur in the locations where those populations are located. Therefore, impacts on special-status plants resulting from implementation of the Proposed Project would be less than significant.



Source: Compiled by DWR 2020

Figure 3-3. Special-Status Plants Documented in the Project Area

As described in Section 2.6.14 and Appendix B, DWR would continue to manage undesirable invasive plants with appropriate management actions to maintain and achieve project goals. Vegetation management would include hand removal, mowing, and, if necessary, herbicide spraying. Although the use of herbicides is not addressed in the SMP EIS/EIR, DWR would adhere to the following BMPs to avoid effects on protected species to the greatest extent feasible:

- ▶ Herbicide applications will occur by an authorized and certified aquatic pest control applicator with experience in the Bay-Delta.
- ▶ Herbicides will be applied using precision foliar spray methods from a backpack sprayer; a spray rig attached to a truck, boat, or all-terrain vehicle; or a drone-mounted sprayer, depending on patch size and accessibility. Herbicide label recommendations will be followed regarding tank mixture, application rate, and spray nozzle adjustments; to minimize overspray, spray nozzles will be adjusted to the coarsest setting possible while maintaining efficacy.
- ▶ Herbicide treatment will not occur when wind speeds are greater than 10 miles per hour.
- ▶ All herbicide applications will occur during low tide, to maximize plant coverage, and the non-wetted portion of the plant will be targeted to minimize water contamination.
- ▶ A water-safe dye will be added to the pesticide formulations to enhance the precision and evenness of pesticide applications.
- ▶ Special status plants will be flagged and avoided.
- ▶ Herbicide treatment will not occur in tidal mudflats.

Temporary and permanent impacts on vegetation and wetlands are anticipated from the Proposed Project. Temporary impacts would occur only during the construction period for restoration and enhancement of wetlands. Permanent impacts would cause irreversible changes on land cover types. The SMP EIS/EIR developed criteria for determining significant impacts on biological resources by reviewing the State CEQA Guidelines, concluding that the SMP likely would result in a significant impact if any of the following criteria were met:

- ▶ A net loss of wetland acres, functions, and values, including waters of the United States
- ▶ Substantial loss of occupied special-status species habitat
- ▶ Reduction in the area and functions in the Marsh of rare natural communities
- ▶ A drop in plant populations below self-sustaining levels
- ▶ Spread or introduction of new noxious weed species in the plan area
- ▶ Reduction in the number or a restriction in the range of an endangered, rare, or threatened plant species or plant species of special concern

Implementing the following environmental commitments identified for recreation in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to less-than-significant:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-2: Access Points/Staging Areas
- ▶ EC-3: Erosion and Sediment Control Plan
- ▶ EC-13: Biological Resources Best Management Practices
 - EC-13-1: General Best Management Practices
 - EC-13-2: Worker Training
 - EC-13-3: Special-Status Plant Species Protection
 - EC-13-4: Special-Status Wildlife Species Protection
 - EC-13-4a: Mammals
 - EC-13-4b: Birds
- ▶ EC-14: Biological Monitoring
 - EC-14-1: Construction Period Restrictions
- ▶ EC-15: Nonnative Plant Control

Consistent with the findings in the SMP EIS/EIR, no significant impacts on vegetation and wetlands would result from implementing the Proposed Project. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to vegetation and wetlands. The analysis of potential impacts on vegetation and wetlands in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.16 WILDLIFE

Wildlife that could be affected by the Proposed Project and the type and severity of potential impacts on these resources are consistent with those evaluated in the SMP EIS/EIR.

The following special-status wildlife species (each described in detail in the EIS/EIR, with the exception of tricolored blackbird, which became State-listed as threatened in 2018), would have the potential to occur in the project area and could be affected directly or indirectly by Proposed Project actions:

- ▶ salt marsh harvest mouse (*Reithrodontomys raviventris*)
- ▶ Suisun shrew (*Sorex ornatus sinuosus*)
- ▶ western pond turtle (*Actinemys marmorata*)
- ▶ California black rail (*Laterallus jamaicensis coturniculus*)
- ▶ California Ridgway's rail (*Rallus obsoletus obsoletus*), formerly California clapper rail (*Rallus longirostris obsoletus*)
- ▶ Northern harrier (*Circus hudsonius*)
- ▶ salt marsh common yellowthroat (*Geothlypis trichas sinuosa*)

- ▶ Suisun song sparrow (*Melospiza melodia*)
- ▶ Swainson's hawk (*Buteo swainsoni*)
- ▶ tricolored blackbird (*Agelaius tricolor*)
- ▶ white-tailed kite (*Elanus leucurus*)

The Proposed Project would involve restoration of tidal wetlands, environmental commitments, and adaptive management. Tidal wetlands would be restored by breaching levees in strategic locations, grading levee elevations down, and filling ditches near breach locations to the elevation of the adjacent marsh plain. These actions would contribute to the recovery of special-status wildlife species that occur or have the potential to occur on Bradmoor and at Arnold.

As described in the SMP EIS/EIR, implementing the Proposed Project could adversely affect wildlife resources. Actions to restore tidal wetlands—specifically, breaching levees—initially would result in establishment of tidally influenced habitat. Tidal wetland vegetation and dispersed sediment would become established and reach a new equilibrium over time. Initial impacts on managed wetlands would include conversion from managed wetlands to tidal wetland and open water marine habitat, which would result in a loss of habitat availability and suitability for some wildlife species that forage in the managed wetland habitat (e.g., waterfowl). However, after the project area is converted to tidal wetland, habitat availability and suitability would increase for special-status and other wildlife species that depend on marine, mesohaline, and tidal wetland habitat and resources. This would result in an overall benefit to wildlife and meet the restoration goals of the SMP. As described in Section 2.6.14 and Appendix B, DWR would continue to manage undesirable invasive plants with appropriate management actions, including hand removal, mowing, and, if necessary, spraying herbicides. Any chemical application would be conducted in consultation with a certified chemical applicator, in accordance with State requirements, manufacturer's instructions, standard BMPs recommended by SRCD, and the RWQCB's General NPDES Permit for Residual Aquatic Pesticide Discharges for Algae and Aquatic Weed Control Applications (Order No. 2013-0002-DWQ, NPDES No. CAG990005).

The following actions could cause short-term adverse effects on wildlife, such as loss of special-status species or degradation of habitat:

- ▶ Levee breaching, grading, and other ground-disturbing activities
- ▶ Channel dewatering or installation of temporary water diversion structures
- ▶ Temporary stockpiling and sidecasting of soil, construction materials, or other construction wastes
- ▶ Placing material adjacent to the landside of levees

The Proposed Project would result in temporary and permanent impacts on wildlife resources. Temporary impacts would occur only during the construction and maintenance periods. Potential temporary impacts on wildlife potentially could include harassment from short-term behavioral disruptions caused by habitat disturbance, habitat removal, and noise associated with project activities, such as construction access, installation of new fencing at Arnold, removal of various structures (e.g., wells at Arnold, culverts, debris, bulkheads), filling of borrow ditches, levee grading and breaching, use of staging areas, stockpiling of materials, and vegetation management. Potential permanent impacts could include conversion of habitat types, such as the conversion of managed wetlands to tidal wetlands.

Implementing the following environmental commitments identified for wildlife in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to a less-than-significant level:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-2: Access Points/Staging Areas
- ▶ EC-7: Recreation Best Management Practices
- ▶ EC-13: Biological Resources Best Management Practices
 - EC-13-1: General Best Management Practices
 - EC-13-2: Worker Training
 - EC-13-4: Special-Status Wildlife Species Protection
 - EC-13-4a: Mammals
 - EC-13-4b: Birds
- ▶ EC-14: Biological Monitoring
 - EC-14-1: Construction Period Restrictions

Minor modifications to the BMPs identified in the SMP EIS/EIR have been made, based on consultation with species experts. The new environmental commitments described in Appendix A would be equally protective of the listed species and would not introduce any new significant impacts.

Consistent with the findings in the SMP EIS/EIR, impacts of the Proposed Project on wildlife resources would be less than significant. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to wildlife. The analysis of potential wildlife impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.17 LAND USE AND DELTA PLAN POLICIES

Land uses that could be affected by the Proposed Project and the type and severity of potential impacts on these resources are consistent with those evaluated in the SMP EIS/EIR.

The land use designations for the upland portions of Bradmoor and Arnold and for the remainder of Bradmoor and Arnold are “agriculture” and “marsh,” respectively. The entire Blacklock site is designated as marsh. Bradmoor, Arnold, and Blacklock have a resource conservation overlay. The marsh designation provides protection to marsh and wetland areas and permits aquatic and wildlife habitat, marsh-oriented recreational uses, agricultural activities compatible with the marsh environment and marsh habitat, and restoration of historical tidal wetlands (Solano County 2008:Table LU-5). The agriculture designation provides areas for agriculture as the primary use and allows secondary uses that support the economic viability of agriculture. The resource conservation overlay identifies and protects areas of the county with special resource management needs; this designation recognizes the presence of certain important natural resources while maintaining the validity of underlying land use designations (Solano County 2008:Table LU-5).

In upland locations at Arnold (and on Blacklock before tidal restoration), grazing has occurred since the 1860s. Historically, the combined 240-acre Arnold/Blacklock Ranch pasture supported about 40 cows (up to 80 with calves) year-round, but the site currently lacks the infrastructure to limit them to the uplands. Wetlands at Arnold are currently managed as waterfowl habitat; the wetlands are flooded during fall and drained in spring and kept

dry to allow land management activities during summer. As part of the Proposed Project, new cattle fencing and a gate would be installed at Arnold to manage the movement of cattle in the upland pasture as necessary.

The state rare plant, hispid bird's beak (*Chloropyron molle* ssp. *hispidum*), is present at Arnold in the upland–wetland transition area. This population does not appear to be affected by grazing or trampling. Plant surveys would be conducted as part of the Proposed Project's monitoring plan, and if the soft bird's beak population appears to decline or be harmed by the presence of cattle, cattle would be excluded at Arnold.

The current grazing regime is anticipated to be the same as that before the acquisition of Arnold. To control invasive weeds, it would continue, unless the soft bird's beak population declines or other activities needed at Arnold require a decrease or temporary cessation in grazing.

The Proposed Project's tidal restoration activities would be consistent with the agriculture and marsh land use designations and the resource conservation overlay. Consistent with the SMP EIS/EIR, impacts of the Proposed Project on land use would be less than significant.

3.17.1 CONSISTENCY WITH DELTA STEWARDSHIP COUNCIL'S DELTA PLAN POLICIES

The Delta Plan became effective with legally enforceable regulations on September 1, 2013 (Delta Stewardship Council 2013). The Proposed Project would meet the criteria of a “covered action,” as defined by the Delta Plan and Section 21056 of the Public Resources Code, and therefore would be subject to the policies of the Delta Plan. The proposed covered actions would need to comply with the Delta Plan policies. All Delta Plan policies have been reviewed, and those specific to restoration projects were deemed applicable and selected for inclusion in this analysis. The Proposed Project would not conflict with the applicable Delta Plan policies discussed next.

Consistent with the findings in the SMP EIS/EIR, impacts of the Proposed Project on land use would be less than significant.

DELTA PLAN POLICY NUMBER G P1: DETAILED FINDINGS TO ESTABLISH CONSISTENCY WITH THE DELTA PLAN

Delta Plan Policy Number G P1 requires covered actions that are not exempt from CEQA to include “applicable feasible mitigation measures identified in the Delta Plan's Program EIR (unless the measure[s] are within the exclusive jurisdiction of an agency other than the agency that files the certification of consistency), or substitute mitigation measures that the agency that files the certification of consistency finds are equally or more effective” (Delta Stewardship Council 2013). Therefore, mitigation measures in the Delta Plan's Program EIR were reviewed to determine whether they would be applicable to the Proposed Project.

A review of Delta Plan mitigation measures conducted during the preparation of this addendum determined that the measures either already have been incorporated into the Proposed Project (as environmental commitments or mitigation measures, and as described under relevant Delta Plan policies), where applicable, or would not be applicable to the Proposed Project for the following reasons:

- ▶ They are not specific to the geography of Suisun Marsh. For example, the project site is not within a designated mineral resource extraction area. Therefore, Mitigation Measure 13-1, which, in part, calls for future land use changes within designated mineral resource extraction areas to recognize mineral resource

extraction as a compatible use, and Mitigation Measure 13-2, which is related to maintaining access to active mineral resource extraction sites, would not apply (Delta Stewardship Council 2013).

- ▶ They are not specific to restoration projects. For example, Delta Plan Mitigation Measure 11-7 applies to levee construction projects and projects entailing surface impoundments and fill embankments, and Delta Plan Mitigation Measure 11-8 applies specifically to the construction of on-site wastewater treatment systems (Delta Stewardship Council 2013).
- ▶ Many of the impacts of the Proposed Project and the SMP on resources would be less than significant and thus would not require mitigation (e.g., aesthetics, geology, hydrology, public health and environmental hazards, recreation, water supply/hydrology/Delta water management).
- ▶ Site-specific SMP environmental commitments and/or mitigation measures already have been incorporated into the Proposed Project for various resources, as applicable (see Appendix A). These measures would be equally effective at avoiding and/or reducing impacts on the resources identified throughout this addendum as similar measures identified in the Delta Plan's program EIR.

DELTA PLAN POLICY NUMBER DP P2: RESPECT LOCAL LAND USE WHEN SITING WATER OR FLOOD FACILITIES OR RESTORING HABITAT

The Proposed Project would be consistent with Delta Plan Policy Number DP P2. The Proposed Project would not include the siting of water or flood facilities. The conversion of managed wetlands to tidal wetlands would not be considered an incompatible use with the existing land use designations of the project area or adjacent areas (designated by Solano County primarily as “marsh” and “agriculture” [Solano County 2008:Chapter 2]). Although grazing on Bradmoor would be discontinued, grazing infrastructure at Arnold would allow grazing to continue as part of long-term management. The overall current use of Suisun Marsh in general, and of the project area specifically, for recreational activities (e.g., hunting, boat fishing, wildlife viewing, walking) would not change.

DELTA PLAN POLICY NUMBER ER P2: RESTORE HABITATS AT APPROPRIATE ELEVATIONS

The Proposed Project would be consistent with Delta Plan Policy Number ER P2. Suisun Marsh is one of six priority habitat restoration areas designated by the Delta Plan (Delta Stewardship Council 2013). The Proposed Project would not conflict with the land elevations identified for “intertidal” and “subtidal” in the elevation map of Appendix 4 of the *Draft Conservation Strategy for Restoration of the Sacramento–San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions* (Delta Stewardship Council 2013) because the elevation of the project site is considered to be intertidal and subtidal.

DELTA PLAN POLICY NUMBER ER P3: PROTECT OPPORTUNITIES TO RESTORE HABITAT

The Proposed Project would be consistent with Delta Plan Policy Number ER P3. As discussed under ER P2, Suisun Marsh is one of six priority habitat restoration areas designated by the Delta Plan (Delta Stewardship Council 2013). The conversion of managed wetlands to tidal wetlands under the Proposed Project would be consistent with restoring habitat and would support Policy ER P3 in protecting opportunities to restore habitat.

DELTA PLAN POLICY NUMBER ER P5: AVOID INTRODUCTIONS OF AND HABITAT IMPROVEMENTS FOR INVASIVE NONNATIVE SPECIES

The Proposed Project would be consistent with Delta Plan Policy Number ER P5. Multiple environmental commitments would be implemented to minimize the potential for introduction of new noxious weeds and spread of weeds previously documented in the project area. These environmental commitments, as presented under “EC-15: Nonnative Plant Control” in Appendix A of this addendum, are as follows:

- ▶ Use certified, weed-free, imported erosion control materials (or rice straw in upland areas).
- ▶ Coordinate with the Solano County agricultural commissioner and land management agencies to ensure that the appropriate BMPs are implemented.
- ▶ Educate construction supervisors and managers on weed identification and the importance of controlling and preventing the spread of noxious weeds.
- ▶ Clean all equipment at designated wash stations after leaving noxious-weed infestation areas.
- ▶ Treat isolated infestations of noxious weeds identified in the project area with approved eradication methods at an appropriate time to prevent further formation of seed and destroy viable plant parts and seed.
- ▶ Minimize surface disturbance to the greatest extent possible.
- ▶ Use certified weed-free native mixes for any restoration planting or seeding as may be necessary, as provided in the revegetation plan developed in cooperation with CDFW. Mulch with certified weed-free mulch. Rice straw may be used to mulch upland areas.
- ▶ Use native, noninvasive species or nonpersistent hybrids in erosion control plantings to stabilize site conditions and prevent invasive species from colonizing.

In addition, the Proposed Project would include an adaptive management and monitoring plan that would incorporate practicable and feasible monitoring and approaches to control nonnative invasive species. Furthermore, the restoration would help promote native species suited to a tidal wetland habitat.

3.18 UTILITIES AND PUBLIC SERVICES

Utilities and public services, including electricity and natural gas, water supply, stormwater, wastewater, solid waste disposal, and emergency services, that could be affected by the Proposed Project and the type and severity of potential impacts on these resources are consistent with those evaluated in the SMP EIS/EIR.

No active/operational natural gas wells are in the project area. Bradmoor contains a capped natural gas well that is connected to gas pipeline in the middle of Bradmoor. Energy services, including natural gas and electricity for Solano County, are provided by Pacific Gas and Electric Company (PG&E). A PG&E easement from Shiloh Road to the private residence is immediately adjacent to Arnold, along with the associated power lines. These lines would not be affected by the Proposed Project. All power lines through the project site have been removed.

The Proposed Project would not require construction of new water, wastewater, stormwater drainage facilities, or landfills, and therefore would not affect any public services. Water supply is provided by private groundwater wells. A defunct groundwater well historically provided water for approximately 40 cows (up to 80 calves) year-round and is on the upland portion of Arnold and the adjacent Blacklock Ranch. All features associated with the defunct well, including a windmill, water tanks, and pumps, would be demolished and removed as part of the Proposed Project. Destruction of water wells would be performed in accordance with Solano County regulations and the recommendations of a qualified geotechnical engineer and/or a certified C-57 driller. Proposed activities would be approved by the Solano County Environmental Health Department.

As described in the SMP EIS/EIR, no wastewater infrastructure is in unincorporated Solano County, and wastewater needs are met by self-contained septic systems, installed by individual landowners. Septic tanks and/or chemical composting toilets are at the hunting club on Bradmoor Hill and at the clubhouse on the southwest corner of Bradmoor. These facilities would be removed as part of the Proposed Project. No new contaminants would be introduced to the bay or exceed any RWQCB wastewater treatment requirements.

The Proposed Project's solid waste disposal needs would be served by Potrero Hills Landfill in Suisun City and/or Recology Hay Road in Vacaville, both of which have sufficient capacity to accept the Proposed Project's small volume of solid waste. As stated in the SMP EIS/EIR, project construction is not expected to generate substantial amounts of solid waste, and materials removed from levees would be used on-site as part of the restoration. All solid waste generated by the Proposed Project would be disposed of in accordance with federal, State, and local statutes and regulations.

Consistent with findings in the SMP EIS/EIR, the Proposed Project would result in a temporary increase in the number of construction vehicles traveling on local roadways. These construction vehicles are not expected to cause a substantial reduction in response times by emergency service providers because they would be limited in number and would be active for a limited duration. Thus, they would not be expected to affect emergency services. As stated in the SMP EIS/EIR, any emergency access via water would not be disrupted because the in-water work would not result in channel inaccessibility or other delays. Because the Proposed Project would not involve construction of any residence, buildings, or infrastructure, it would be adequately served by existing emergency service providers and would not create a need for construction of police and fire protection facilities.

Implementing the following environmental commitment identified for utilities and public services in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts, although not to a less-than-significant level:

► EC-1: Standard Design Features and Construction Practices

Consistent with the findings in the SMP EIS/EIR, these potential impacts would be less than significant. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to utilities and public services. The analysis of potential utilities and public services impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.19 VISUAL/AESTHETIC RESOURCES

Visual/aesthetic resources that could be affected by the Proposed Project and the type and severity of potential impacts on these resources are consistent with those evaluated in the SMP EIS/EIR.

A private residence that could be affected by construction activities is immediately adjacent to the Arnold property on the north. Other surrounding properties are used for cattle grazing and waterfowl hunting. The restoration sites are accessed by two gravel roads, located at the intersection of Shiloh and Little Honker Bay roads. The project site is not within view of a State Scenic Highway.

Construction activities for the Proposed Project would occur during daytime working hours from Monday through Friday (7 a.m. to 6 p.m.) and Saturday through Sunday (8 a.m. to 5 p.m.). This would ensure that the Proposed Project would not create a new source of light or glare at night. The timing of restoration construction activities would depend on the type of activity, presence or absence of sensitive resources, tides, and/or water management in wetlands. In general, landside work would occur between July and September, and in-water activities would occur from August through November.

Construction activities for the Proposed Project would create temporary visual impacts. Such activities would include site preparation, which would involve establishing staging and stockpile areas and removing existing infrastructure and waste material; invasive vegetation removal and management operations; other land-based interior island modifications, including installation of new gates and fencing; in-water work; construction of a new boat ramp and beach seine monitoring ramp; breaches of external levees; placement of ditch blocks; and final site grading and finishing. The Proposed Project would establish staging areas for equipment storage and construction materials. The access road used by the private residence likely would become a temporary construction access road to the project site.

All construction and demolition methods and activities would be performed in accordance with the BMPs described further in Appendix A of this addendum. As stated in the SMP EIS/EIR, construction would be temporary and environmental commitments would be implemented; thus, the impact of temporary changes in views during construction would be less than significant. Because the visual effects would be temporary, the impact of project construction activities would be less than significant.

Implementing the following environmental commitments identified for visual/aesthetic resources in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to a less-than-significant level:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-11: Visual/Aesthetic Best Management Practices

Consistent with the findings in the SMP EIS/EIR, either no impacts or less-than-significant impacts on visual/aesthetic resources would result from implementing the Proposed Project.

3.20 CULTURAL RESOURCES

Cultural resources that could be affected by the Proposed Project and the type and severity of potential impacts on cultural resources are consistent with those evaluated in the SMP EIS/EIR.

A cultural resources evaluation of the project area was conducted in March 2018 (Appendix E, “Cultural Resources Report”), and included background research and field inventories. This evaluation determined that seven historic-age built-environment resources are in the project area. Of the built-environment resources, the Bradmoor Island Road Bridge, 322 Overlook Club, 329 Flying D, 330 Wildwing Duck Club, Marsh Gates, Bradmoor Island, and Nurse Slough levee previously were identified classes of architectural features in Suisun Marsh and were identified in the SMP. These groups of classes of architectural features (i.e., engineering structures, duck clubs, dams, and levees) previously were determined not to be eligible for listing in the National Register of Historic Places (NRHP) or California Register of Historical Resources (CRHR) (SHPO 2014). The resources belonging to these classes of architectural features were recorded and evaluated and also have been found ineligible for the NRHP or CRHR. Arnold also was determined to be ineligible for listing in the NRHP or CRHR.

The evaluation also determined that one archaeological site was in the project area. The archaeological remains consist of the 1880s paddleboat *T. C. Walker*, which was re-used as a residence and duck club from the late 1930s to 1973. The archaeological remains of the *T. C. Walker* are in a tidal wetland outside the existing exterior levees on the easternmost side of Bradmoor. Historic research indicates that the integrity of the *T. C. Walker* has been severely compromised. The boilers, engines, and presumably other salvageable materials were removed before the paddleboat was relocated to Bradmoor in the 1930s. A subsequent fire likely destroyed most if not all of the superstructure, and the paddleboat’s current remains are continuously inundated by the tides. Archaeological investigations were not conducted as part of this investigation; however, structural elements may remain, and they could provide information regarding the construction of early paddlewheel/steamers designed to navigate in shallow water in the Sacramento–San Joaquin Delta from the late 1800s into the early 1900s. Because of the potential presence of unique archaeological data that can address questions about the design of these unique vessels, the archaeological remains of the *T. C. Walker* should be preserved in place until they can be properly evaluated for significance under NRHP or CRHR criteria. The Proposed Project would not adversely affect this archaeological site because no ground disturbance would occur near the site and the Proposed Project would not cause further damage from tidal inundation.

The cultural resources evaluation concluded that the Proposed Project would not affect any NRHP-eligible or CRHR-significant resources. In addition, the SMP EIS/EIR determined that only approximately 5 percent of the area of potential effect delineated for the Proposed Project is archeologically sensitive. These areas, located in current marsh environments, consist of the east side of Bradmoor and areas along the northern boundary of Arnold; no activities related to the Proposed Project are planned for these areas.

The potential would remain for the discovery of cultural resources in low-sensitivity areas that may be affected by ground-disturbing activities. If any previously unidentified cultural resources are observed, and if they are determined to be historic properties and ground-disturbing activities would result in adverse effects, DWR as the lead State agency would resolve the effects in accordance with Section 106 of the National Historic Preservation Act (NHPA) or CEQA, as applicable, consistent with the environmental commitment “Cultural Resources” (Chapter 2 of the SMP EIS/EIR). If any significant cultural resources are discovered in the restoration areas, the level of significance after mitigation would depend on the magnitude of the physical effect. In cases where the Proposed Project would affect small portions of the resources, implementing the environmental commitment “EC-12: Inadvertent Discovery of Cultural Resources” (Chapter 2 of the SMP EIS/EIR) would reduce the impact to less than significant. In the event of major damage or destruction of any significant cultural resources, the environmental commitment “EC-12: Inadvertent Discovery of Cultural Resources” would reduce the impact’s

severity, although the impact still could be significant. If the find is determined to be potentially significant under National Environmental Policy Act (NEPA)/CEQA standards, an appropriate treatment plan would be developed to mitigate adverse effects, which would reduce the impact to a less-than-significant level.

Human remains constitute a special class of cultural resource and are protected by State and federal legislation. Human remains have been identified at previously recorded Native American archaeological sites in the overall SMP plan area; however, no evidence of their presence was observed specifically in the project site, and human remains most likely are not present there. However, human remains, particularly those of Native Americans, have occasionally been found in levees because archaeological sites inadvertently have been used as borrow material for levee construction. Although human remains most likely are not present, the procedures to be implemented in the event of the unanticipated discovery of human remains would be consistent with State and federal laws as outlined in the environmental commitment “EC-12: Inadvertent Discovery of Cultural Resources” (Chapter 2 of the SMP EIS/EIR).

Implementing the following environmental commitments identified for cultural resources in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to a less-than-significant level:

- ▶ EC-12: Inadvertent Discovery of Cultural Resources
- ▶ EC-16: Cultural Resources

Impacts from the Proposed Project would be less than significant. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to cultural resources. The analysis of potential cultural resources impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.21 PUBLIC HEALTH AND ENVIRONMENTAL HAZARDS

Public health and environmental hazards that could be affected by the Proposed Project and the type and severity of potential impacts related to these resources are consistent with those evaluated in the SMP EIS/EIR.

Bradmoor includes a building complex consisting of two wood frame buildings, a modular home, and a shed with a partially enclosed carport on the southwestern slope of the uplands. One large building and a small dock/boat launching facility are along the southwestern side of the property. Bradmoor has six WCSs and associated bulkheads, and 10 culverts. A cattle fence and gate are in the uplands. Bradmoor contains a natural gas well that is connected to a gas pipeline in the middle of the site. This well has been capped, a quitclaim has been executed, and any potential hazards associated with past natural gas production have been resolved. The natural gas pipeline has been filled with slurry and welded shut, and the valve and access points have been filled with brick and mortar.

Arnold historically was part of the larger Blacklock Ranch, which traditionally was used for cattle grazing and waterfowl hunting. Existing infrastructure on the property includes an old boat ramp and dock, a dilapidated shack, a windmill, an aboveground water tank and water trough, a pumping structure and pipe, one WCS and bulkhead, one culvert, and cattle gates and fencing. The Arnold property does not contain any natural gas wells; therefore, no active/operational natural gas wells are on the project site.

A search was conducted of SWRCB's GeoTracker and the California Department of Toxic Substances Control's EnviroStor websites to identify toxic releases, hazardous waste, or other violations on or in the vicinity of Bradmoor and Arnold (SWRCB 2018; DTSC 2018). In addition, a search was conducted of EPA's Envirofacts database to identify hazardous waste sites and National Priorities List sites being assessed under the Superfund program (EPA 2018). The records search did not find documentation of known contaminated municipal groundwater wells, leaking underground or aboveground storage tanks, or active or inactive landfills located on, adjacent to, or within one-half mile of Bradmoor or Arnold. No confirmed State or federal Superfund sites were identified within 1 mile of the project area.

Infrastructure removal and internal site modifications would include site preparation activities, such as establishing staging and stockpile areas and access roads; removing existing infrastructure and waste material, including modular structures, features associated with the well, and small amounts of hazardous materials stored in the on-site shed; removing WCSs, culverts, and the old boat dock at Arnold; placing ditch blocks; and completing final grading and finishing of the stockpile. These activities would involve the incidental storage, use, and transport and use of common hazardous materials, such as oils, lubricants, and fuels. If improper handling occurs, construction workers and the environment could be exposed to hazardous materials. Project construction contractors would be required by law to implement and comply with existing hazardous material regulations. Construction contractors would be required to comply with the California Environmental Protection Agency's Unified Program; regulated activities would be managed by the Solano County Environmental Health Department, the designated certified unified program agency for Solano County, in accordance with the regulations included in the Unified Program. Each of these regulations is specifically designed to protect public health through improved procedures for the handling of hazardous materials, better technology in the equipment used to transport these materials, and a more coordinated, quicker response to emergencies.

In addition, all construction and demolition methods and activities would follow the environmental commitments identified in the SMP EIS/EIR (described further in Appendix A of this addendum) that are related to staging areas, spill prevention and control, and hazardous materials management. Staging areas would be established at least 100 feet from water bodies for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants. A spill prevention and control plan would be developed and implemented as part of the SWPPP to minimize effects from spills of hazardous, toxic, or petroleum substances during construction of the Proposed Project. In addition, a hazardous materials management plan would be prepared and implemented to identify the hazardous materials to be used during construction; describe measures to prevent, control, and minimize the spillage of hazardous substances; describe storage and disposal procedures for these substances; and outline procedures to be followed in case of a spill of a hazardous material. Therefore, implementing environmental commitments would reduce the potential adverse impact from exposure of construction workers and the environment to hazardous materials to a less-than-significant level.

The existing wood frame buildings, modular home, and shed may contain asbestos-containing materials, and lead-based paint may have been used on these structures. If any materials containing asbestos or lead are suspected, they would be investigated and removed by an accredited contractor, in accordance with Article 17 Section 36000 and 36100 (lead-based paint) of the CCR and Section 39658(b)(1) of the Health and Safety Code (asbestos). Furthermore, the construction contractor would be required to submit a completed BAAQMD Asbestos Renovation (Removal) and Demolition Notification Form at least 10 working days before demolition and removal begins. The materials containing asbestos and lead would be appropriately disposed of at a permitted off-site disposal facility.

The Proposed Project would require removal of bulkheads. These bulkheads are made of treated lumber that may contain creosote. Treated wood waste (i.e., removed bulkheads) would be cut, removed, stored, handled, and transported in accordance with Section 25143.15 of the California Health and Safety Code and other applicable regulations. All wooden debris created by demolition of bulkheads would be removed and hauled off-site to an appropriately licensed Class 1 or composite-lined portion of a solid waste landfill.

Destruction of the water well would be performed in accordance with Solano County regulations and permits and the recommendations of a qualified geotechnical engineer and/or a certified C-57 driller. Proposed activities would be approved by the Solano County Environmental Health Department. Any water contaminated during destruction would be collected and properly disposed of.

The tidal restoration occurring as part of the Proposed Project would have the potential to increase mosquito production in Suisun Marsh. As discussed in the SMP EIS/EIR, managed wetlands more than tidal wetlands demonstrate characteristics that can lead to increased mosquito production; thus, the change from the baseline managed-wetland condition to tidal wetlands along with appropriate tidal wetland design and the implementation of BMPs for mosquito abatement would reduce the potential for mosquito production. As described in the environmental commitments in Appendix A of this addendum, site-specific plans would be developed to address mosquito production for each restoration activity. These site-specific plans could include developing a management program consistent with marsh-wide management actions for the control of mosquitoes, obtaining an engineering survey to locate depressions that would retain tidal water, and designing site restoration to promote water drainage. The site-specific plans would be implemented before any levee or water control structure is removed or breached. Therefore, implementing environmental commitments would reduce the potential adverse impact associated with increases in mosquito production to a less-than-significant level.

As stated previously, Bradmoor contains a natural gas well that is connected to gas pipeline in the middle of the site. The natural gas pipeline has been filled with slurry and welded shut, and the valve and access points have been filled with brick and mortar. Therefore, no potential would exist for natural gas to be released during construction.

Implementing the following environmental commitments identified for public health and environmental hazards in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to a less-than-significant level:

- ▶ EC-1: Standard Design Features and Construction Practices
- ▶ EC-2: Access Points/Staging Areas
- ▶ EC-4: Stormwater Pollution Prevention Plan
- ▶ EC-8: Mosquito Abatement Best Management Practices
- ▶ EC-9: Hazardous Materials Management Plan

Consistent with the findings in the SMP EIS/EIR, the impacts on public health from implementation of the Proposed Project would be less than significant with mitigation incorporated or no impacts would occur. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to public health and environmental hazards. The analysis of potential impacts on public health and environmental hazards in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.22 GROWTH-INDUCING IMPACTS, INCLUDING POPULATION AND HOUSING

Growth-inducing impacts, including those associated with population and housing, that could be affected by the Proposed Project and the type and severity of potential impacts related to these resources are consistent with those evaluated in the SMP EIS/EIR.

The SMP EIS/EIR did not evaluate population and housing impacts because activities under the SMP would not involve constructing new homes or businesses, extending roadways or other infrastructure, or displacing people. Similarly, the Proposed Project would consist of restoring tidal hydrology on Bradmoor and at Arnold and would not involve constructing new homes or businesses or extending roadways or other infrastructure.

One modular home on Bradmoor is occupied seasonally in winter. This home is to be vacated permanently in the spring of 2020, and then would be removed as part of the Proposed Project. Therefore, removal of this home would not result in displacement of a substantial number of existing houses or people, which would necessitate construction of replacement housing elsewhere.

The source of the construction labor force likely would come from the local labor pool. No additional DWR staff would be required for maintenance of the restoration sites or monitoring and adaptive management activities. Therefore, the Proposed Project would not directly or indirectly induce unplanned population growth.

Consistent with the findings in the SMP EIS/EIR, no growth-inducing or population and housing impacts would result from implementing the Proposed Project. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to growth inducement. The analysis of potential growth inducement impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.23 CUMULATIVE IMPACTS

Section 15130 of the State CEQA Guidelines requires that cumulative impacts be analyzed in an EIR. Cumulative impacts do not refer to project-related impacts, but to the impacts of a proposed project when they are considered with the impacts of past, present, and probable future projects producing related impacts. Cumulative impacts are impacts on the environment that result from the incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions (State CEQA Guidelines Section 15355[b]). Such impacts can result from individually minor but collectively significant actions taking place over time. 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” (State CEQA Guidelines Section 15065[a][3]).

As set forth in Section 15130(b) of the State CEQA Guidelines, “the discussion of cumulative impacts must reflect the severity of the impacts, as well as the likelihood of their occurrence; however, the discussion need not be as detailed as the discussion of environmental impacts attributable to the project alone. The analysis should be guided by the standards of practicality and reasonableness, and it should focus on the cumulative impacts to which the other identified projects contribute to the cumulative impact.” In addition, as per the State CEQA Guidelines, the “mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project’s incremental effects are cumulatively considerable.”

Cumulative impacts that could result from implementation of the Proposed Project would be consistent with those evaluated in the SMP EIS/EIR.

3.23.1 SMP EIS/EIR

The SMP EIS/EIR generated a project list to evaluate cumulative impacts. That list included the following:

- ▶ other tidal restoration projects in the San Francisco Bay Area that could result in impacts and benefits similar to those of the SMP;
- ▶ related projects, including CALFED, Bay Delta Conservation Plan (BDCP)/California WaterFix, Delta Vision, Delta Regional Ecosystem Restoration Implementation Plan, San Francisco Bay Long-Term Management Strategy, Delta Risk Management Strategy, San Francisco Bay Ecosystems Goals, the Delta Plan, and the various USFWS recovery plans for species that use Suisun Marsh;
- ▶ City and County development projects (e.g., new or expanded residential, commercial, or industrial development projects); and
- ▶ regional and local agency infrastructure projects (e.g., water and wastewater facility construction and/or improvements and flood protection projects).

In addition, regional plans were reviewed to characterize development trends and growth projections in Solano County over the 30-year planning period of the SMP. These projects were considered with the SMP to determine whether the combined effects of all of the projects would be cumulatively considerable, and therefore would result in significant cumulative impacts.

The SMP EIS/EIR determined that the combination of all of the projects would have the potential to result in cumulatively considerable impacts on the following resources, depending on project-specific considerations, project design, and geographic conditions:

- ▶ Biological Resources—Fish
- ▶ Biological Resources—Vegetation and Wetlands
- ▶ Biological Resources—Wildlife
- ▶ Water Quality
- ▶ Geology and Groundwater
- ▶ Sediment Transport
- ▶ Transportation and Navigation
- ▶ Air Quality
- ▶ Noise
- ▶ Utilities and Public Services
- ▶ Cultural Resources

The SMP EIS/EIR determined that, for all resources except cultural resources, cumulative impacts either would not occur or the SMP incremental contribution to the cumulative impact would not be cumulatively considerable and significant. This generally is because:

- ▶ SMP restoration activities would be restricted to areas within the Marsh; many of the other projects that could result in cumulatively considerable impacts on resources (such as air quality, biological resources, cultural resources, noise, traffic, water quality, and utilities) would occur well outside the Marsh;
- ▶ SMP restoration activities would occur on a different temporal and geographic scale than some of the restoration and development/infrastructure projects;
- ▶ SMP restoration modeled scenarios' contribution to changes in water quality (i.e., salinity) would not be considerable, and restoration would be subject to the various regulations in place to control salinity in the Marsh and throughout the Delta;
- ▶ SMP restoration activities would include design criteria and environmental commitments to reduce substantial changes related to water supply, water quality, terrestrial and aquatic biological resources, sediment and geology, and transportation and navigation;
- ▶ SMP restoration activities would be small, sporadic, and short term in magnitude over the entire Marsh, through plan implementation;
- ▶ SMP restoration activities would result in an increase in quality and quantity for sensitive terrestrial and aquatic biological resources;
- ▶ SMP restoration activities would implement, as appropriate, mitigation measures related to air quality, cultural resources, and utilities and public services, as described in the SMP EIS/EIR; and
- ▶ SMP restoration activities would not result in impacts on some resource, such as aesthetics, recreation, flood control and levee stability, noise, and land use.

The SMP EIS/EIR determined that for cultural resources, restoration activities would be cumulatively considerable and significant because significant impacts would occur on numerous cultural resources, including the Montezuma Hills Rural Historic Landscape. Impacts on the Montezuma Hills Rural Historic Landscape resource would be especially consequential because several constituent features—some of which would be likely to have individual significance—would be affected by the restoration activities described in the SMP.

3.23.2 PROPOSED PROJECT

Table 3-13 shows wetland and tidal restoration and enhancement projects (the status and projects updated since the time of certification of the SMP EIS/EIR). Several tidal restoration projects have been completed, are under way, or are proposed throughout the San Francisco Bay Area. Each of these restoration projects is expected to increase natural habitats for species that historically have occupied these areas. Because all of them would require a shift in habitat types, they all would have some level of habitat loss associated with conversion. In addition, managed wetland activities have been proposed through the North American Waterfowl Conservation Act and the San Francisco Bay Joint Venture. Associated activities are expected to improve management capabilities and habitat functions and values. Other major projects that could have a restoration component to them also are shown in Table 3-13, such as the BDCP/California WaterFix and the Delta Plan. Table 3-14 shows other projects that were identified in the SMP EIS/EIR that could result in cumulative impacts.

Table 3-13. Updated Wetland Restoration and Enhancement Cumulative Project List

Project	Status at the Time of SMP Certification	County	Total Acres	Current Status
Blacklock Tidal Marsh Restoration	Completed	Solano	70.0	N/A
Decker Island Tidal Habitat Restoration Project	Not Included	Solano	140	Completed, 2017
Dutch Slough Tidal Marsh Restoration Project	Not Included	Contra Costa	1,200	In progress
Hill Slough West Restoration Project	Planned	Solano	223.0	In progress
Honker Bay Conservation Bank	Not Included	Solano	125	Planned
Lower Yolo Ranch Tidal Restoration Project	Not Included	Yolo	1,100	Planned
Mallard Farms Conservation Bank	Not Included	Solano	700	In Progress
Montezuma Wetlands Project	In progress	Solano	2,229.0	
Prospect Island Tidal Restoration Project	Not Included	Solano	1,600	Planned
Tule Red Restoration Project	Not Included	Solano	610	In progress
Wings Landing Tidal Habitat Restoration Project	Not Included	Solano	270	In progress
Winter Island Tidal Habitat Restoration Project	Not Included	Contra Costa	589	In progress
Yolo Flyway Farms Tidal Habitat Restoration Project	Not Included	Yolo	359	Complete

Sources: EcoAtlas 2018; EcoRestore 2019

Table 3-14. Updated Other Projects Cumulative Project List

Project	SMP EIS/EIR Status	Location	Total Acres	Current Status
Sacramento Deep Water Ship Channel Dredging	Planned	Sacramento	-	In progress
Potrero Hills Landfill Expansion Project	Planned	Solano	250	In progress
Industrial Development (south of State Route 12 and north of Cordelia Road)	Planned	Solano	-	In progress

As demonstrated in the analysis in Sections 3. 1 through 3.22 of this addendum, the Proposed Project would not result in impacts not previously disclosed in the SMP EIS/EIR. In addition, the Proposed Project would not result in new significant and unavoidable impacts on any resources, would not require additional mitigation measures not identified in the SMP EIS/EIR, would not result in any new significant and unavoidable impacts not previously disclosed in the SMP EIS/EIR, and would not result in impacts on any resources not previously disclosed in the SMP EIS/EIR. Furthermore, impacts on cultural resources would be less than significant under the Proposed Project because of the baseline conditions and project location, and thus would be reduced when compared to the impact determination disclosed for those resources in the SMP EIS/EIR (i.e., significant and unavoidable).

Implementing the environmental commitments and mitigation measures UTL-MM-1 to UTL-MM-4 (identified for utilities and public services in the SMP EIS/EIR) would reduce potential adverse impacts to a less-than-significant level.

The past, present, and reasonably foreseeable future projects shown in Table 3-13 may result in cumulatively considerable impacts on certain resources. However, for the reasons described in the following list, the Proposed Project is not expected to include activities that would result in a new cumulatively considerable incremental contribution to any significant cumulative impacts or change the cumulative impact analysis and the conclusions in the SMP EIS/EIR. Thus, the Proposed Project:

- ▶ would be restricted to areas within the Marsh; many of the other projects that could result in potentially cumulatively considerable impacts related to resources (such as noise, traffic, utilities and public services, and cultural resources) would occur outside the Marsh;
- ▶ would occur on a different temporal and geographic scale than some of the restoration and development/infrastructure projects shown in Tables 3-13 and 3-14;
- ▶ would include environmental commitments and project-specific monitoring and adaptive management protocols, as intended by the SMP to reduce substantial changes related to water supply, water quality, fish and wildlife species, vegetation and wetlands, and sediment and geology;
- ▶ would be relatively small and short-term in magnitude during construction over the entire Marsh, and thus would have very limited, localized, or temporary effects related to air quality, water quality, fish and wildlife species, vegetation and wetlands, sediment and geology, and hazards and hazardous materials during construction;
- ▶ would benefit listed fish species, including Delta Smelt and Longfin Smelt, and would benefit special-status and native wildlife species; and
- ▶ would not need to implement new mitigation measures related to air quality, cultural resources, noise, public health, or utilities and public services.

3.24 MANDATORY FINDINGS OF SIGNIFICANCE

The analysis in this document concluded that the Proposed Project would not have a significant impact on the environment with implementation of the environmental commitments provided in Appendix A, “Environmental

Commitments,” of the SMP EIS/EIR. As evaluated in Section 3.13, “Fish,” Section 3.15, “Vegetation and Wetlands,” and Section 3.16, “Wildlife,” of this addendum, with implementation of all environmental commitments, the Proposed Project would not substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or reduce the number or restrict the range of an endangered, rare, or threatened species.

As discussed in Section 3.20, “Cultural Resources,” the Proposed Project would not eliminate important examples of the major periods of California history or prehistory, and impacts on cultural resources would be less than significant with implementation of all environmental commitments.

The Proposed Project would result in short-term, temporary impacts that would mainly be limited to the project area. As discussed in Section 3.23, “Cumulative Impacts,” the Proposed Project would result in less-than-significant impacts or no impacts on water supply/hydrology/Delta water management; water quality; geology and groundwater; flood control and levee stability; sediment transport; transportation and navigation; air quality, GHGs; noise; fish; recreation; vegetation and wetlands; wildlife; land use; utilities; visual/aesthetic resources; cultural resources; public health and environmental hazards; or growth-inducing impacts, including population and housing. Therefore, the Proposed Project would not make a cumulatively considerable incremental contribution to any significant cumulative adverse impacts on these resource areas.

The analysis in this document has determined that implementing the Proposed Project would not make a cumulatively considerable incremental contribution to any significant cumulative impacts on any resources affected by past, current, or probable future projects in the vicinity. As discussed above, the Proposed Project would result in less-than-significant impacts and would not cause substantial adverse effects on human beings, either directly or indirectly.

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APPENDIX A

List of the Environmental Commitments and Best Management Practices

APPENDIX B

Invasive Vegetation Management Plan

APPENDIX C

Hydrodynamic Modeling Report

APPENDIX D

Air Quality Modeling Details and Assumptions

APPENDIX E

Cultural Resources Report

