

WINGS LANDING TIDAL HABITAT RESTORATION PROJECT

CEQA Addendum

Prepared for:
Natural Resources Group, Inc.
California Department of Water Resources

July 2020



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CHAPTER 1

INTRODUCTION

This chapter presents background and introductory information for the Wings Landing Tidal Habitat Restoration Project (Proposed Project) Addendum to the Suisun Marsh Habitat Management, Preservation, and Restoration Plan Environmental Impact Statement/Environmental Impact Report (SMP EIS/EIR). It gives an overview of the SMP EIS/EIR, which is incorporated by reference, and provides a synopsis of the Proposed Project, then discusses the scope of the addendum and the addendum organization.

1.1 Overview of the Suisun Marsh Plan EIS/EIR

The SMP EIS/EIR was certified by the California Department of Fish and Wildlife (CDFW) in December 2011 and the Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (USFWS) in April 2014. The Suisun Marsh Plan (SMP) provides a comprehensive 30 year plan for activities within the Suisun Marsh, including tidal restoration activities, and managed wetland management. As such, the SMP is intended to be a flexible, science-based management plan for Suisun Marsh, consistent with the revised Suisun Marsh Preservation Agreement and CALFED Bay-Delta Program. It also is intended to set the regulatory foundation for future actions within Suisun Marsh. The SMP is based on four major Suisun Marsh resources and functions, which are linked directly to the purpose and objective of the SMP EIS/EIR. The resources and functions are listed below.

- **Habitat and Ecological Processes** – Restore lost tidal wetlands by implementing the CALFED Ecosystem Restoration Program Plan (ERPP) restoration target for the Suisun Marsh ecoregion (5,000 to 7,000 acres of tidal marsh) and 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 recreational uses and associated wildlife habitat.

The intention of the SMP is to balance the benefits of tidal wetland restoration with other habitat uses in the Suisun Marsh by evaluating alternatives in Suisun Marsh-wide land use, such as managed wetlands, public use, and salt marsh harvest mouse (SMHM) and upland habitat. The SMP relies on the incorporation of existing science and information developed through adaptive management.

The SMP was prepared by the Suisun Principal Agencies (Principals), a group of agencies with primary responsibility for Suisun Marsh management. The Principals are USFWS, Reclamation, CDFW, California Department of Water Resources (DWR), National Marine Fisheries Service (NMFS), Suisun Resource Conservation District (SRCD), and CALFED Bay-Delta Program (CALFED). The Principals have consulted with other participating agencies, including United States Army Corps of Engineers (USACE), San Francisco Bay

Conservation and Development Commission (BCDC), Regional Water Quality Control Board (RWQCB), and State Water Resources Control Board (State Water Board), in developing the SMP.

The Principal agencies prepared the SMP EIS/EIR and analyzed the potential environmental impacts of implementing the SMP (the preferred project of the SMP EIS/EIR). The SMP EIS/EIR programmatically evaluated the conversion of 5,000 to 7,000 acres of managed wetlands to tidal habitat over the next 30 years. The Proposed Project would be one of several tidal restoration projects within the Marsh that was planned for by the SMP and programmatically evaluated in the SMP EIS/EIR. Accordingly, DWR has prepared an addendum to the SMP EIS/EIR to implement the Proposed Project and document potentially significant environmental impacts in accordance with the California Environmental Quality Act (CEQA).

1.2 Project Location and Proposed Project

Historically, the Suisun Marsh was a tidal marsh system, with the range of salinity, vegetation composition, and species utilization based on local geography and Sacramento and San Joaquin River inputs. In the late 1800s, the Marsh was diked for water management to support agriculture and duck hunting activities. **Figure 1-1** shows the location and general vicinity of the Proposed Project within the Suisun Marsh.

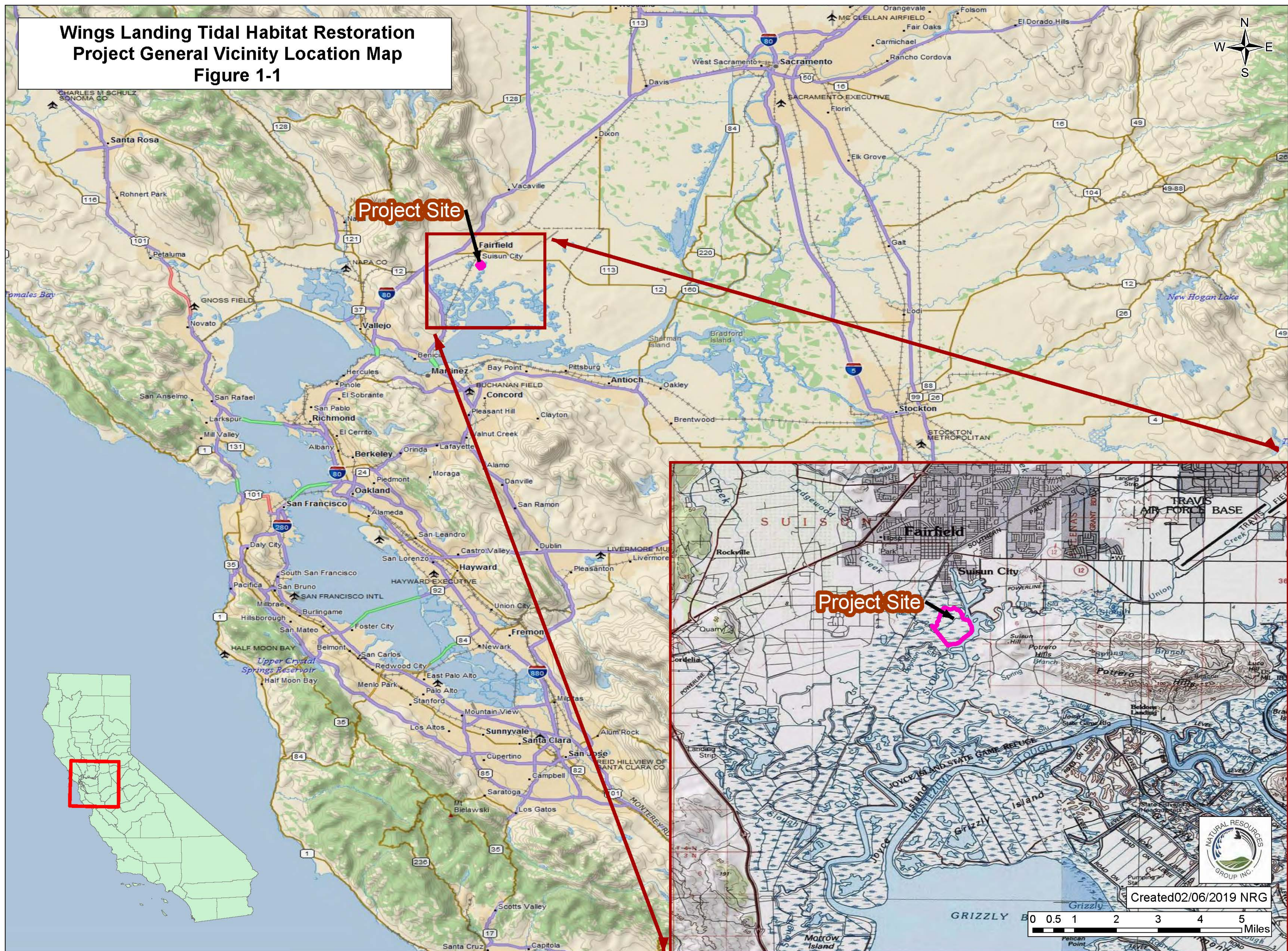
The “Project Site” is an approximately 267.02-acre parcel within the approximately 272.62-acre “Overall Property”, currently owned by Wings Landing LLC. The Project Site is shown in **Figure 1-2**. The Project Site is located within north-central Suisun Marsh, in Solano County, California. The Project Site is currently, and has been historically, managed as a duck club. It is located in SMP Region 1 of the Suisun Marsh and adjacent to Peytonia Slough to the north, Suisun Slough to the east, and Boynton Slough to the south. The Project Site contains managed marsh, managed channels, and uplands, which are regularly managed by disking, mowing, flooding, draining, and contouring to improve conditions for waterfowl and waterfowl hunting. The northern end of the Project Site contains an approximately 19-acre brood pond, which is a small area of managed marsh at the north end of the Project Site that is managed for waterfowl nesting.

The Proposed Project includes restoration of the Project Site’s managed marsh, managed perennial channels, managed seasonal channels, and uplands to a tidal marsh ecosystem. The Proposed Project would reconnect the high order marsh-adjacent subtidal channels in Boynton, Peytonia, and Suisun Sloughs to the newly restored tidal and sub-tidal marsh within the Project Site. Returning the Project Site to natural tidal influence would restore previously inaccessible managed marsh into spawning, rearing, and/or food production habitat for Delta Smelt (*Hypomesus transpacificus*), Longfin Smelt (*Spirinchus thaleichthys*), North American Green Sturgeon (*Acipenser medirostris*), and salmonids including Central Valley Distinct Population Segment (DPS) steelhead (*Oncorhynchus mykiss*), Central California coast DPS steelhead (*Oncorhynchus mykiss*), and multiple evolutionarily significant units (ESUs) of Chinook Salmon (*Oncorhynchus tshawytscha*): Sacramento River winter-run, Central Valley spring-run Chinook Salmon, and Central Valley fall-/ late fall-run Chinook Salmon within the north-central Suisun Marsh.

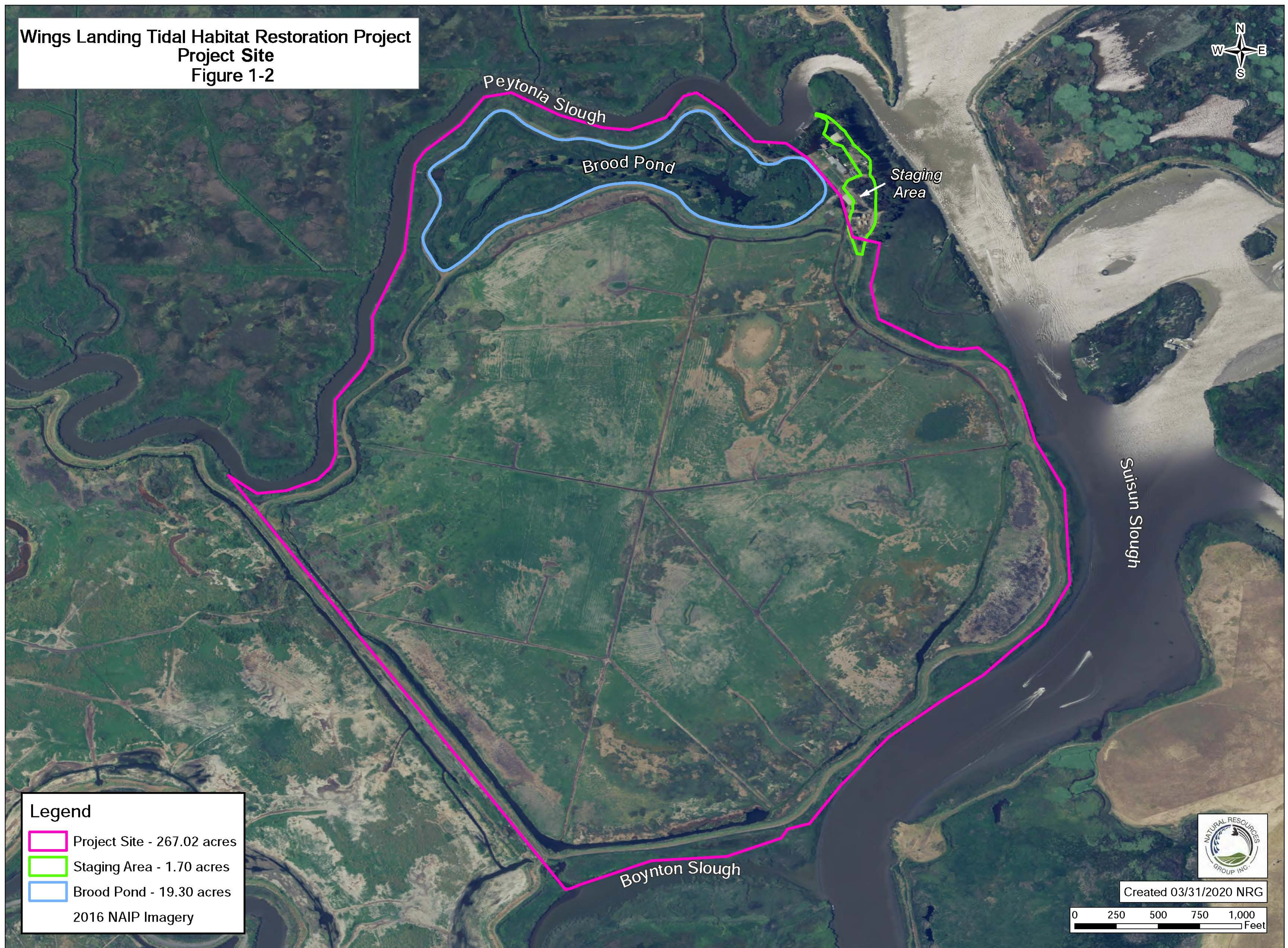
The Proposed Project is consistent with the SMP and the evaluation in the SMP EIS/EIR. The Proposed Project would partially fulfill the 8,000-acre tidal restoration obligations of the Fish Restoration Program Agreement (FRPA) (DWR, CDFG, USFWS, NMFS, 2012), satisfying the requirements of the USFWS 2008 Biological Opinion for Delta Smelt (USFWS 2008 BiOp) (USFWS, 2008), the 2009 NMFS Biological Opinion for the Coordinated Operations of the State Water Project (SWP) and the Federal Central Valley Project (CVP) (NMFS

2009 BiOp) (NMFS, 2009), and the Longfin Smelt Incidental Take Permit for the SWP (2009 LFS ITP) (CDFG, 2009). The 2008 USFWS BiOp Reasonable and Prudent Alternative (RPA) 4 and 2009 NMFS BiOp RPA I.6.1 were carried forward as baseline conditions in the USFWS Biological Opinion for the Reinitiation of Consultation on the Coordinated Operations of the Central Valley Project and the State Water Project (2019 USFWS BiOp) and the NMFS Biological Opinion on Long Term Operation of the Central Valley Project and the State Water Project (2019 NMFS BiOp). Additionally, the Incidental Take Permit for Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta (2020 LTO ITP) carries forward the 8,000-acre tidal habitat restoration requirement as compensatory mitigation for the covered activities.




**Wings Landing Tidal Habitat Restoration
Project General Vicinity Location Map
Figure 1-1**



Wings Landing Tidal Habitat Restoration Project
Project Site
Figure 1-2



Legend

-  Project Site - 267.02 acres
 -  Staging Area - 1.70 acres
 -  Brood Pond - 19.30 acres
- 2016 NAIP Imagery



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1.3 CEQA and Addendums

As the lead agency, DWR has prepared this addendum to the SMP EIS/EIR for the SMP to assess the impacts associated with the Proposed Project that could occur since the SMP EIS/EIR was certified. According to Section 15164(a) of the State CEQA Guidelines, the lead agency or the responsible agency will prepare an addendum to a previously certified EIR if changes or additions are necessary but none of the conditions described in Section 15162, calling for the preparation of a subsequent or supplemental EIR, have occurred. An addendum need not be circulated for public review but can be included in or attached to the final EIR. The decision-making body considers the addendum with the final EIR prior to making a decision on the Proposed Project.

Section 15162 of the State CEQA Guidelines states that, for a project covered by a certified EIR, preparation of a subsequent or supplemental EIR rather than an addendum is required only if one or more of the following conditions occur:

- i. Substantial changes are proposed in the project that will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects.
- ii. Substantial changes occur with respect to the circumstances under which the project is undertaken that will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects.
- iii. New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:
 - a) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;
 - b) Significant effects previously examined will be substantially more severe than shown in the previous EIR;
 - c) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or
 - d) Mitigation measures or alternatives that are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

The addendum is prepared in accordance with CEQA Public Resources Code (PRC) Section 21000 et seq. and the State CEQA Guidelines (California Administrative Code [CAC] Section 15000 et seq.).

1.4 Scope of Addendum

Section 15063(c)(3)(D) of the State CEQA Guidelines states that earlier analyses may be used where, pursuant to tiering, a program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR. The scope, content, and organization of this addendum to the SMP EIS/EIR meet the current requirements of CEQA and the State CEQA Guidelines.

The addendum describes the affected environmental resources and evaluates the potential changes in the impacts that were previously described in the SMP EIS/EIR with respect to constructing and operating the Proposed

Project. The scope of analysis in the addendum addresses each of the environmental resource areas previously analyzed in the SMP EIS/EIR, and identified in Appendix G of the State CEQA 2019 Guidelines, as listed below.

- Air Quality
- Biological Resources
- Cultural Resources
- Greenhouse Gas Emissions
- Hydrology and Water Quality
- Land Use
- Recreation

The proposed activities associated with the Proposed Project constitute minor changes in the approved SMP. Impacts associated with several resource areas would already occur under the approved SMP, were analyzed in the SMP EIS/EIR, and would not increase in magnitude even though they would occur in different locations in some cases. These resources topics are analyzed briefly in Section 3.8, Other Resources and listed below:

- Aesthetics
- Agricultural Resources
- Geology, Soils, and Mineral Resources (levee stability)
- Hazards and Hazardous Materials
- Noise
- Population and Housing
- Transportation
- Utilities and Public Services

The addendum substantiates why it is appropriate to use the SMP EIS/EIR and that no significant impacts on the environment that were not previously disclosed in SMP EIS/EIR would occur under the Proposed Project. Details from the project description and the SMP EIS/EIR support these conclusions.

Technical information used in the addendum to support conclusions includes the following:

- Hydrodynamic modeling evaluating velocity, tidal prism, salinity, tidal range, particle tracking, residence time, and water-surface elevation
- Geotechnical investigation of the cross berm, evaluating performance and longevity with respect to wave action degradation, foundation soil consolidation/subsidence, stability, seepage, overtopping, and seismic loading
- Sensitive-species surveys
- Air quality analysis
- Cultural resource evaluation, documenting known cultural resources and identifying the potential for undiscovered cultural resources within the Project Site

The criteria for determining the significance of environmental impacts in the addendum analysis are generally the same as those used in the SMP EIS/EIR and are consistent with those described in Appendix G of the State CEQA 2019 Guidelines.

1.5 Addendum Organization

This addendum includes the certified final SMP EIS/EIR by reference and addresses the impacts of the changes to the project description/concept design. The content and organization of this addendum to the previously certified SMP EIS/EIR are designed to meet the current requirements of CEQA and the State CEQA Guidelines.

This addendum is organized as described below.

- Chapter 1, “Introduction,” includes background and introductory information regarding the proposed modifications, the background of the Proposed Project, the purpose of the addendum, and the scope and content of the document.
- Chapter 2, “Proposed Project Description,” provides the location, details, and objectives of the Proposed Project.
- Chapter 3, “Environmental Analysis,” compares the potential changes in the impacts of the Proposed Project to the impacts that were previously analyzed as part of the certified SMP EIS/EIR. This chapter identifies which effects were within the scope of and adequately analyzed in the previously certified SMP EIS/EIR and whether such effects were addressed by mitigation measures, based on the earlier analysis. Where appropriate, mitigation measures that are incorporated or refined from the SMP EIS/EIR are discussed to distinguish the extent to which they address site-specific conditions for the Proposed Project.
- Chapter 4, “References,” identifies the documents (printed references), web sites, and individuals (personal communications) that were consulted during preparation of this addendum.
- Appendices A through G contain detailed technical information to support the analysis and conclusions in Chapter 3.

1.6 Previous Environmental Documents Incorporated by Reference

Consistent with Section 15150 of the State CEQA Guidelines, the following document was used in preparation of this addendum and is incorporated herein by reference:

Bureau of Reclamation, USFWS, and CDFW. 2011. Suisun Marsh Habitat Management, Preservation, and Restoration Plan Final Environmental Impact Statement/Environmental Impact Report. November. SCH#2003112039 (Reclamation, 2011).

Available: 2011 Suisun Marsh Plan EIS/EIR

CHAPTER 2

PROPOSED PROJECT DESCRIPTION

2.1 Proposed Project

This section provides a description of the Proposed Project, including its relationship to the SMP EIS/EIR and the CEQA objectives of the Proposed Project.

The Proposed Project was selected by DWR through a Request for Proposal (RFP) process in 2017. DWR is the Lead Agency and would approve and fund the Proposed Project. Natural Resources Group, Inc. (NRG) would design and carry out the Proposed Project.

The Proposed Project includes restoration of the approximately 267.02-acre Project Site (**Figure 1-2**), which lies within an approximately 272.62-acre Overall Property. The Proposed Project consists of restoring managed marsh, managed perennial channels, managed seasonal channels, and uplands to a tidal marsh ecosystem. The Proposed Project would reconnect the marsh-adjacent subtidal channels in Boynton, Peytonia, and Suisun Sloughs to the newly restored tidal and subtidal marsh within the Project Site. Returning the Project Site to natural tidal influence would restore previously inaccessible managed marsh into rearing, and/or food production habitat for Delta Smelt (*Hypomesus transpacificus*) (Federally Threatened/California Endangered), Longfin Smelt (*Spirinchus thaleichthys*) (Candidate for federal listing/California Threatened), North American Green Sturgeon (Federally Threatened) (*Acipenser medirostris*), and salmonids including Central Valley DPS steelhead (*Oncorhynchus mykiss*) (Federally Threatened), Central California coast DPS steelhead (*Oncorhynchus mykiss*) (Federally Threatened), and multiple ESUs of Chinook Salmon (*Oncorhynchus tshawytscha*): Sacramento River winter-run (Federally Endangered/State Endangered), Central Valley spring-run Chinook Salmon (Federally Threatened/State Threatened), and Central Valley fall-/ late fall-run Chinook Salmon (California species of concern). The Proposed Project is within the north-central Suisun Marsh, a priority area in the 2008 United States Fish and Wildlife Service (USFWS) Biological Opinion Delta Smelt Crediting Decision Model (USFWS, 2008). The Proposed Project would help contribute to meeting the purpose and objectives of the SMP and is consistent with the evaluation in the SMP EIS/EIR (**Table 2-1**).

2.1.1 Proposed Project Purpose and Objectives

The Proposed Project is a Fish Restoration Project with DWR and NRG as the Project Proponents. The Proposed Project was designed in partial fulfillment of DWR's 8,000-acre tidal habitat restoration obligations contained within Reasonable and Prudent Alternative (RPA) 4 of the 2008 USFWS Biological Opinion (BiOp) on the Coordinated Operations of the Central Valley Project and State Water Project (2008 USFWS BiOp) (USFWS, 2008). The Proposed Project is also expected to benefit migrating and rearing juvenile salmonids, so it is consistent with RPA I.6.1 of the 2009 National Marine Fisheries Service (NMFS) Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project (2009 NMFS BiOp) (NMFS, 2009). The 2008 USFWS BiOp RPA 4 and 2009 NMFS BiOp RPA I.6.1 were carried forward as baseline conditions in the USFWS Biological Opinion for the Reinitiation of Consultation on the

Coordinated Operations of the Central Valley Project and the State Water Project (2019 USFWS BiOp) and the NMFS Biological Opinion on Long Term Operation of the Central Valley Project and the State Water Project (2019 NMFS BiOp), both of which were issued on October 21, 2019. In addition, Section 9.1.1 of the Incidental Take Permit for Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta (2081-2019-066-00) (2020 LTO ITP), issued by the California Department of Fish and Wildlife (CDFW) on March 31, 2020, carries forward the 8,000-acre tidal habitat restoration requirement as compensatory mitigation for activities under the 2020 LTO ITP.

The Proposed Project goal is to restore unrestricted tidal connectivity to the interior of the Project Site. Tidal connectivity would restore tidal channels and tidal marsh onsite to benefit native fish species.

**TABLE 2-1
PROPOSED PROJECT CONSISTENCY WITH SUISUN MARSH PLAN PURPOSE AND OBJECTIVES**

Suisun Marsh Plan Purpose and Objectives	Wings Landing Tidal Habitat Restoration Project
Habitats 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 protect and enhance 40,000 to 50,000 acres of managed wetlands.	The Proposed Project would contribute to the restoration target by restoring the approximately 267.02-acre Project Site to predominantly tidal marsh and tidal channels. The SMP set a target to restore over 1,000 acres of tidal wetlands within Region 1, where the Project Site is located. Almost all of the Region 1 goal would be met between the Proposed Project and restoration of the Hill Slough Wildlife Area.
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.	Navigable waterways created onsite would become accessible for public access.
Levee System Integrity—Maintain and improve the Suisun Marsh levee system integrity to protect property, infrastructure, and wildlife habitats from catastrophic flooding.	The Proposed Project would enhance the shared cross levee between the Project Site and the Walnut Creek Gun Club's (WCGC's) managed wetlands, located west of the Project Site.
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 recreational uses and associated wildlife habitat.	The Proposed Project was designed to protect and improve water quality, and increase aquatic food production on and in the vicinity of the Project Site. Hydrologic modeling indicates that the Proposed Project would minimally affect salinity and velocity either onsite and in the vicinity (RMA, 2018).

The Proposed Project includes the following objectives, which are consistent with the SMP.

- Create appropriate habitat for salmonids, Delta Smelt, Longfin Smelt, and other native fish species.
- Enhance available food web productivity for Delta Smelt, Longfin Smelt, and other native fish species within, adjacent to, and in the vicinity of the Project Site.
- Enhance the quality of habitats to support more special-status and native wildlife that have the potential to occur on and in the vicinity of the Project Site.
- Avoid promoting conditions, such as invasive species infestations, that are in conflict with the above project objectives.

The Proposed Project would promote the restoration of tidal marsh, as discussed in the SMP EIS/EIR by:

Restoring managed marsh to high quality tidal marsh with improved ecosystem function, enhancing food web productivity and reestablishing full tidal exchange to allow export to adjacent tidal sloughs (Peytonia, Boynton, and Suisun) to support Delta Smelt, Longfin Smelt, and salmonid recovery.

Restoring rearing and breeding habitats for aquatic and wetland dependent species that use or depend on freshwater-influenced tidal sloughs and brackish-tidal marsh habitat, such as Sacramento Splittail (*Pogonichthys macrolepidotus*).

Reintroducing natural conditions that support native plants and wildlife, and help them outcompete invasive species while minimizing conditions that encourage predation by non-native fish.

Providing transitional uplands and high-water refugia for terrestrial marsh species and sea level rise accommodation.

Improving water quality by restoring tidal action to reduce low dissolved oxygen (DO) conditions.

Contributing to the recovery of special-status species, including salmonids, Delta Smelt, Longfin Smelt, salt marsh harvest mouse (*Reithrodontomys raviventris*), and California Black Rail (*Laterallus jamaicensis*).

2.1.2 Proposed Project Background

The Proposed Project falls under the Suisun Marsh Habitat Management, Preservation, and Restoration Plan, which defines and limits development within the Suisun Marsh. The Suisun Marsh is a 116,000-acre area of land, bays, and sloughs in a brackish portion of the San Francisco Bay Estuary that is formed by the confluence of the Sacramento and San Joaquin rivers between Martinez and Suisun City, CA. The SMP calls for the protection of tidal marshes because they are critical habitat for marsh-related wildlife and essential to the integrity of Suisun Marsh. The Proposed Project would ensure the long-term protection of the restored tidal marsh as well as the existing fringing tidal marsh habitat.

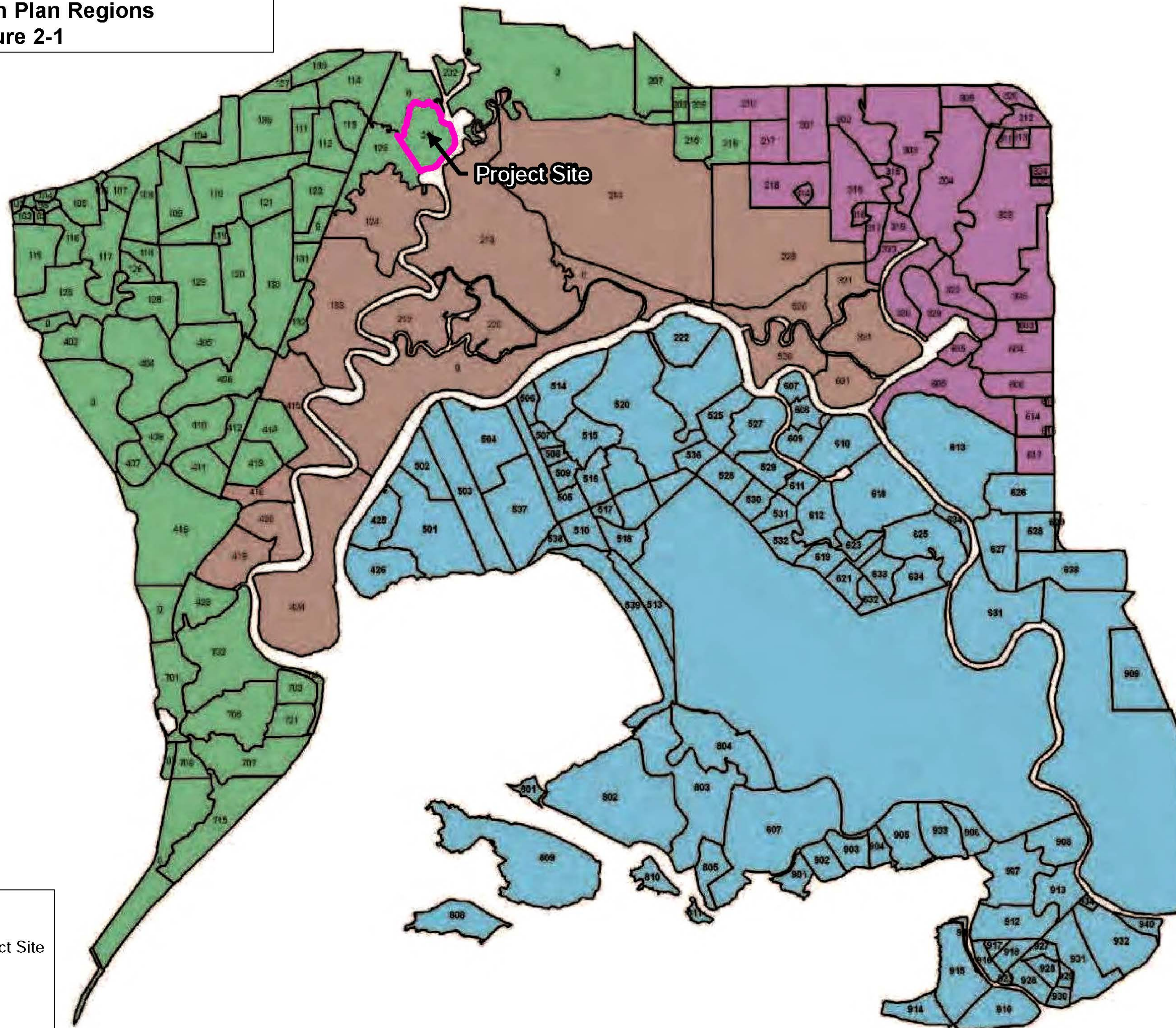
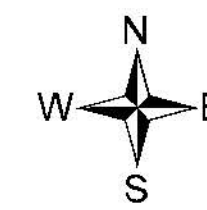
The Project Site was reclaimed for agriculture in the 1800's and has been managed intermittently as a duck club since the 1940's, and continuously since the late 1960's. It is currently owned by Wings Landing, LLC. The Project Site is located in north-central Suisun Marsh, within the SMP Region 1 (**Figure 2-1**). The Proposed Project is located in Delta Smelt and Green Sturgeon critical habitat, the mesohaline portion of the Bay-Delta Estuary, and is in an important connective corridor between the protected lands of CDFW's Peytonia Ecological Reserve, CDFW's Hill Slough Wildlife Area, and the Solano Land Trust's Rush Ranch. The Proposed Project is surrounded on three sides by water; Peytonia Slough to the north, Suisun Slough to the east, and Boynton Slough to the south. The Proposed Project is located in the Suisun Bay Area Recovery Unit, "Segment B" as described in the 2013 Recovery Plan for Tidal Marsh Ecosystems in Northern and Central California (Tidal Marsh Recovery Plan) (USFWS, 2013a). Because the Project Site is situated adjacent to protected areas within critical habitat and within the Suisun Bay Area Recovery Unit, it is a prime location for tidal marsh restoration.

2.1.3 Description

The Proposed Project would restore an approximately 267.02-acre managed marsh to a tidal marsh ecosystem. The Proposed Project is designed to restore the site-specific historic hydrologic regime to increase the extent and natural development of sinuous, dendritic channels.

Existing tidal marsh and channels on the exterior of the levees would be enhanced and protected, while managed marsh habitat interior of the levees would be restored to tidal marsh. The Proposed Project would result in a net increase of approximately 243.70 acres of tidal wetlands including approximately 6.72 acres of restored tidal channels and approximately 236.98 acres of restored tidal marsh. **Table 2-2** shows the acreages of each habitat type before and after restoration.

Wings Landing Tidal Habitat Restoration Project
 Suisun Marsh Plan Regions
 Figure 2-1



Legend

Wings Restoration Project Site

Suisun Marsh Regions

- Region 1
- Region 2
- Region 3
- Region 4



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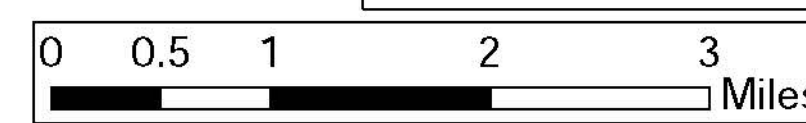


TABLE 2-2
MARSH, WETLAND, AND WATER TYPES PRE AND POST CONSTRUCTION

Wetland Type	Existing (acres)*	Change (acres)*	Post Restoration (acres)*
Managed Marsh	229.42	-229.42	0.00
Managed Perennial Channel	3.11	-3.11	0.00
Managed Seasonal Channel	2.33	-2.33	0.00
Restored Tidal Channel	0.00	+6.72	6.72
Enhanced Tidal Channel	0.42	+0.08	0.50
Restored Tidal Marsh (interior of levees)	0.00	+236.98	236.98
Enhanced Tidal Marsh (exterior of levees)	17.25	-0.08	17.17
Upland	14.49	-8.84	5.65
Total	267.02	0.00	267.02

*Acreages are approximate, and would vary slightly between 100% design and As-Built.

The Proposed Project has been modeled, evaluated, and designed through an iterative and collaborative process to maximize achievement of the Proposed Project objectives. **Figure 2-2** shows the Proposed Project concept design, which contains the following Proposed Project elements described below:

Cross Berm Enhancement

- Cross Berm Improvement – The interior levee (“cross berm”) would be improved and raised in elevation to maintain existing protections for the Walnut Creek Gun Club (“WCGC”).
- Borrow-ditch Restoration – The managed perimeter channel adjacent to the cross berm would be restored to vegetated tidal marsh to reduce tidal pressure including wind and wave action and maintain levee functionality.

Tidal Channel Restoration

- Channel Enhancement – Certain existing channels would be enhanced to improve water transport to the interior of the Project Site. This would include contouring channels from straight to meandering to increase overall channel length, as well as increase channel complexity to mimic natural tidal channels.
- Channel Creation – Channels would be created to maximize tidal action and distribute water to and from the interior of the Project Site.

Channel Plugs – Strategic locations within existing channels would be plugged to direct water into the Project Site’s interior and to facilitate flow of water on and offsite.

Tidal Depressions – Seven tidal depressions would be created to increase topographic and bathymetric diversity.

Structure Removal – Five water control structures along the existing exterior levee would be removed and the levee would be backfilled to prevent the need for disturbance from future maintenance.

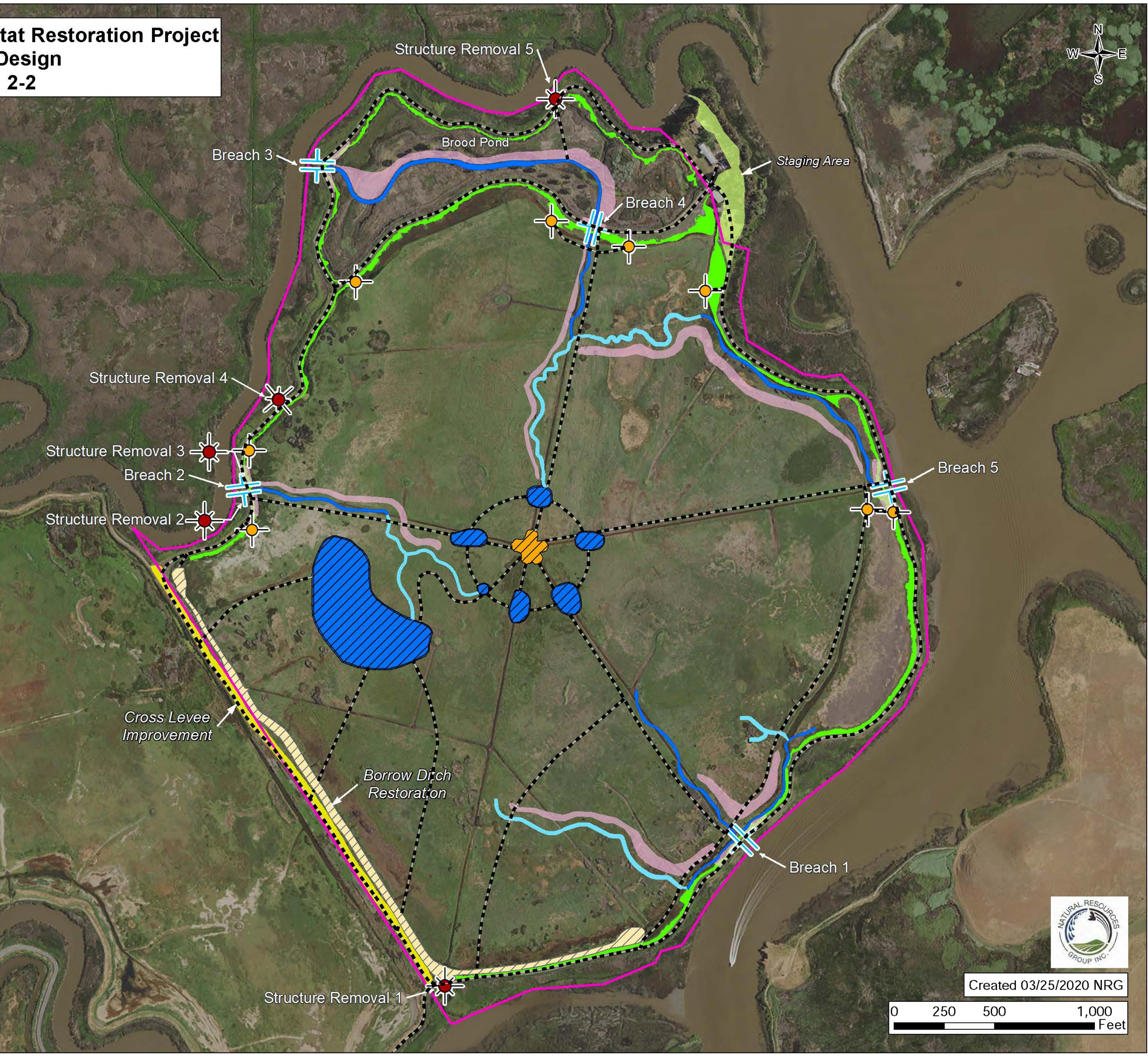
Levee Breaches – Exterior levees would be breached in five locations by removing water control structures to reintroduce full tidal exchange.

Wings Landing Tidal Habitat Restoration Project
Concept Design
Figure 2-2



Legend

- Project Site
- Levee Breach
- Structure Removal
- Channel Plugs
- Borrow-Ditch Restoration
- Centered Channel Plug
- Channel Created
- Channel Enhanced
- Cross Levee Improvement
- Haul Route
- Levee Source Borrow Area
- Spoils Material
- Staging Area
- Tidal Depression



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Table 2-3 describes the estimated design specifications of the Proposed Project elements. In some cases, material excavated from one element would be placed to create another element. To avoid double-counting the impact acreage, the numbers shown only include those associated with that element. For example, material excavated out of the tidal depression would be used for borrow-ditch restoration. The impact acreage of the tidal depression does not include the impact acreage of the borrow-ditch, and vice versa.

**TABLE 2-3
ESTIMATED DESIGN SPECIFICATIONS FOR EACH PROPOSED PROJECT ELEMENT TYPE**

Proposed Project Element	Elevation (feet NAVD88)	Slope (horizontal: vertical)	Base Width (feet)	Equipment	Excavation(-)/ Fill(+) Volume (cubic yards)	Impact Square Feet (Acreage)
Cross Berm Improvement	9.6, with expected settlement to 9.1	2H:1V to 10H:1V	Varies. Top width 12	Tractor with mower/disc, bulldozer, excavator, dump truck, water truck, compactor	+11,400	Upland: Cross Berm = 95,000 (2.18) Upland: Borrow = 330,000 (7.58)
Borrow-ditch Restoration	3	3H:1V	n/a	Excavator, dump truck, bulldozer	+8,900	Managed channel: 137,000 (3.15)
Tidal Depressions	1.24	4H:1V	n/a	Tractor with mower/disc, excavator, dump truck	-17,620	Managed marsh: 312,500 (7.17)
Channel Creation	1	2H:1V	6	Tractor with mower/disc, excavator, bulldozer, dump truck	-4,380	Managed marsh: Channel = 68,900 (1.58) Managed marsh: Spoils = 87,120 (2.00)
Channel Enhancement	1	2H:1V	6	Tractor with mower/disc, excavator, bulldozer, dump truck	-4,820	Managed channel/marsh: 85,600 (1.96) Managed Marsh: Spoils = 113,692 (2.61)
Channel Plugs	5	5H:1V	n/a	Tractor with mower/disc, excavator, bulldozer, dump truck	+3,720	Managed channel/marsh: 38,140 (0.88)
Structure Removal	Build to match surrounding levees	Build to match surrounding levees	n/a	Excavator, bulldozer, dump truck	+68	Tidal channel /upland/managed channel: 783 (0.02)
Breach 1	-2	1H:1V	25	Excavator, bulldozer, dump truck	-640	Upland/enhanced tidal marsh/managed channel: 3,240 (0.074)
Breach 2	-2	1H:1V	25	Excavator, bulldozer, dump truck	-750	Upland/Enhanced tidal marsh/managed channel: 3,850 (0.091)
Breach 3	1.24	1H:1V	25	Excavator, bulldozer, dump truck	-410	Upland/Enhanced tidal marsh/managed channel: 2,730 (0.06)
Breach 4	3.5	1H:1V	6	Excavator, bulldozer, dump truck	-30	Upland/managed marsh/managed channel: 540 (0.01)
Breach 5	-2	1H:1V	25	Excavator, bulldozer, dump truck	-940	Upland/Enhanced tidal marsh/managed channel: 5,790 (0.13)

Cross Berm Enhancement

Cross Berm Enhancement includes Cross Berm Improvement and Borrow-ditch Restoration, described in detail below.

The southwest boundary of the Project Site is a 2,473-foot interior levee (“cross berm”) that has historically been shared and managed jointly by the Wings Landing Duck Club and the WCGC. The Proposed Project would convert this interior levee into an exterior levee, and it would continue to be utilized for water management by the WCGC. In its current configuration, the cross berm has a crest-width of approximately 20 feet, and 3H:1V slopes. The wide, gentle sloping nature of this interior levee is the result of combining two individual levees independently owned by each club in the mid 1980’s. The two levees were previously separated by an open water channel connecting Boynton Slough to Peytonia Slough, which was filled with borrow material from both clubs, creating borrow-ditches on either side of the combined levee. As part of the Proposed Project, the cross berm would be improved such that it continues to provide WCGC with protection from unplanned inundation, waves, and wind fetch.

The final design characteristics (i.e., height and side slopes) of the improved cross berm, as well as construction methodologies were determined by a Geotechnical Investigation conducted by Geocon Consultants, Inc. in June 2019. Following the guidelines in the Geotechnical Investigation would ensure that the cross berm would continue to have reasonable and improved performance with respect to wave action degradation, foundation soil consolidation/subsidence, stability, seepage, overtopping, and seismic loading when compared to existing Wings Landing and WCGC perimeter levees.

The interior levee would be raised to 9.1 feet elevation and would have a crest width of 12 feet. Geotechnical analysis concluded that the maximum ultimate settlement of the cross berm would be 6 inches (0.5 feet). Therefore, the levee would be built to 9.6 feet to account for eventual possible settlement. The improved cross berm would be 2H:1V on the WCGC side, and 3H:1V on the Proposed Project side. For the benefit of upland species, including salt marsh harvest mouse, transitional habitat with 10H:1V slopes would be constructed on the north and south ends of the cross berm. These gentle transitional slopes would facilitate access to potential refuge habitat during high tide and would provide climate change/sea level rise accommodation into the future. Material used to improve the cross berm would be generated onsite, harvested from the inboard side of the existing exterior levees on the Project Site.

Geotechnical observation and testing would occur during construction including in-situ moisture content and density compaction testing. All construction equipment would be limited to light to medium size (not to exceed a 75,000 lb operating weight), supported on mud-tracks or balloon-type tires. Haul routes for heavy equipment would be kept level and smooth to prevent equipment from bouncing and imposing very high dynamic loads on the bay mud. Equipment would not be allowed to travel more than 15 mph as this could cause serious subgrade damage and rutting. Prior to placing fill materials on the levee, the existing ground surface within the levee footprint would be stripped of vegetation and organic-laden topsoil. The ground surface exposed after stripping would be scarified to a depth of up to 12 inches (as determined by the onsite Geotechnical personnel), moisture conditioned (if necessary) and re-compacted. Where new material is placed on the existing levee slopes, benching would be required to properly “tie” the materials together. Bench widths on the order of 2 to 4 feet would likely be required. Actual bench widths would be determined by Geotechnical personnel during grading and would depend on field conditions at that time. Keyways would be excavated at the toe of the slopes, as directed by onsite Geotechnical personnel.

Prior to placing material, topsoil would be stripped from the cross berm with a tractor using mower and bulldozer attachments. Excess soil material would be pushed to the side of the levee using a bulldozer to establish a seed bank to help protect the levee post-restoration. An excavator would borrow material from the borrow areas and place it in a dump truck. The dump truck would then transport the material to the levee and dump it there for spreading. A bulldozer would spread out the dumped material into no more than 6 inch lifts at one time. This new material would be moisture tested and dried out as necessary by discing or ripping the newly placed material. Fill material would be moisture conditioned (if necessary) to at least 3 percent over optimum moisture content, as determined by what is suitable for the fill to be compacted to at least 88 percent but no more than 92 percent relative compaction. Once moisture targets are hit, depending on the guidance from the Geotechnical personnel, additional material would be placed on top, or the placed material would be compacted using a compactor. The water truck would be used throughout the process where necessary for dust control as well as to moisten material to ensure suitability for compaction.

Once the cross berm has reached the target slope and elevation of 9.6 feet NAVD88 and has been compacted sufficiently, revegetation would be conducted using the previously stripped topsoil material with a seed bank, along with a native seed mix to reestablish native vegetation on the disturbed levee top. Care would be taken not to use invasive species for revegetation purposes. Raising the cross berm to 9.6 feet, allowing for eventual settlement to 9.1 feet, would require a maximum of 11,400 CY of material. The total impact area of cross berm improvement would be 9.76 acres (425,000 ft²), all within uplands. Approximately 2.18 acres (95,000 ft²) of impact result from the placement of fill on the cross berm, and an additional 7.58 acres (330,000 ft²) would be impacted in the borrow areas.

Borrow-ditch Restoration

The borrow-ditch located adjacent to the cross berm on the Proposed Project side was originally created to generate material for the creation and maintenance of the cross berm. The borrow-ditch would be restored to tidal marsh habitat elevation at approximately 3 feet NAVD88. This, along with cross berm improvement and recruitment of tall emergent vegetation would provide the cross berm with additional protection from wave and wind action. Restoring this borrow-ditch would reduce future cross berm maintenance by facilitating marsh vegetation establishment, buffering wind-wave action against the improved cross berm, reducing water intrusion, and strengthening and stabilizing the base of the cross berm.

Borrow-ditch restoration would be accomplished by placing material generated from the creation of the large tidal depression directly onto the borrow-ditch until the elevation reaches approximately 3 feet, requiring approximately 8,900 CY of material. Prior to placing tidal depression material into the borrow-ditch, tall emergent marsh vegetation would be salvaged and set aside, excluding invasive vegetation as feasible. Using an excavator, material would be taken from the tidal depression and placed in a dump truck for transport to the borrow-ditch. Material would then be dumped in the borrow-ditch and spread out using a bulldozer or excavator. Compaction would not be required as the material would be peat, which is unsuitable for compaction. Once the borrow-ditch has reached the target elevation the salvaged material would be placed back on top of the newly filled borrow-ditch to facilitate vegetative growth. Material placed in the restored borrow-ditch is expected to recruit native vegetation naturally post-restoration, and would be enhanced with the placement of marsh vegetation salvaged onsite and seeding of native vegetation. Care would be taken not to use invasive species for revegetation purposes. The impact acreage for borrow-ditch restoration would be approximately 3.15 acres (137,000 ft²) (not including the area of the tidal depression), all within the managed perennial channel.

Tidal Channel Restoration

Tidal Channel Restoration includes Created Channels and Enhanced Channels.

Material excavated from created and enhanced channels would be used to construct channel plugs, and side-cast to create variable elevation habitat berms and mounds along the channels, simulating areas of natural accretion along tidal channels, maximizing topographic and bathymetric diversity, and increasing the Project Site's resilience to sea level rise. These constructed berms and mounds would vary in elevations from mid to high marsh and are anticipated to support emergent marsh vegetation. An excavator, dump truck, and bulldozer would be utilized to create new channels and enhance existing channels. The excavator would travel alongside the created and enhanced channels removing material from the channels and placing it in mounds alongside the channels in designated areas. Some material would be placed in a dump truck and transported to a nearby location for channel plug creation. Once there, the dump truck would dump the transported material for either the bulldozer or the excavator to form into the desired shape. No compaction is expected following channel construction. Created and enhanced channels would be constructed with a 6-foot base width at a maximum elevation of 1 foot (Table 2-3). This elevation would ensure that the channels remain unvegetated. Created and enhanced channels would have banks with a maximum 2H:1V slope (no steeper), allowing for a vegetated transition from tidal open water to tidal marsh. Emergent vegetation (e.g., tules) is expected to quickly colonize these new tidal areas, including the habitat berms, and would provide additional high tide refugia during extreme high tide events. Natural colonization would be supplemented with seeding of native plants.

Channel creation would result in the excavation of approximately 4,380 CY of material and a total impact area of approximately 3.58 acres (156,020 ft²). Approximately 1.58 acres (68,900 ft²) of impact would be the result of channel excavation, and approximately 2.00 acres (87,120 ft²) of impact would result from the placement of the excavated material (not including the acreage for the channel plugs). All channel creation impacts would occur within the managed marsh.

Channel enhancement would require excavation of approximately 4,820 CY of material and a total impact area of approximately 5.11 acres (199,292 ft²). Approximately 1.96 acres (85,600 ft²) of impact would be the result of channel excavation, and approximately 2.61 acres (113,692 ft²) of additional impact area would result from the placement of the excavated material.

Channel Plugs

Channel plugs would be strategically constructed to guide water movement within the Project Site and encourage full tidal exchange between the restored marsh and adjacent sloughs (**Figure 2-2**). These channel plugs would block water flow to some existing channels and direct water movement into desired locations, such as the enhanced and created channels and the tidal depressions in the interior of the Project Site. Eight channel plugs are located along the perimeter channel and would direct tidal exchange in the interior of the Project Site. One large center channel plug would direct water to enter and exit the Project Site via breaches and diminish the amount flowing across the Project Site in the existing interior channels.

Channel plugs would remain below the mean higher high water (MHHW) elevation to ensure that they support tidal marsh vegetation. Channel plugs would improve topographic variability and overall habitat quality of the Project Site by serving as high tide refugia as well as mediate the effects of climate change and sea level rise onsite. Fill material placed to create the channel plugs is anticipated to recruit native vegetation naturally with

tidal action post-restoration, but may be supplemented with marsh vegetation clumps salvaged onsite and seeding of native vegetation. Care would be taken not to use invasive species for revegetation purposes.

Channel plugs would be created as described under *Tidal Channel Restoration*, since these elements would be constructed simultaneously. Channel plugs would have a maximum elevation of 5 feet with a maximum 5H:1V slope (no steeper) and a rounded top to approximate a natural topographic feature (Table 2-3). Channel plugs would be constructed using material excavated during channel creation and channel enhancement from areas as close to the channel plugs as possible. Approximately 3,720 CY of material would be required to create all nine channel plugs. The impact area for channel plugging would be approximately 0.88 acres (38,140 ft²), which would take place within managed channels and the managed marsh. Material would be transported to the channel plugs and placed using a dump truck, excavator, bulldozer, and scraper/tractor.

Tidal Depressions

Seven tidal depressions would be created on the Project Site including six smaller depressions around the center channel plug, and one large depression west of the center plug, south of Breach 2. Tidal depressions would increase bathymetric diversity and were designed to mimic an approximately 6-acre depression that exists in the southeast corner of the Project Site. In addition to increasing bathymetric diversity, tidal depressions are anticipated to contribute to a slight increase in residence time and provide onsite material necessary for borrow-ditch restoration and topographic diversity. Tidal depressions would be concentrated near the center of the Project Site. Material generated by the creation of the tidal depressions in excess of that necessary for borrow ditch restoration would be sidecast in mounds to create bathymetric diversity.

Tidal depressions would be created as described in the *Borrow-ditch Restoration* section since these elements would be constructed simultaneously. Tidal depressions would be excavated with a maximum 4H:1V slope to an elevation of 1.24 feet, the mean lower low water (MLLW) elevation (Table 2-3). Construction of tidal depressions would require the excavation of approximately 17,620 CY of material. The largest depression would be approximately 5.46 acres (238,000 ft²), and the smaller six depressions average 0.28 acres (12,416 ft²). The impact area of all tidal depressions would be approximately 7.17 acres (312,500 ft²) of managed marsh.

Structure Removal

There are five water control structures that would not be levee breach locations. These water control structures would need to be removed in order to eliminate future maintenance of these features and to prevent unplanned levee breaches at those locations. These water control structures would be removed and the levee backfilled using material harvested from the inboard side of the exterior levees. This would exclude water passage from those areas and force all tidal flow through the proposed breaches. The repaired levee in those locations would be constructed to match the adjacent levee geometry.

Removal of the water control structures would require an excavator, bulldozer, dump truck, and a scraper/tractor. Structure removal would require in-water work. The water control structures and other debris at each proposed location would be removed using a long-arm excavator, placed temporarily on the adjacent levee top if necessary (no more than 24 hours), then loaded onto a dump truck, and would be disposed according to local regulations. After removing water control debris and structures, the levee would be backfilled by placing material in the newly open areas to match the elevation, top width, and geometry of the adjacent levees. Structure removal of all five non-breach structures would require a total of approximately 1840 CY and would have an impact area of

approximately 0.02 acres (783 ft²). Revegetation with native plants is expected to occur by natural recruitment after breaching.

Levee Breaches

Five levee breaches would restore tidal influence and maximize tidal excursion for unimpeded movement of water, sediments, nutrients, and biota to and from the Project Site. Breaches 1, 2, 3, and 5 would re-connect the Project Site to adjacent sloughs, and Breach 4 would connect the restored brood pond to the restored main tidal marsh. Breach sizes, side slopes of 1H:1V, and breach locations were strategically selected based on hydraulic modeling (RMA, 2018), historic site conditions, and expert and regulatory agency feedback. Breaches were located on existing water control structure locations in order to minimize impacts to special-status plants and wildlife, as well as for ease of construction. Perimeter levees would be retained as upland “islands” to provide high tide refuge, wave sheltering, and sea-level rise/climate change accommodation.

An excavator, bulldozer, and dump truck would be utilized for levee breach construction, which would require in-water work. In-water work days would be minimized to the maximum extent possible. The water control structures and other debris at each breach would be removed using an excavator, placed temporarily on the adjacent levee top if necessary (no more than 24 hours), then loaded onto a dump truck, transported offsite, and disposed according to local regulations. After removing water control debris and structures, the levees would be excavated according to the specifications in Table 2-3. Levee breaches would have a bottom width of 25 feet, aside from Breach 4, which would have a width of 6 feet. Breaches would have slopes of 1H:1V and would be excavated to various depths: Breaches 1, 2, and 5 would be excavated to -2 feet NAVD88, while Breaches 3 and 4 would be excavated to 1.24 and 3.5 feet NAVD88 respectively. The amount of material that would be excavated for all breaches is approximately 2,770 CY, which would impact approximately 0.37 acres (16,150 ft²). Excavated soil would be placed on the disturbed upland levee tops and other disturbed areas near the cross berm for future levee maintenance. Areas surrounding breaches would be expected to revegetate with native plants by natural recruitment after breaching, but revegetation may be supplemented where necessary by marsh vegetation salvaged during excavation and spreading of a native seed mix. Breaches would be unarmored, and would be allowed to evolve naturally following construction, unless conditions develop that meet an intervention threshold, as detailed in **Table 2-5**.

2.1.4 Construction

Construction activities to restore the Project Site, including scheduling, workforce, and equipment are described below.

Construction Schedule

Construction would begin with site preparation. All interior work including cross berm enhancement, tidal channel restoration, channel plugs, and tidal depressions would be completed prior to all exterior work, which includes structure removal and levee breaches. Exact sequencing is subject to conditions on the ground, but is expected to be completed in the following order:

1. Tidal Depressions and Borrow-Ditch Restoration (would occur simultaneously)
2. Tidal Channel Restoration including Channel Enhancement and Channel Creation
3. Channel Plug Creation

4. Cross Berm Improvement
5. Structure Removal
6. Levee Breaches
7. Site stabilization would mark the end of construction.

Construction is scheduled to begin in September 2020 or 2021, but may be postponed based on unforeseen circumstances. The Wings Landing Tidal Habitat Restoration Project (Proposed Project) is anticipated to occur over one construction year. Construction would end by November 30th. In-water work windows for construction of structural removal and levee breaches would be September 1st to November 30th. Construction may be further restricted beginning in October to accommodate waterfowl hunting on adjacent properties. Construction would generally occur between 8 and 10 hours a day, 5 days a week. Construction in salt marsh harvest mouse habitat (vegetation above 8 inches) would only occur between one hour after sunrise and one hour before sunset when mice are the least active. Rail surveys would be conducted if construction were to occur in potential habitat during the nesting season. All construction would take place within work windows approved by NMFS, USFWS, and CDFW. As allowed by permits and acceptable hours of operation, weekend work may occur. Interior work would be completed prior to exterior work, but may be spatially or temporally restricted based on the results of pre-construction surveys and biological monitors in the event that nesting birds or potentially other terrestrial listed species are identified. Work schedules would comply with the requirements of the Migratory Bird Treaty Act (MBTA) and other applicable legislation as described in the SMP.

Workforce and Equipment

Construction staffing for the Proposed Project would consist of approximately 6 to 20 personnel. Contractors working onsite would be properly trained in Best Management Practices (BMPs), and educated on the habitat, special life stage conditions, and identification of special species that may be encountered during construction, as well as what to do in the event one is encountered.

Restoration would require various types of heavy equipment, and conditions in the field at the time of construction would influence the equipment that would be best suited for the work (**Table 2-4**). A water pump would be used to fill a water truck to spray construction areas periodically for dust prevention as well as to attain ideal moisture levels for compaction. Water pumps would also be used to dry out the Project Site beyond what is possible with the water control structures. The pumps would be outfitted with a fish screen and would have a low flow rate to prevent take of fish and other wildlife in accordance with NMFS' guidance for Pump Intake Screen Criteria for Water Drafting (NMFS, 1996; NMFS, 2008).

TABLE 2-4

Equipment Type	Unit Amount
Excavator	2
Bulldozer	1
Tractor with mower/disc/scrapper	2
Skip Loader	1
4,000 Gallon Water Truck	1
Water Pump with 6-inch Pipe	4

Equipment Type	Unit Amount
Tractor with Mower	1
Dump Truck	4
Compactor	1

Equipment would be chosen by the construction contractor in order to construct the project safely and efficiently, and would be delivered to the Project Site by flatbed truck using local roads. All equipment would be available for use for the duration of construction.

Construction Logistics

Site Preparation

Site preparation activities would occur prior to the initiation of construction and would include:

- implementing BMPs, including pre-construction surveys (see Appendix A),
- providing worker Environmental Resources Worker Training Program,
- setting up equipment staging areas, and
- any remaining water onsite would be pumped to ensure the managed marsh and interior channels are dry.

Duck club management practices including mowing and weed-eating would continue as necessary to keep construction areas and haul routes accessible during construction and to prevent attracting the salt marsh harvest mouse to those areas. The Project Site would be dry prior to the start of the Proposed Project using duck club management activities; therefore, fish rescue would not be necessary. Salvaged tall emergent marsh vegetation would be transplanted within disturbed areas to promote revegetation. Areas vegetated with tall emergent marsh vegetation would be stripped and temporarily placed on levee tops and other disturbed areas in the immediate vicinity using an excavator and/or bulldozer. Upon completion of Proposed Project elements, salvaged vegetation would be placed in disturbed areas to promote revegetation of native species using an excavator and a bulldozer.

Staging Areas

The Proposed Project footprint includes all excavations, haul routes, fill areas, and the staging area (**Figures 2-2, 2-3**). The existing staging area already developed for use by the duck club would be utilized for the Proposed Project. The staging area is approximately 1.70 acres and is located on the Overall Property.

Earthwork

Earthwork (grading, excavation, and redistribution of material) would be necessary for all Proposed Project elements. Prior to earthmoving, the topsoil layer (approximately 6 inches) along with debris from mowing, would be stripped back by a bulldozer with a blade and temporarily placed in disturbed areas, including levee tops and other haul routes, the staging area, and areas within Proposed Project element construction footprints. This would be used later as mulch for exposed mineral soils. Equipment utilized may include a tractor, bulldozer, excavator, and dump truck. If the area provides salt marsh harvest mouse habitat, the upper 6 inches of topsoil, excluding highly invasive plants as feasible, will be temporarily stockpiled separately for less than 24 hours and replaced on top of the backfilled material.

The Proposed Project is a balanced cut-and-fill project; no soil would be brought to or hauled off the Project Site. Excavated material would be picked up with an excavator and transported within the Project Site with low ground pressure dump trucks, and then placed with the excavator and bulldozer. All heavy equipment would utilize haul routes throughout the Project Site, as shown in **Figure 2-3**. A portion of the material excavated during construction of the tidal channels would be used for channel plugs, and the remaining material would be side-cast in a diffuse pattern or mounded in the area immediately surrounding the channel network, allowing wetland vegetation to colonize the spoils within a single growing season.

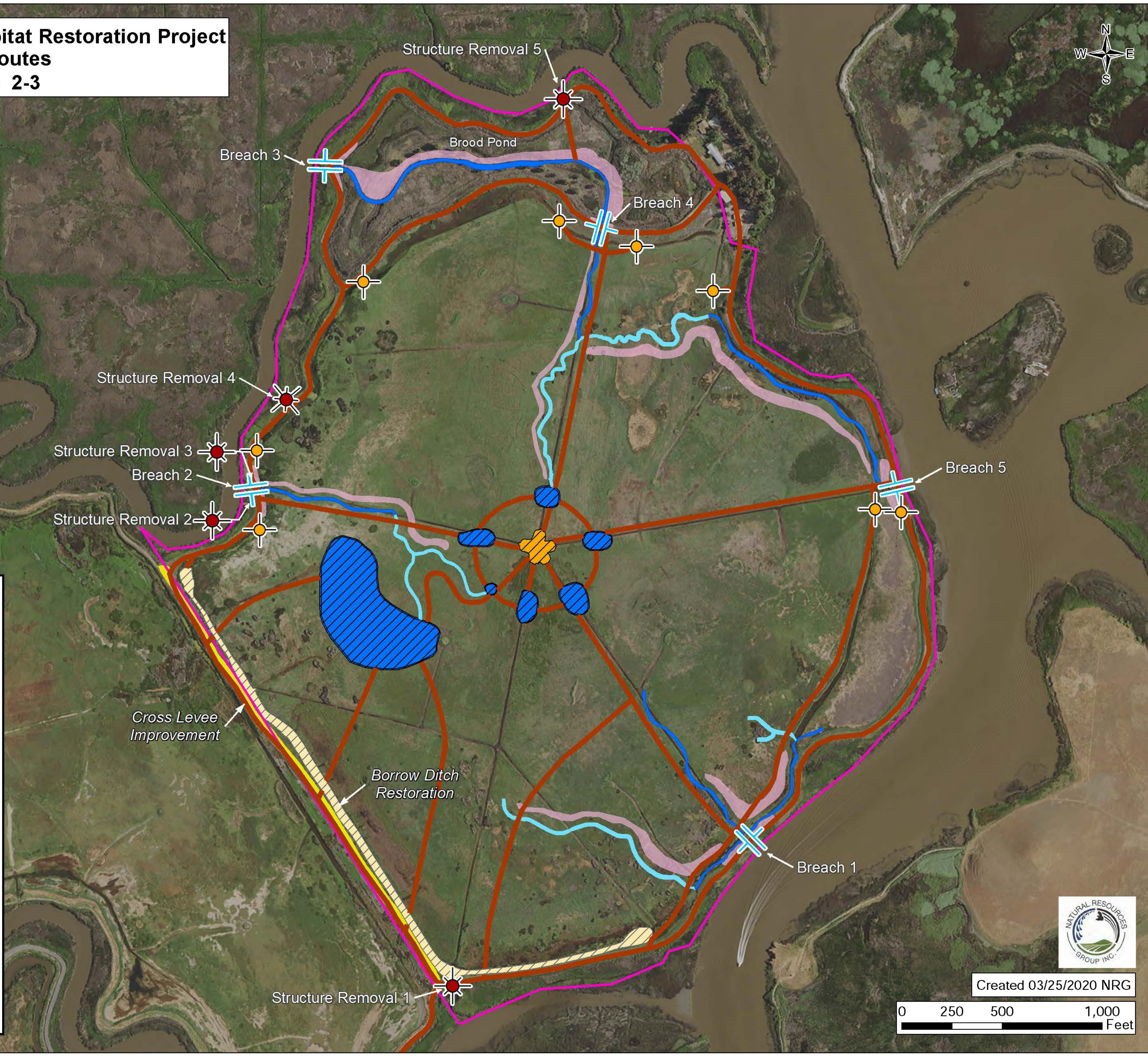
Project Site Stabilization

Site stabilization would include erosion control, ground compaction and smoothing, planting of salvaged tall emergent marsh vegetation, and seeding of native plants using the following equipment: compactor, excavator, bulldozer, tractor, water truck, water pump. Some or all of these activities would occur in areas that have been heavily degraded and that are subject to erosion, such as haul routes, breaches, tidal depressions, and similarly impacted areas.

Wings Landing Tidal Habitat Restoration Project
Haul Routes
Figure 2-3

Legend

- Project Site
- Channel Plugs
- Levee Breach
- Structure Removal
- Haul Route
- Borrow-Ditch Restoration
- Centered Channel Plug
- Channel Created
- Channel Enhanced
- Cross Levee Improvement
- Spoils Material
- Tidal Depression



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0 250 500 1,000 Feet

2.2 Project Site Monitoring and Management

The Proposed Project would use an adaptive management approach with objective-driven monitoring as intended by the SMP (Appendix E, *Adaptive Management and Monitoring Plan*, of the SMP EIS/EIR). The Proposed Project was designed to require minimal maintenance and is anticipated to function with minimal management. An Adaptive Management and Monitoring Plan for the Proposed Project is included as **Appendix B**, *Wings Landing Tidal Habitat Restoration Project Adaptive Management and Monitoring Plan*.

2.2.1 Public Access

By enhancing the Project Site from a privately-owned managed marsh to a publicly owned tidal marsh, all navigable waterways within the approximately 267.02-acre site would be newly available for public enjoyment. Navigable waters would be restored within the Project Site, creating newly available public access opportunities. Public access would consist of newly available kayak routes in navigable waters that would allow the public to view and enjoy the natural restored tidal marsh ecosystem. Kayak routes would begin at the Suisun Marina Boat Launch and would continue less than a mile to the Project Site (**Figure 2-4**). The route could be adjusted to longer or shorter lengths to suit the needs of each public visitor and would also be accessible for paddle boarding, canoeing, and other non-motorized watercraft activities. This would also improve fishing and wildlife viewing opportunities in the restored channels onsite. The upland islands created from remnants of breached levees are expected to become heavily vegetated, which would reduce public trespass and access on land. “No Trespassing” signs will be installed at a minimum of three per mile to deter trespass.

2.2.2 Interim Management

Current duck club maintenance and management activities conducted under the Regional General Permit 3 (RGP3) would continue until site preparation begins. Examples of regular duck club management include vegetation management and levee maintenance, including common reed (*Phragmites australis*) removal, mowing levees, and discing the managed marsh. Prior to the start of construction, regular duck club maintenance would continue to be subject to the RGP3 and associated 401 certification requirements as well as the SMP EIS/EIR and Biological Opinions (USACE, 2016; USACE, 2017). Restoration activities would require separate Proposed Project specific permits tiered off of the SMP (USACE, 2014).

2.2.3 Long-term Management

Long-term management activities would be required to maintain the Project Site following construction. Long-term management would be consistent with other restored tidal marsh properties within the Suisun Marsh. Anticipated management activities include invasive plant control, levee maintenance on the cross berm, and adaptive management actions, described in **Table 2-5** and Section 2.2.5, *Adaptive Management*. Regular levee maintenance and emergency levee repair are not permitted as part of the Proposed Project, and would be conducted under a Regional General Permit (RGP 3 and 5). Remnant portions of breached levees onsite may be used as a source of material for long-term cross berm maintenance.

**Wings Landing Tidal Habitat Restoration Project
Public Access & Kayak Routes
Figure 2-4**



**Suisun Marsh Natural
History Association**

**Peytonia Slough
Ecological Reserve**

**Hill Slough Tidal Restoration
Wildlife Area**

**State of
California**








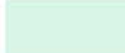

Peytonia Slough

Suisun Slough

**Rush Ranch
Open Space**

**Goat Island Marsh
Tidal Restoration**

Legend

-  Project Site
-  Suisun Marina Boat Launch
-  Kayak Routes
-  Goat Island Marsh Tidal Restoration
-  Hill Slough Tidal Restoration Wildlife Area
-  Peytonia Slough Ecological Reserve
-  Rush Ranch NERR
-  State of California
-  Suisun Marsh Natural History Association



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TABLE 2-5
WINGS LANDING TIDAL HABITAT RESTORATION PROJECT ADAPTIVE MANAGEMENT RESPONSES TO DEFICIENCIES IN ATTAINING PROJECT OBJECTIVES

Objective	Expected Outcome	Monitoring Group	Metric	Target	Intervention Threshold
Objective 1					
Create appropriate rearing habitat for salmonids, Delta Smelt, Longfin Smelt and other native fish species.	Levee breaches and channels would restore tidal exchange within the restoration site.	Physical & Hydrological	Topography, Tidal gauges, Photo-point pictures,	Slough stage and tidal stage in the restoration site shall be reciprocal. Connectivity to the breaches shall evolve with channel formation over time creating more habitat.	Levee breach becomes blocked by debris, sediment, or by beaver dams in first 5 years. Blockage severely limits water exchange within the restoration site or the habitat adjacent to it.
	Enhanced tidal exchange would increase primary and secondary productivity at the site and/or adjacent to it.	Food web	Phytoplankton, Zooplankton, Surface invertebrates, Benthic macroinvertebrates.	Increase in abundance of prey beneficial to Delta Smelt, Longfin Smelt, and salmonids shall be made available during certain times in the tidal cycle.	Highly-invasive, nuisance vegetation becomes established in first 5 years such that it poses an ecological threat to the success of restoration goals.
Objective 2					
Enhance available productivity for salmonids, Delta Smelt, Longfin Smelt, and other native fish species within, adjacent to, and in the vicinity of the restoration site.	Levee breaches would increase intertidal habitat and the exchange of food resources within and adjacent to the site for Delta Smelt, Longfin Smelt, and salmonids.	Food web	Phytoplankton, Zooplankton, Surface invertebrates, Benthic macroinvertebrates.	Increase in abundance of prey beneficial to Delta Smelt, Longfin Smelt, and salmonids shall be made available during certain times in the tidal cycle.	Levee breach becomes blocked by debris, sediment, or by beaver dams in first 5 years. Blockage severely limits water exchange within the restoration site or with the habitat adjacent to it.
					Highly-invasive, nuisance vegetation becomes established in first 5 years such that it poses an ecological threat to the success of restoration goals.
Objective 3					
Enhance the quality of habitats to support more special-status wildlife and plants that have the potential to occur on the restoration site.	Tidal restoration would create suitable habitat for secretive marsh birds.	Other monitoring	Secretive Marsh Birds	Shall try to maintain secretive marsh bird detections.	N/A

Objective	Expected Outcome	Monitoring Group	Metric	Target	Intervention Threshold
	Tidal restoration would not cause the SMHM population to decline.	Other monitoring	Aerial Vegetation surveys	Shall try to maintain long-term availability in SMHM habitat.	N/A
	Tidal restoration would create suitable habitat for special-status plants	Other monitoring	Aerial Vegetation surveys	Shall try to maintain habitat for special-status plants	N/A
Objective 4					
Avoid promoting conditions, such as invasive species infestations, that are in conflict with the above project objectives.	Invasive species composition and spread is reduced as much as possible.	Vegetation	Aerial imagery, site visit	Shall try to limit Invasive weeds coverage to less than 5% of the site.	<i>P. australis</i> invades previously <i>P. australis</i> free areas in the site. Invasive weed coverage increases.

Invasive Plant Removal

If invasive plants establish at Wings Landing and meet the intervention threshold identified in Table 2-5, control and management of targeted species may be proposed. Control techniques would include hand or mechanical removal, biological control, or chemical treatment. Only chemicals approved for such purposes in California may be used in any control action. Because funding and time to get to an infestation site may be limiting factors, monitoring may be done simultaneously with treatment to save time. Follow-up monitoring would occur at the time of year and frequency sufficient to detect change in invasive plant patches, and the effects of treatment. Equipment may include excavators or backhoes, or invasive plant removal work may be done using hand tools.

2.2.4 Effectiveness Monitoring and Management

Compliance and effectiveness monitoring would be conducted to meet the requirements of the 2019 USFWS BiOp, the 2019 NMFS BiOp, and the 2020 LTO ITP (Table 2-6). These monitoring data would be used to identify the need for actions necessary for the management and maintenance of the Project Site and to learn whether the stated objectives of the Proposed Project are being met. Effectiveness monitoring would occur at the Project Site, adjacent channels, and at the Reference Site, Rush Ranch Ecological Reserve, located approximately 500 feet east of the Project Site across Suisun Slough. Table 2-6 shows the Proposed Project's metrics and monitoring methods.

Compliance Monitoring

The Proposed Project's goal is to partially fulfill the 8,000 acres of tidal wetland restoration and 800 acres of mesohaline habitat obligations of the Fish Restoration Program Agreement in satisfaction of the 2019 USFWS BiOp, the 2019 NMFS BiOp, and the 2020 LTO ITP. Proposed Project personnel would monitor the Project Site to verify the post-construction restored acreages, as-built topography and elevations, and establishment of hydrologic connection restored via levee breaches.

Effectiveness Monitoring

Effectiveness monitoring involves comparison of metrics of ecological status and function at and near the Project Site and Reference Site, both before and after restoration actions (Before-After-Control-Impact sampling design). Sampling techniques would include vegetation surveys, hydrologic and water quality monitoring via instrumentation, and seasonal sampling of aquatic food web components. Measurements of physical and biological components would be used to evaluate the evolution of habitat on the Project Site including tidal channel and marsh morphology, vegetation response (including the growth of non-native invasive plants), and contributions to the food web. Targeted fish sampling is not a part of this proposed action, but incidentally caught fish would be handled as follows: (1) all larval fish too small for field identification would be preserved (mostly in ethanol) for later identification; (2) all fish large enough for field identification would be identified, measured, and released; and (3) all injured or dead Delta Smelt, Longfin Smelt, salmonids, and sturgeon would be preserved for later analysis.

TABLE 2-6
WINGS LANDING TIDAL HABITAT RESTORATION PROJECT METRICS AND MONITORING METHODS

			Pre-Breach	Post Breach	Years After Breach						
Metric	Method	Time of Year, Frequency			1	2	3	4	5	5-10	Sites and samples
Hydrologic Connections, Physical Processes and Hydrology											
Topography and bathymetry (e.g., channel morphology, pond depths)	Ground-based GPS survey, or LiDAR if available, aerial photos	During summer	X	X					X	Once Every 5 years	Project area, up to 6 cross-sections including breaches, major channels, marsh plain
Tidal Regime	Gauges or water level loggers	All year, automatic measurements (may focus on spring-fall or tidal extremes)		X	X		X		X	D	1-3 sites (breaches, main channel, marsh plain)
Water Quality											
Water quality (temperature, EC, turbidity, pH, DO)	Continuous data sonde	Automatic measurements (may focus on spring-fall period)	X	X	X	X	X	X	X	D	Up to 1-3 sites (Permanent, telemetered sonde at Rush Ranch, temporary sondes at various locations within project site)

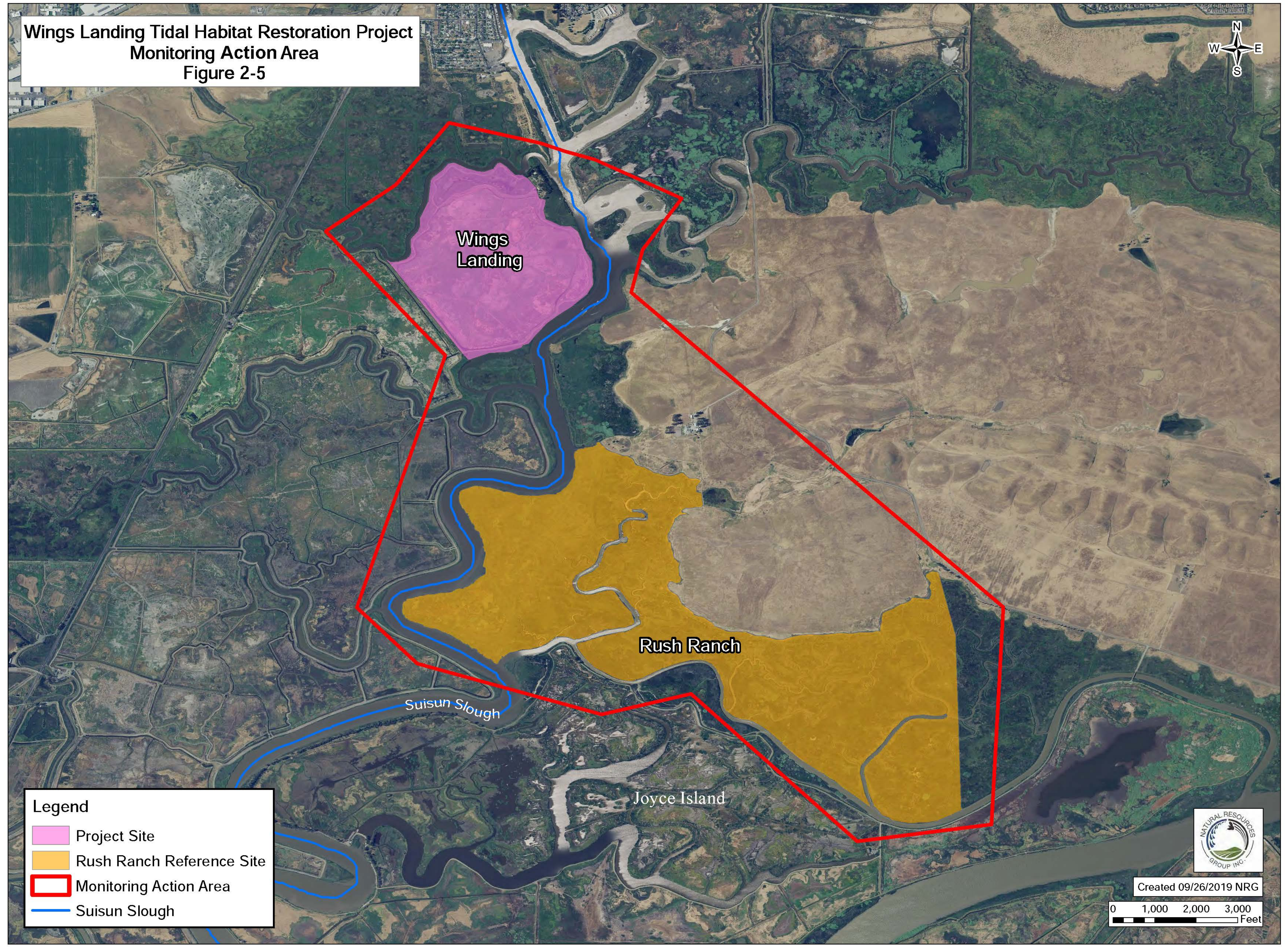
			Pre-Breach	Post Breach	Years After Breach						
Metric	Method	Time of Year, Frequency			1	2	3	4	5	5-10	Sites and samples
	Discrete seasonal samples	Up to monthly Mar-Nov, winter sampling discretionary (up to 12 sampling events)	X	X	X	X	X	X	X	D	At sonde locations and concurrently with invertebrate sampling.
Nutrients (NH ₄ -PO ₄)	Grab samples, standard methods	Up to monthly Mar-Nov, winter sampling discretionary (up to 12 sampling events)	X	X	X	X	X	X	X	D	Up to 27 sites (12 sites within Wings Landing, 9 sites in Peytonia, Boynton, and Suisun Sloughs, 6 sites in Rush Ranch
Particulate organic matter (POM), dissolved organic matter (DOM)	Grab samples, standard methods or FDOM on sonde.	Up to monthly Mar-Nov, winter sampling discretionary (up to 12 sampling events)	X	X	X	X	X	X	X	D	Up to 27 sites (12 sites within Wings Landing, 9 sites in Peytonia, Boynton, and Suisun Sloughs, 6 sites in Rush Ranch
Food Web Productivity											
Chlorophyll a	Optical sensor (if available); Grab samples	X	X	X	X	X	X	X	Reduced frequency	X	

			Pre-Breach	Post Breach	Years			After	Breach		
Metric	Method	Time of Year, Frequency			1	2	3	4	5	5-10	Sites and samples
Phytoplankton	Plankton grab samples lab sorting	X	X	X	X	X	X	X	Reduced frequency	X	Up to 27 sites (12 sites within Wings Landing, 9 sites in Peytonia, Boynton, and Suisun Sloughs, 6 sites in Rush Ranch
Zooplankton	Mesozooplankton and mysid net trawls, lab sorting	X	X	X	X	X	X	X	Reduced frequency	X	
Benthic macroinvertebrates	Benthic grab samples or sediment cores, lab sorting	X	X	X		X	X	X	Reduced frequency	X	
Surface invertebrates	Neuston tow	X	X	X		X	X	X	Reduced frequency	X	Up to 27 sites (12 sites within Wings Landing, 9 sites in Peytonia, Boynton, and Suisun Sloughs, 6 sites in Rush Ranch
Epibenthic/epiphytic macroinvertebrates	Sweep nets	X	X	X		X	X	X	Reduced frequency	X	





			Pre-Breach	Post Breach	Years After Breach						
Metric	Method	Time of Year, Frequency			1	2	3	4	5	5-10	Sites and samples
Wetlands and Vegetation											
General habitat conditions	Photo points (qualitative record)	Annual during growing season (summer)	X		X	X	X	X	X	Every 5 years	Up to 10 points across site
EPA recommended level II assessment (optional)	California Rapid Assessment Method (CRAM)	Once during growing season (summer)	X		X				X	D	Vegetated marsh plain
Vegetation composition and cover	Aerial imagery and other methods consistent with regional monitoring requirements	Monitoring will be coordinated with the triennial marsh-wide vegetation survey effort and include full surveys consistent with SMPA requirements*	X	X	X			X		Year 7 and 10, D	Entire site.
Invasive plants	Visual assessment, ground surveys with aerial imagery during triennial marsh-wide surveys	Annual during early growing season or coincident with land-management visits	X	X	X	X	X	X	X	Every 3 years	Assess entire site. Annual checks to continue during qualitative site surveys.
Other Monitoring											
Salt Marsh Harvest Mouse	Aerial Vegetation surveys	Every 3-5 years	X	X					X	Every 5 years	Entire site

			Pre-Breach	Post Breach	Years After Breach						
Metric	Method	Time of Year, Frequency			1	2	3	4	5	5-10	Sites and samples
Secretive marsh birds	Currently accepted sampling methods	3x during survey season, every other year, or as methods specify	X	X	X		X		X	Every 5 years	Several points around Wings Landing

Wings Landing Tidal Habitat Restoration Project
Monitoring Action Area
Figure 2-5



Legend

-  Project Site
-  Rush Ranch Reference Site
-  Monitoring Action Area
-  Suisun Slough



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Wings Landing Tidal Habitat Restoration Project
Habitat Sampling Areas
Figure 2-6



Legend

Project Site

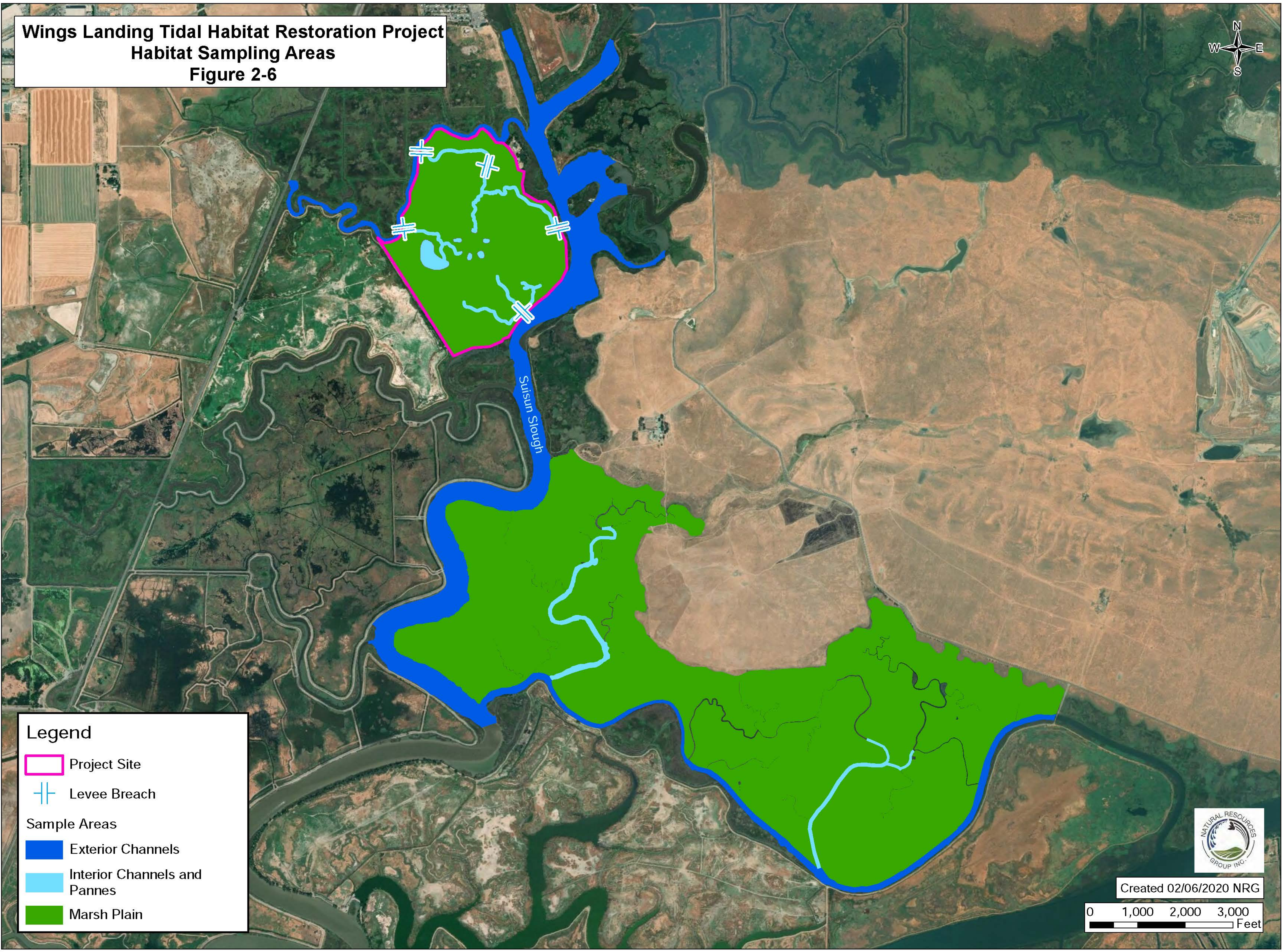
Levee Breach

Sample Areas

Exterior Channels

Interior Channels and Pannes

Marsh Plain



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2.1.5 Adaptive Management

Adaptive management is an approach to natural resource management which incorporates changes to management practices, including corrective actions as determined to be appropriate by the landowner and the permitting agencies. Indicators of functional outcomes from Proposed Project construction and operation will be measured to evaluate progress toward expected outcomes of each objective and to inform corrective measures if thresholds for action are met. Monitoring will address physical habitat, hydrological regime, water quality, aquatic food web (primary and secondary producers), and wetland habitat types.

Adaptive management includes those activities necessary to address the effects of natural changes through time, changes in the scientific understanding of Delta Smelt, Longfin Smelt, and salmonids and their needs, advancements in data collection, changes in the understanding of natural resource land management and “BMPs,” climate change, fire, flood, force majeure or any other events that necessitate a change in the management of the Project Site in order to preserve the Project Site’s conservation values.

A range of activities could occur post-construction. Some activities are potential management responses that could be triggered if monitoring data reach an intervention threshold that indicates a problem or unsatisfactory progress toward objectives. Others are maintenance activities that may be necessary for long-term management of the Project Site. Before implementing any adaptive management actions, the landowner and the permitting agencies would consider whether such actions would help ensure the continued viability of Project Site’s conservation values and biological resources. Future management responses are subject to approval of the USFWS, NMFS, and CDFW to determine if the activities are necessary for meeting the objectives of the Proposed Project. If, through implementing any of the activities associated with adaptive management, the Proposed Project effects differ from those analyzed herein in a manner or to an extent not previously considered, reinitiation will be required.

Table 2-5 provides a draft summary of the four Proposed Project objectives, the expected outcomes related to those objectives, the metrics by which progress towards meeting the objectives is measured, as well as triggers (or intervention thresholds) for undertaking a management response if goals are not being met or problems occur which require intervention.

2.2 Environmental Commitments and Mitigation Measures

The Proposed Project is tiered from the SMP EIS/EIR and therefore would incorporate the applicable Environmental Commitments (ECs) and mitigation measures identified in the SMP EIS/EIR Chapter 2 and Appendix F, *Mitigation Monitoring and Reporting Program*, where appropriate. The full text of the measures and ECs are included in **Appendix A, Wings Landing Tidal Restoration Environmental Commitments and Mitigation Measures**. A general list is provided below.

- Standard Design Features and Construction Practices
- Access Points and Staging Area BMPs
- Erosion and Sediment Control Plan
- Stormwater Pollution Prevention Plan

- Hazardous Materials Management Plan
- Air Quality BMPs and Mitigation Measures
- Biological Resources BMPs
- General
- Environmental Resources Worker Training Program
- Special-Status Plant Species Protection
- Special-Status Wildlife Species Protection
- Mammals
- Birds
- Raptors
- California Clapper Rail and California Black Rail
- California Least Tern
- Western Pond Turtle
- Biological Monitoring
- Construction Period Restrictions
- Non-Native Plant Control
- Cultural Resources
- Greenhouse Gases
- Pre-Construction and Final Design BMPs
- Construction BMPs

In addition, ECs for Managed Wetland Activities are included to provide resource protection during long-term management (maintenance of the cross berm) and post-project compliance and effectiveness monitoring.

Proposed changes to Biological Resources BMPs for Mammals, specifically salt marsh harvest mouse, are discussed in Chapter 3.2, *Biological Resources*.

In order to comply with DWR's Greenhouse Gas Emission Reduction Plan (GGERP), all applicable GHG emission reduction measures have been incorporated into the Proposed Project. Applicable project-level reduction measures include 15 construction BMPs as well as the implementation of statewide equipment and fuel regulations. The full list of GHG emission reduction measure BMPs incorporated from DWR's GGERP can be found in **Appendix A**, and are included as ECs of the Proposed Project.

2.4 Agency Involvement

The SMP EIS/EIR described the agencies involved in preparing the SMP and the SMP EIS/EIR as well as those that are expected to use the SMP EIS/EIR (Chapter 1). These agencies assumed roles and

responsibilities either through their agency's authority or through their participation in the National Environmental Policy Act (NEPA) and CEQA process.

Similarly, the lead agency, responsible agencies, and trustee agencies expected to use this CEQA document are listed in **Table 2-7** below.

**TABLE 2-7
PROPOSED PROJECT AGENCY INVOLVEMENT**

Agency	Jurisdiction
Lead Agency	
California Department of Water Resources	Project Proponent
Trustee Agency	
State Lands Commission	State-owned "sovereign" lands
California Department of Fish and Wildlife	California Endangered Species Act
Responsible Agency	
California Department of Fish and Wildlife	California Endangered Species Act
U.S. Army Corps of Engineers	Clean Water Act (CWA) Section 404; Rivers and Harbors Act Section 10
NOAA-National Marine Fisheries Service	Federal Endangered Species Act (FESA); Magnuson-Stevens Act
U.S. Fish and Wildlife Service	FESA
Regional Water Quality Control Board (Region 2)	CWA Section 401 compliance; Porter-Cologne Water Quality Control Act
State Office of Historic Preservation	National Historic Preservation Act Section 106 compliance
San Francisco Bay Conservation and Development Commission (BCDC)	McAteer-Petris Act compliance; Suisun Marsh Preservation Act; Coastal Zone Preservation Act
Delta Stewardship Council	Delta Plan consistency review

NOTES:

Trustee Agency: One that has jurisdiction over certain resources that are held in trust for the people of California but does not necessarily have legal authority with respect to approving or carrying out the Proposed Project.
Responsible Agency: One that has responsibility for carrying out or approving the Proposed Project.

CHAPTER 3

ENVIRONMENTAL ANALYSIS

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 modifications fall within the scope of the certified *Final Suisun Marsh Habitat Management, Preservation, and Restoration Plan Environmental Impact Statement/Environmental Impact Report* (SMP EIS/EIR) with respect to implementing the Wings Landing Tidal Habitat Restoration Project (Proposed Project).

3.1.1 Impact Conclusions

The Proposed Project, as well as the analysis contained within 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 (Sections 15162.1 and 15162.2). All of the mitigation measures included in the certified SMP EIS/EIR were adopted for the previously approved SMP. The Proposed Project would not require mitigation measures that would be considerably different from those identified in the SMP EIS/EIR (Section 15162.3(d)). The level of overall activities analyzed as part of the certified SMP EIS/EIR for restoration projects and the location is comparable to that under the Proposed Project. The potential environmental impacts associated with the Proposed Project were adequately identified and addressed in the certified SMP EIS/EIR.

All of the ECs described in the SMP EIS/EIR would be adopted, as appropriate, for the Proposed Project. As described above in Section 2.3.1, *Revised Mammal Best Management Practices*, some revisions are proposed to the Salt Marsh Harvest Mouse and Suisun Shrew ECs and Conservation Measures due to feasibility constraints or for improved benefits. These revisions are for protection of these species, and do not substantially change the intent or severity of these BMPs or increase the level of impacts.

Another change to the ECs is the inclusion of additional BMPs focused on reducing greenhouse gas emissions. These additional ECs are consistent with Greenhouse Gas Emission Reduction Plan (GGERP) and also do not substantially change the intent or severity of the BMPs adopted from the SMP EIS/EIR. The significant and unavoidable impacts related to utilities and cultural resources identified in the SMP EIS/EIR would not occur under the Proposed Project because of the location of the Proposed Project and because there are no utilities or known significant cultural resources on the Project Site.

Table 3.0-1 summarizes the status of impact determinations and the need for mitigation measures by resource based on the analysis contained within this document and compared to the SMP EIS/EIR for restoration projects.

TABLE 3.0-1
STATUS OF IMPACTS BY RESOURCE OF THE PROPOSED PROJECT COMPARED TO THE FINAL SMP EIS/EIR

Resource	SMP EIS/EIR Findings	Addendum Findings	Change from SMP EIS/EIR	Required Mitigation in SMP
Aesthetics	LTS	NI	Less	No
Air Quality and Greenhouse Gases	LSM	LTS	Less	Yes
Agricultural Resources	NA	NA	NA	No
Biological Resources	LTS	LTS	Same	No
Cultural Resources	LSM	LSM	Same	Yes
Geology, Soils, and Mineral Resources	LTS	LTS	Same	No
Greenhouse Gas Emissions	LTS	LTS	Same	No
Hazards and Hazardous Materials	LTS	LTS	Same	No
Hydrology and Water Quality	LTS	LTS	Same	No
Land Use	LTS	NI	Less	No
Noise	LSM	NI	Less	No
Population and Housing	LTS	NI	No	No
Recreation	NI	NI	Same	No
Transportation	LTS	LTS	Same	No
Utilities and Public Services	LSM	NI	Less	Yes

NOTE: The impact determinations summarized in this table reflect the multiple thresholds analyzed in this document. Each resource was given the most severe impact determination.

LTS = Less-than-Significant Impact

LSM = Less-than-Significant with Mitigation

NI = No Impact

NA = Not Applicable

3.1.2 Resources

The analysis in this addendum focuses on the changes to impacts on the environment that could occur as a result of implementing the Proposed Project under the SMP EIS/EIR. The scope of analysis contained within this section addresses each environmental resource area that was previously analyzed in the certified Final SMP EIS/EIR. The resource sections provide a summary of the SMP EIS/EIR and Proposed Project analysis of specific resources.

3.2 Air Quality

3.2.1 Existing Conditions

The Project Site is located in Suisun Marsh, Solano County, which is influenced by the West Coast Marine climate and has Mediterranean seasonally defined characteristics. Summer temperatures average at a low of 57°F and a high of 87°F, while winter temperatures average at a low of 40°F and a high of 58°F. Westerly winds are most common in the region; however, atmospheric conditions can sometimes

cause air to flow from east to west, which typically create more polluted conditions than marine air from the west.

The Project Site, within the north-central portion of the Suisun Marsh, falls within the San Francisco Bay Area Air Basin (SFBAAB) near the boundary of the Yolo-Solano Air Quality Management District (YSAQMD). The SMP EIS/EIR utilized the Bay Area Air Quality Management District (BAAQMD) CEQA thresholds when they were in draft phase to analyze air quality impacts. These draft thresholds have since been approved and are appropriate for the Proposed Project. The SFBAAB's attainment status for criteria air pollutants, according to state and federal standards, are summarized in **Table 3.1-1**. No sensitive receptors, including residential buildings, schools, colleges or universities, daycare facilities, hospitals, or senior-care facilities, have been constructed within 1,000 feet of the Project Site since certification of the SMP EIS/EIR.

**TABLE 3.1-1
SFBAAB CRITERIA POLLUTANT ATTAINMENT STATUS**

Pollutant and Averaging Time	State Standards Designation	Federal Standards Designation
Ozone (1-hour)	Nonattainment	No Federal Standard
Ozone (8-hour)	Nonattainment	Nonattainment
Carbon Monoxide	Attainment	Unclassified/Attainment
Nitrogen Dioxide	Attainment	Unclassified/Attainment
Sulfur Dioxide	Attainment	Unclassified/Attainment
Respirable Particulate Matter (PM ₁₀)	Nonattainment	Unclassified
Fine Particulate Matter (PM _{2.5})	Nonattainment	Nonattainment
Lead	Attainment	Unclassified/Attainment
Visibility Reducing Particles	Unclassified	No Federal Standard
Sulfates	Attainment	No Federal Standard
Hydrogen Sulfide	Unclassified	No Federal Standard
Vinyl Chloride	Unclassified	No Federal Standard

NOTE: California Air Resources Board (CARB) makes area designations for ten criteria pollutants (O₃, CO, NO₂, SO₂, PM₁₀, PM_{2.5}, lead, visibility reducing particles, sulfates, and hydrogen sulfide). CARB does not designate areas according to the vinyl chloride standard.

SOURCE: California Air Resources Board, 2017. Area Designation Maps. Available: www.arb.ca.gov/desig/adm/adm.htm. Accessed March 25, 2019.

3.2.2 SMP EIS/EIR

The SMP EIS/EIR determined that there would be less-than-significant impacts to air quality with implementation of mitigation measures and BMPs. The air quality impacts from the Proposed Project are analyzed to ensure consistency with those analyzed in the SMP EIS/EIR. As described in **Table 3.1-2**, construction-related emissions were proposed to be mitigated through the limitation of concurrent construction activity within the plan area, use of diesel particulate filters (DPF), implementation of BAAQMD BMPs, and limitation of concurrent equipment use. Operational impacts were not addressed in the SMP EIS/EIR as they are assumed to be negligible.

Table 3.1-2 excludes those SMP EIS/EIR air quality impacts that are not applicable to the Proposed Project. Impacts AQ-2 and AQ-6 are associated with current management activities, which are considered baseline conditions for the analysis. Impacts AQ-4 and AQ-8 are only relevant if there is potential for

restoration activities and new management activities to occur concurrently. These conditions would not occur with the Proposed Project.

**TABLE 3.1-2
SUISUN MARSH PLAN AIR QUALITY IMPACT ANALYSIS**

SMP EIS/EIR Impact	SMP EIS/EIR: Significance Before Mitigation	SMP EIS/EIR Mitigation Measures	SMP EIS/EIR: Significance after MMs
AQ-1: Generation of Construction-Related Emissions in Excess of Draft BAAQMD Standards Associated with Restoration	S	AQ-MM-1: Limit Construction Activity During Restoration AQ-MM-2: Reduce Construction NO _x Emissions AQ-MM-3: Implement All Appropriate BAAQMD Mitigation Measures	LS
AQ-3: Generation of Construction-Related Emissions in Excess of Draft BAAQMD Standards Associated with New Management Activities	LTS	NA	NA
AQ-5: Construction-Related Diesel Health Risk Associated with Restoration	LTS	NA	NA
AQ-7: Construction-Related Diesel Health Risk Associated with New Management Activities	LTS	NA	NA
AQ-9: Increase in Construction Emissions in Excess of Federal <i>de Minimis</i> Thresholds	LTS	NA	NA
AQ-10: Increase in Construction-Related Odor	LTS	NA	NA

NOTES:

LTS = Less-than-Significant

S = Significant

NA = Not Applicable

3.2.3 Impact Analysis

a) Would the Proposed Project conflict with or obstruct implementation of the applicable air quality plan?

The most recently adopted air quality plan to address nonattainment issues for the Bay Area is the 2017 Bay Area Clean Air Plan (2017 CAP; BAAQMD, 2017a). The 2017 CAP provides a regional strategy to protect public health by continuing progress toward attaining all state and federal air quality standards, thereby eliminating health risk disparities from exposure to air pollution among Bay Area communities. The 2017 CAP includes 85 control measures designed to decrease emissions of the air pollutants that are most harmful to Bay Area residents, such as particulate matter, ozone, and toxic air contaminants (BAAQMD, 2017a).

The BAAQMD CEQA Guidelines recommend that a project's consistency with the current 2017 CAP be evaluated using the following three criteria:

- a) The project supports the goals of the CAP,
- b) The project includes applicable control measures from the CAP, and
- c) The project does not disrupt or hinder implementation of any control measures from the CAP.

If it can be concluded with substantial evidence that a project would be consistent with the above three criteria, then the BAAQMD considers it to be consistent with air quality plans prepared for the Bay Area (BAAQMD, 2017b).

The primary goals of the 2017 CAP are to attain air quality standards, reduce population exposure, and protect public health in the Bay Area. The BAAQMD-recommended guidance for determining if a project supports the goals in the 2017 CAP is to compare project-estimated emissions with BAAQMD thresholds of significance. If the Proposed Project's emissions would not exceed the thresholds of significance after the application of all feasible mitigation measures, it would be consistent with the goals of the 2017 CAP. As indicated in the following discussion with regard to air quality impact Question (b), the Proposed Project would not exceed the BAAQMD thresholds of significance and would therefore result in a less-than-significant impact related to construction emissions and would not result in long-term adverse air quality impacts. Therefore, the Proposed Project would support the primary goals of the 2017 CAP.

As noted above, the 2017 CAP contains 85 control measures aimed at reducing air pollution in the Bay Area. Projects that incorporate all feasible air quality plan control measures are considered consistent with the 2017 CAP. With no specific control measures from the 2017 CAP applicable, the Proposed Project would not hinder implementation of the 2017 CAP control measures.

In summary, the Proposed Project would be consistent with all three criteria listed above to evaluate consistency with the 2017 CAP and, therefore, would not conflict with or obstruct implementation of the 2017 CAP. Therefore, impacts related to air quality plans as a result of the Proposed Project would remain within the scope of the impacts that were identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

b) Would the Proposed Project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

The Proposed Project would result in primarily construction-related emissions, which were modeled for this analysis using the California Emissions Estimator Model (CalEEMod), version 2016.3.2. Project-specific information was used for modeling when possible; where project-specific data is unavailable, CalEEMod defaults were used, which capture assumed values consistent with standard practice.

Construction of the Proposed Project would occur within one calendar year, beginning in July 2020 (or 2021 if necessary) and ending no later than November 30. **Table 3.1-3** below provides the inputs to CalEEMod based on the project description. **Table 3.1-4** provides the equipment assumptions associated with Proposed Project element/sub-phase.

**TABLE 3.1-3
CONSTRUCTION ASSUMPTIONS BY SUB-PHASE**

Proposed Project Element/Sub-phase Name	Total Work Days	Daily Worker Trips	Daily Vendor Trips	Total Haul Trips
Site Preparation	5	13	34	0
Tidal Depressions	45	23	2	1,450
Borrow-Ditch Restoration	45	13	2	2,204
Channel Enhancement	30	18	2	629
Channel Creation	30	18	2	527
Channel Plug Creation	15	28	2	359
Cross-Berm Improvement	30	30	2	3,304
Structure Removal	10	28	2	23
Levee Breaches	10	18	2	345
Site Stabilization	7	20	34	0

NOTE: Assumes 8-hour work days, 10.8 miles for worker trips, 7.3 miles for vendor trips, and 0.5 mile for haul trips.
SOURCE: ESA, 2019.

Operational emissions of the Proposed Project would come from minimal long-term management activities and visits to the wetland from the public. As stated above, operational impacts were not analyzed in the SMP EIS/EIR, as they were assumed to be negligible. Because the Project Site is changing from a managed wetland to natural tidal habitat, the amount of management activities, and consequently, associated emissions, will decrease with implementation of the Proposed Project. Therefore, operational emissions are not modeled in this analysis and are assumed to be negligible.

Because the Proposed Project would result in a less-than-significant impact associated with construction emissions of criteria air pollutants, it would not result in a cumulatively considerable net increase in any of the criteria pollutants for which the SFBAAB is in nonattainment.

**TABLE 3.1-4
EQUIPMENT COUNT ASSUMPTIONS**

Proposed Project Element/Sub-phase Name	Excavators	Rubber Tired Dozers	Tractors, Loaders, Backhoes	Compactors	Pumps
Site Preparation	2	1	2	--	--
Tidal Depressions	2	1	4	--	2
Borrow-Ditch Restoration	2	1	--	--	2
Channel Enhancement	2	1	2	--	2
Channel Creation	2	1	2	--	2
Channel Plug Creation	2	1	4	--	4
Cross-Berm Improvement	2	1	4	1	4
Structure Removal	2	1	4	--	4
Levee Breaches	2	1	--	--	4

Proposed Project Element/Sub-phase Name	Excavators	Rubber Tired Dozers	Tractors, Loaders, Backhoes	Compactors	Pumps
Site Stabilization	2	1	2	1	2

NOTE: Assumes 8-hour usage.

SOURCE: ESA, 2019.

As shown in **Table 3.1-5**, estimated construction emissions fall below the BAAQMD thresholds, and, as discussed above, operational emissions associated with the site would decrease following implementation of the Proposed Project. Therefore, potential impacts related to the construction and operation of the Proposed Project would be within the scope of the impacts identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

**TABLE 3.1-5
PROPOSED PROJECT CONSTRUCTION EMISSIONS IN POUNDS PER DAY**

Construction Year	ROG (ppd)	NO _x (ppd)	PM ₁₀ (ppd)	PM _{2.5} (ppd)
2020	3.4	35.1	1.7	1.6
BAAQMD Thresholds	54	54	82	54
Exceeds Threshold?	No	No	No	No

NOTE: Project construction emissions estimates were made using CalEEMod version 2016.3.2. See **Appendix C** for model outputs and more detailed assumptions.

SOURCE: ESA, 2019.

c) Would the Proposed Project expose sensitive receptors to substantial pollutant concentrations?

Because the nature of the land use is not changing fundamentally (e.g. there is no new development), the Proposed Project would not add any new operational sources of air pollutants to the Project Site. Operational emissions are limited to infrequent management activities and occasional visits from the public. As discussed above, because the Project Site is changing from a managed wetland to natural tidal habitat, the amount of management activities, and consequently, associated emissions, would decrease from what was identified in the SMP EIS/EIR. Additionally, there are no sensitive receptors within 1,000 feet of the Project Site. Therefore, potential impacts of the Proposed Project related to sensitive receptors would remain within the scope of the impacts identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

d) Would the Proposed Project result in other emissions (such as those leading to odors adversely affecting a substantial number of people)?

Because the Project Site would remain a wetland and construction of permanent structures would not occur, the Proposed Project would not add any new odor sources to the vicinity. Potential for odor-generating emissions is consistent with that identified in the SMP EIS/EIR, and the impact would be less-than-significant. No mitigation is required.

3.3 Biological Resources

3.3.1 Existing Conditions

Location and Land Use

The Project Site is located in the ecologically diverse Great Valley Ecological Section, Montezuma Hills subsection (Miles and Goudey, 1997) in the northern part of Suisun Marsh just south of Suisun City (**Figures 1-1 and 1-2**). Suisun Marsh is generally characterized by tidal marsh, muted tidal, and diked managed wetlands and associated uplands intersected by channels and sloughs that connect with the adjacent Suisun Bay, Grizzly Bay, and Honker Bay. Much of Suisun Marsh is now disconnected from direct tidal influence by constructed berms and levees, allowing water levels within the marsh to be manipulated to meet a variety of environmental and recreational objectives including duck hunting, which is one of the primary land uses in Suisun Marsh.

The Project Site is managed as a duck club and is disconnected from direct tidal influence. Under present management practices, water levels in the Project Site are carefully managed throughout the year to optimize the site conditions for waterfowl habitat and duck hunting recreation. This is made possible by the use of passive water control structures that include flashboards and a flap gate. The Project Site also includes a brood pond, which is a small area of managed marsh at the north end of the Project Site that is managed for waterfowl nesting, and includes tidal marsh habitat outboard of the exterior levee, which is subject to daily tidal fluctuation.

Fish

The SMP EIS/EIR describes the life history, habitat requirement, and factors that affect abundance of special-status fish species that could be affected by implementation of the SMP. In analyzing the potential to occur for each species, the SMP EIS/EIR concluded the following: Central Valley steelhead, Central California coast steelhead, Central Valley spring-run Chinook Salmon, and Sacramento River winter-run Chinook Salmon migrate through Suisun Bay; Central Valley fall-/late fall-run Chinook Salmon, Delta Smelt, Longfin Smelt and Sacramento Splittail are special-status fish known to occur in Suisun Marsh; and Suisun Marsh may be used by Green Sturgeon for rearing juveniles and some adults. Table 6.1-4, *Fish Life Stage Timing in Suisun Marsh*, summarizes the time of year that each species can be found in Suisun Marsh at each life stage.

Habitat types important to the native fishes of Suisun Marsh include shallow bays and channels; tidal flats, and low, mid, and high tidal marshes (Goals Project, 1999). Subtidal and low intertidal habitat is most likely to provide direct benefits to juvenile Chinook Salmon, Splittail, Sturgeon, steelhead, and some native resident species. Low intertidal habitat would also provide indirect benefits to Delta and Longfin Smelt from transported phytoplankton from the marshes. Low marsh may include a small band of middle marsh vegetation and would have developed sinuous tidal channels in the marsh plain. Aquatic species such as Splittail, Striped Bass, and resident native species may use the marsh plain when inundated, but would more likely benefit from exported primary and secondary pelagic production. Middle marsh, which includes intertidal mudflats and a flooded marsh plain at high tide, would provide similar benefits to low marsh habitat. High marsh is occasionally completely inundated, and fish may benefit from increased export of secondary production, such as terrestrial insects and epibenthic

invertebrates, and indirectly through export of organic carbon and nutrients (USFWS, 2011). Native resident fish species are most common in dead-end sloughs, whereas seasonal species are more often found in larger sloughs, and introduced species are found in both habitats (Suisun Ecological Workgroup, 2001). In addition, there is evidence that species diversity and native fish abundance tend to be higher in smaller sloughs, where habitat diversity is higher, than in medium and large sloughs, where habitat diversity is lower (Matern et al., 1997; Matern et al., 2002).

Fish are also sensitive to water quality parameters such as salinity, turbidity and water temperature. Native species peak in abundance during the early, cooler part of the year (January through July), while non-native warmer water fish are most abundant mid-June to September (Matern et al. 2002). The majority of non-native fish species prefers low salinity and inhabits the Marsh during low-salinity periods, typically from spring to early summer. Native fish species spawn and rear in the Marsh from February through June and require salinity of less than 0.5 parts per thousand (ppt).

Vegetation and Wetlands

Under the discussion of Existing Conditions for Vegetation and Wetlands, the SMP EIS/EIR describes the Suisun Marsh regions and existing land cover types, including wetlands and special-status plant species. Suisun Marsh is divided into four regions, which were developed to ensure that restoration activities are distributed throughout the Marsh (USFWS, 2011). The Project Site is within Region 1, which represents approximately 23 percent of the total land area in the Marsh and in which the primary land use is private duck clubs. The SMP EIS/EIR describes the Suisun Marsh as a mosaic of tidally-influenced bays and sloughs, tidal marsh, managed wetlands, and uplands representing over 99 percent of the land cover. The remaining land cover in Suisun Marsh is comprised of freshwater streams, seasonal wetlands, and riparian habitat. Managed wetlands and tidal wetlands account for the majority of land cover in Region 1, at 67 percent and 12 percent, respectively. At the time the SMP EIS/EIR was written, special-status plant surveys had not been performed; however, a list of special-status plant species known to occur, or with potential to occur, in Suisun Marsh was developed (USFWS, 2011; see Table 6.2-3 of the SMP EIS/EIR).

For the Proposed Project, ESA analyzed special-status plant species that are known to occur or have a moderate to high likelihood to occur within the vicinity of the Project Site. This data was compiled based on the following sources:

Floristic surveys (ESA, 2016; ESA, 2018)

Mason's lilaeopsis, Special Status Plant surveys (NRG, 2019)

California Natural Diversity Database (CNDDB) (CDFW, 2016; CDFW, 2019)

U.S. Fish and Wildlife Service ECOS Environmental Conservation Online System. Accessed online on February 27, 2019. [USFWS Environmental Conservation Online System \(USFWS, 2019\)](#)

California Native Plant Society Inventory of Rare and Endangered Plants (CNPS, 2019)

Based on ESA's analysis, all of the special-status plant species that are known to occur or have a moderate to high potential to occur in the Project Site are covered under the SMP EIS/EIR, except Bolander's water hemlock (*Cicuta maculata* var. *bolanderi*), which is discussed in more detail under the impact analysis below.

Vegetation within Suisun Marsh has been mapped and classified by the CDFW. The most recent update occurred in 2015 (CDFW, 2015), and the shapefiles of mapped vegetation are available from the CDFW Vegetation Classification and Mapping Program (VegCAMP). Based on the vegetation observed within the Project Site during ESA's 2016 and 2018 field investigations, the CDFW mapping is generally accurate four years after the 2015 mapping.

The 2015 vegetation map shows most of the managed marsh mapped as "Lacustrine, Estuarine," likely because this area is flooded for several months of the year during the duck hunting season. During the growing season the managed marsh supports a mixed community of annual and perennial herbaceous plants including: swamp pricklegass (*Crypsis schoenoides*); rough cocklebur (*Xanthium strumarium*); fat-hen (*Atriplex prostrata*); brass buttons (*Cotula coronopifolia*); sea purslane (*Sesuvium verrucosum*); and, salt dodder (*Cuscuta salina*). Within this matrix of low-growing herbs there are small patches of narrowleaf cattail (*Typha angustifolia*), California club rush (*Schoenoplectus californicus*), salt marsh club rush (*Bolboschoenus maritimus*), and Baltic rush (*Juncus balticus*), and some larger areas dominated by pickleweed (*Salicornia pacifica*). Several patches of tall wheat grass (*Elymus ponticus*) occur in upland areas. Tall wheat grass was planted by CDFW in some areas of Suisun Marsh in the 1980s and 1990s to provide vegetative cover for nesting waterfowl (Ackerman et al., 2014). The stands within the Project Site may be from that effort, or may have been planted by the Wings Landing land manager many decades ago in an effort to improve waterfowl nesting habitat onsite.

The brood pond, located at the northern tip of the Project Site, has undergone a shift in vegetation dominance over the past four years since the CDFW mapping effort that showed it was mostly open water. The quailbush (*Atriplex lentiformis*) stand and eucalyptus grove are still present, but the majority of the brood pond is dominated by cattails with small areas of open water and some small stands of common reed (*Phragmites australis*) and Himalayan blackberry (*Rubus armeniacus*) present on the west end.

Upland areas, including islands, levee tops, and land side levee slopes, mainly support exotic upland annuals. The dominant plant along the levee slopes is wild radish (*Raphanus sativus*) and associates include ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), prickly lettuce (*Lactuca saligna*, *L. serriola*), and wall barley (*Hordeum murinum*). For the most part, upland areas occur in a narrow band along the inside of the levee road; these areas are not captured on the vegetation map because of their small size. However, as discussed above, the large upland stands of tall wheat grass were captured in the CDFW vegetation mapping and are classified as "Mediterranean California naturalized annual and perennial grassland."

The outboard side of the levee between the levee road and the open water of the surrounding sloughs is densely vegetated with tules (*Schoenoplectus acutus*, *S. californicus*, *S. americanus*). Vegetation at the water's edge consists almost entirely of tules while further up the slope, toward the road, mid-marsh and high-marsh associates are more prevalent. These associates include cattail, common reed, California rose, Himalayan blackberry, leather root (*Hoita macrostachya*) and Suisun Marsh aster (*Symphyotrichum lentum*). This area experiences daily tidal inundation in areas below the mean higher high water tidal datum.

Excavated channels within the Project Site have either perennial or seasonal water and lack vegetation. These are classified as managed perennial channel or managed seasonal channel based on the permanence of water. Tidal channels include Peytonia Slough, Suisun Slough, and Boynton Slough and define the perimeter of the Project Site.

Wildlife

Suisun Marsh provides essential habitat for more than 221 bird species, 45 animal species, 16 different reptilian and amphibian species (Audubon 2019). It is identified as an Important Bird Area by Audubon noting that the mix of freshwater and tidal marsh results in nearly every wetland bird species in the region occurring in the marsh, often in great numbers (Audubon, 2019). The SMP EIS/EIR describes the Suisun Marsh as “a mosaic of tidally influenced bays and sloughs and tidal wetland habitats, managed wetlands and uplands” (USFWS, 2011). The area includes land cover types including natural vegetation communities, managed vegetation communities, aquatic communities, and developed land, all of which are present at the Project Site and provide habitat for wildlife. Most of the Project Site is comprised of managed wetlands, upland (i.e., levees) and developed habitat that have been historically managed for duck hunting.

Managed Wetlands

Managed wetlands in Suisun Marsh provide nesting, foraging and wintering habitat for waterbirds, shorebirds, and wading birds such as Northern Pintail (*Anas acuta*), Bufflehead (*Bucephala albeola*), Mallard (*Anas platyrhynchos*), Northern Shoveler (*Anas clypeata*), American Wigeon (*Anas americanus*), Green-winged Teal (*Anas crecca*), Pied-billed Grebe (*Podilymbus podiceps*), Double-crested Cormorant (*Phalacrocorax auritus*), Black-necked Stilt (*Himantopus mexicanus*), American Avocet (*Recurvirostra americanus*), Short-billed Dowitcher (*Limnodromus griseus*), Greater Yellowlegs (*Tringa melanoleuca*), Black-crowned Night Heron (*Nycticorax nycticorax*), Snowy Egret (*Egretta thula*) and Great Blue Heron (*Ardea herodias*). Common songbirds in managed wetlands include Marsh Wren (*Cistothorus palustris*), Red-winged Blackbird (*Agelaius phoeniceus*), and some special-status species, such as Suisun Song Sparrow (*Melospiza melodia* ssp. *maxillaris*) and Saltmarsh Common Yellowthroat (*Geothlypis trichas* ssp. *sinuosa*).

Additional special-status species that use managed wetlands include California Black Rail (*Laterallus jamaicensis*), Yellow Rail (*Coturnicops noveboracensis*), Short-eared Owl (*Asio flammeus*), Northern Harrier (*Circus cyaneus*), White-tailed Kite (*Elanus leucurus*), salt marsh harvest mouse (*Reithrodontomys raviventris* ssp. *halicoetes*), Suisun shrew (*Sorex ornatus sinuosus*), and western pond turtle (*Actinemys marmorata*). Other common species that can be found in managed wetlands include coyote, beaver, river otter, skunk, raccoon, and black-tailed jackrabbit.

Uplands

Upland habitat is limited to the levees of Wings Landing and can provide important high tide refugia for special-status mammals such as salt marsh harvest mouse and Suisun shrew. Upland habitat may also support vegetation suitable for nesting birds, such as Suisun Song Sparrow, or be used by common mammals such as Tule elk, skunk, raccoon and black-tailed jackrabbit. Within the managed marsh, there are also small islands of high ground and land-side levee slopes that support suitable nesting habitat for birds.

Developed Land

Developed land is located at the northeast part of the Overall Property, around the clubhouse and dock for the duck club. The house is surrounded by non-native seeded grass and several outbuildings. Developed habitat tends to support common generalist species such as birds that nest on human-made structures (Cliff Swallow [*Petrochelidon pyrrhonota*], Black Phoebe [*Sayornis nigricans*]) or barren ground (e.g. Killdeer [*Charadrius vociferus*]), or are tolerant of human activity (e.g., Mourning Doves [*Zenaidura macroura*] and Northern Mockingbirds [*Mimus polyglottos*]).

3.3.2 SMP EIS/EIR

The SMP EIS/EIR determined there would be less-than-significant impacts to wetlands and special-status plants, fish and wildlife with implementation of the ECs summarized in Chapter 2, Environmental Commitments and in Appendix F, Mitigation Monitoring and Reporting Program of the SMP EIS/EIR, as described in Table 3.2-1. Therefore, no mitigation was required.

The SMP EIS/EIR determined there would be less-than-significant impacts to wetlands and special-status plants, fish and wildlife with implementation of the ECs summarized in Chapter 2, *Environmental Commitments* and in Appendix F, *Mitigation Monitoring and Reporting Program* of the SMP EIS/EIR, as described in **Table 3.2-1**. Therefore, no mitigation was required.

**TABLE 3.2-1
SUISUN MARSH PLAN BIOLOGICAL RESOURCES IMPACT ANALYSIS**

SMP EIS/EIR Impact	SMP EIS/EIR: Significance Before Mitigation	SMP EIS/EIR Mitigation Measures	SMP EIS/EIR: Significance after MMs
Restoration Impacts on Fish			
FISH-1: Construction-related Temporary Impairment of Fish Survival, Growth, and Reproduction by Accidental Spills or Runoff of Contaminants (Heavy Metals)	LTS	None Required	NA
FISH-2: Construction-related Temporary Reduction of Special-status Fish Rearing Habitat Quality or Quantity through Increased Input and Mobilization of Sediment	LTS	None Required	NA
FISH-3-8: Short-term Impairment of Delta Smelt (FISH-3), Chinook Salmon (FISH-4), steelhead (FISH-5), Green Sturgeon (FISH-6), Sacramento Splittail (FISH-7), longfin smelt (FISH-8) Passage and Reduced Availability of Spawning and Rearing Habitat Resulting from Changes in Channel Morphology and Hydraulics Attributable to Restoration Activities	LTS	None Required	NA
FISH-9-14: Temporary Reduction of Delta Smelt (FISH-9), Chinook Salmon (FISH-10), steelhead (FISH-11), Green Sturgeon (FISH-12), Sacramento Splittail (FISH-13), Longfin Smelt (FISH-14) Habitat Quantity or Quality through Removal and Destruction of Cover Attributable to Restoration Activities	LTS	None Required	NA
FISH-15 Improved Fish Habitat Due to Increased Dissolved Oxygen Concentration in Tidal Channels Attributable to	B	None Required	NA

SMP EIS/EIR Impact	SMP EIS/EIR: Significance Before Mitigation	SMP EIS/EIR Mitigation Measures	SMP EIS/EIR: Significance after MMs
Restoration Activities			
FISH-16-21: Salinity-Related Reduction of Delta Smelt (FISH-16), Chinook Salmon (FISH-17), steelhead (FISH-18), Green Sturgeon (FISH-19), Sacramento Splittail (FISH-20), Longfin Smelt (FISH-21) Survival, Growth, Movement, or Reproduction Attributable to Restoration Activities	LTS	None Required	NA
FISH-22: Disturbance, Injury, or Mortality of Individual Fish Resulting from Work Adjacent to Bodies of Water	LTS	None Required	NA
FISH-23: Change in Fish Species Composition Attributable to Changes in Salinity or Water Quality from Managed or Natural Wetland Modification	LTS	None Required	NA
FISH-24: Change in Benthic Macroinvertebrate Composition Attributable to Changes in Channel Morphology and Hydraulics as a Result of Tidal Restoration	LTS	None Required	NA
FISH-25: Change in Primary Productivity as a Result of Tidal Restoration	B	None Required	NA
Restoration Impacts on Vegetation and Wetlands			
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	LTS	None Required	NA
VEG-2: Loss or Degradation of Tidal Wetlands Adjacent to Restoration Sites as a Result of Levee Breaching/Grading	LTS	None Required	NA
VEG-3: Loss of Managed Wetlands as a Result of Tidal Wetland Restoration	LTS	None Required	NA
VEG-4: Loss of Upland Plant Communities	LTS	None Required	NA
VEG-5: Spread of Noxious Weeds as a Result of Restoration Construction	LTS	None Required	NA
VEG-6: Loss of Special-Status Plants or Suitable Habitat as a Result of Tidal Wetland Restoration	LTS	None Required	NA
VEG-7: Degradation of Native Plant Species and Spread of Invasive Plant Species as a Result of Increased Public Access	LTS	None Required	NA
VEG-8: Loss or Degradation of Tidal Native Plant Species and Spread of Invasive Plant Species as a Result of Tidal Muting	LTS	None Required	NA
Restoration Impacts on Wildlife			
WILD-1: Loss or Disturbance of Salt Marsh Harvest Mouse Suitable Habitat as a Result of Tidal Wetland Restoration	LTS	None Required	NA
WILD-2: Loss or Disturbance of California Ridgway's Rail Suitable Habitat as a Result of Tidal Wetland Restoration	LTS	None Required	NA
WILD-3: Loss or Disturbance of California Black Rail Suitable Habitat as a Result of Tidal Wetland Restoration	LTS	None Required	NA
WILD-4: Loss or Disturbance of Suisun Shrew Suitable Habitat as a Result of Tidal Wetland Restoration	LTS	None Required	NA
WILD-5: Loss or Disturbance of California Least Tern	LTS	None Required	NA

SMP EIS/EIR Impact	SMP EIS/EIR: Significance Before Mitigation	SMP EIS/EIR Mitigation Measures	SMP EIS/EIR: Significance after MMs
Suitable Habitat as a Result of Tidal Wetland Restoration			
WILD-6: Loss of Suisun Song Sparrow and Salt Marsh Common Yellowthroat Suitable Habitat as a Result of Tidal Wetland Restoration	LTS	None Required	NA
WILD-7: Loss or Disturbance of Raptor Nest Sites or Foraging Habitat Suitable Habitat as a Result of Tidal Wetland Restoration	LTS	None Required	NA
WILD-8: Loss or Disturbance of Western Pond Turtle as a Result of Tidal Wetland Restoration	LTS	None Required	NA
WILD-9: Loss or Disturbance of Tricolored Blackbird as a Result of Tidal Wetland Restoration	LTS	None Required	NA
WILD-10: Effects on Southern Resident Killer Whales as a Result of Changes in Salmon Populations	LTS	None Required	NA
WILD-11: Loss or Disturbance of Waterfowl and Shorebird Habitat as a Result of Tidal Wetland Restoration	LTS	None Required	NA

Notes:

B = Beneficial

LTS = Less-than-Significant

NA = Not Applicable

3.3.3 Impact Analysis

- a) **Would the Proposed Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? (Less-than-significant impact with mitigation)**

Fish

SMP EIS/EIR

The SMP EIS/EIR identified nine special-status fish species that could be potentially affected by restoration activities covered under the Suisun Marsh Plan. The special-status species with potential to migrate through or rear within Suisun Bay, or occur in tributaries to Suisun Bay, included Central Valley spring-run Chinook Salmon (*Oncorhynchus tshawytscha*; federally-threatened [FT]/state-threatened [CT]), Sacramento River winter-run Chinook Salmon (*Oncorhynchus tshawytscha*; federally-endangered [FE]/state-endangered [CE]), Central Valley fall-/late fall-run Chinook Salmon (*Oncorhynchus tshawytscha*; federal species of concern/ California species of special concern [CSC]), Central California coast steelhead (*Oncorhynchus mykiss*; FT), Central Valley steelhead (*Oncorhynchus mykiss*; FT), Green Sturgeon (southern DPS) (*Acipenser medirostris*; FT/CSC), Delta Smelt (*Hypomesus transpacificus*; FT/CE), Longfin Smelt (*Spirinchus thaleichthys*; candidate for federal listing/CT), and Sacramento Splittail (*Pogonichthys macrolepidotus*; CSC). The SMP EIS/EIR (Table 6.1-3) describes the status, distribution, and likelihood of

occurrence for these species in Suisun Marsh as well as designated critical habitat. This information is current, except the federal listing for Longfin Smelt, which is now considered a candidate for federal listing under the ESA, but at the time of the SMP EIS/EIR was not.

The SMP EIS/EIR evaluated the potential impact of restoration activities on fish passage and reproduction or rearing habitat. Impacts to special-status fish species could include temporary disturbance of fish and their habitats because of construction-related activities; temporary impacts to fish habitat because of levee breaching and/or lowering existing levees and upgrading or constructing new exterior levees; and, changes in salinity due to breaching. Based on implementation of ECs and BMPs, which are summarized in Chapter 2 and in Appendix F, *Mitigation Monitoring and Reporting Program* (MMRP) of the SMP EIS/EIR, the SMP EIS/EIR determined that restoration would have a less-than-significant impact on sensitive and special-status fish species, fish species in general, and benthic communities.

Current Conditions and Proposed Project

Sacramento River winter-run Chinook Salmon, Central Valley spring-run Chinook Salmon, Central Valley fall-/ late fall-run Chinook Salmon, California Central Valley steelhead, Central California coast steelhead, Delta Smelt, Longfin Smelt, Green Sturgeon, and Sacramento Splittail are listed special-status native fish species that occur in Suisun Marsh. For the current project, ESA analyzed special-status fish species that are known to occur or have a moderate to high potential to occur within the vicinity of the Project Site. These data were compiled based on the following sources:

- California Natural Diversity Database (CNDDB) (CDFW, 2019)
- U.S. Fish and Wildlife Service (USFWS) IPaC Report (2019)
- California Department of Fish and Game (2009) Longfin Smelt Fact Sheet.
- Moyle, P. et al. (2016). Delta Smelt: Life History and Decline of a Once-Abundant Species in the San Francisco Estuary. *San Francisco Estuary and Watershed Science*, 14(2).
- Moyle, P. (2002). *Inland Fishes of California*. UC Press. Berkeley, CA.
- Moyle, P. et al. (1992) Life History and Status of Delta Smelt in the Sacramento-San Joaquin Estuary, California.
- National Marine Fisheries Service (2014). Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-Run Chinook Salmon and Central Valley Spring-Run Chinook Salmon and the District Population Segment of California Central Valley Steelhead.
- National Marine Fisheries Service (2010), Federal Recovery Outline: North American Green Sturgeon Southern Distinct Population Segment.
- National Oceanic and Atmospheric Administration (2005) Endangered and Threatened Species: Designation of Critical Habitat for Seven Evolutionary Significant Units of Pacific Salmon and Steelhead in California; Final Rule. *Federal Register* vol. 70, No. 170, September 2, 2005.
- USFWS (2016a) Species Account for Delta Smelt (*Hypomesus transpacificus*)
- USFWS (2016b) Species Account for Longfin Smelt (*Spirinchus thaleichthys*)

Based on ESA's review of the above materials, the following special-status fish species are known to occur or have a moderate to high potential to occur in the Project Site and adjacent channels: Delta Smelt, Longfin Smelt, Chinook Salmon, steelhead – Central Valley DPS, steelhead – Central California coast DPS, Green Sturgeon, and Sacramento Splittail. All of these species are covered under the SMP EIS/EIR. The following discussion describes their potential to occur in the Project Site.

Chinook Salmon, Steelhead

Interagency Ecological Program (IEP) surveys have detected Chinook Salmon and steelhead in the lower Montezuma Slough region, at sampling locations approximately 3-4 miles south of the Project Site (the IEP does not have sampling locations in closer proximity to the site). As such, it is presumed that there is a moderate potential for Chinook Salmon to utilize the Project Site for rearing habitat.

Delta Smelt

Based on longstanding fish surveys conducted by U.C. Davis in the Suisun Marsh, Delta Smelt have historically used the sloughs surrounding the Project Site. They are less frequently found in the area in recent years, likely a result of their overall precipitous population decline throughout the San Francisco Estuary. Since the Suisun Marsh was crucial habitat for this species historically, and the Project Site occurs within the low salinity zone known to be important for this species, the potential for Delta Smelt to use the Project Site is high.

Longfin Smelt

Young-of-year Longfin Smelt have been captured within the sloughs surrounding the Project Site as recently as 2015 by U.C. Davis researchers. As such, the potential for Longfin Smelt to utilize the Project Site is high.

Green Sturgeon

In the Central Valley, adult Green Sturgeon are known to spawn in the Sacramento River mainstem within a particular reach downstream of Keswick Dam. Green Sturgeon have been caught in the San Joaquin River in recent years, however Green Sturgeon spawning in this watershed has not yet been confirmed. Larval Green Sturgeon are found in the lower Sacramento River and North Delta primarily in June and July and juveniles are found in the Delta in all months. Green Sturgeon exhibit demersal behavior, even as larval fish, and as such are expected to mostly utilize subtidal habitat. The Suisun Marsh was designated by NMFS in 2009 as critical habitat for Green Sturgeon. The potential for occurrence of Green Sturgeon within the deeper sloughs surrounding the Project Site is presumed to be high.

Sacramento Splittail

Seasonal inundation of floodplains provides Splittail with both foraging and spawning habitat. Spawning success for Splittail is greatest during wet years when large areas of floodplains are inundated. Young Splittail forage within the highly productive floodplains and backwaters, until water temperatures increase and they move into deeper water. The Suisun Marsh contains a particularly high concentration of Splittail, and they are frequently found in the sloughs surrounding the Project Site.

As described in Chapter 2, Project Description, of this document, the Proposed Project would include excavation associated with five levee breaches to restore tidal influence and maximize tidal exchange and movement of sediments, nutrients, and biota. Breaches are located to capitalize on existing water control structures, which would minimize impacts to special-status plants and wildlife. The Proposed Project would also create new channels and enhance existing channels to maximize tidal action and distribute water to and from the interior of the Project Site. Existing channels used for accessing duck blinds by boat would be enhanced to improve water transport to the interior of the Project Site, and some channels would be retained in their current condition. Once the channels are completed, channel plugs would be constructed using excavation spoils to guide water movement within the Project Site and encourage full tidal exchange. In addition, the cross berm at the southwest boundary of the Project Site adjacent to WCGC, would be converted from an interior berm to exterior berm once the Project Site is restored and reinforced, making it taller and narrower. A pre-existing borrow ditch adjacent to the improved cross berm would be filled with excavation spoils and restored to a vegetated tidal marsh. As discussed in the SMP EIS/EIR, breaching levees, grading, excavation, and filling could potentially impact special-status fish by causing changes in salinity, sediment transport, oxygen and/or hydraulics.

Special-status Fish ECs and BMPs

ECs and BMPs for special-status fish are described in detail in **Appendix A**. The following is a brief overview of the ECs and BMPs that will minimize the Proposed Projects potential impacts on special-status fish species:

Standard Design Features and Construction Practices

- Erosion and Sediment Control Plan
- Stormwater Pollution Prevention Plan
- Hazardous Materials Management Plan

Biological Resources BMPs

- General
- Environmental Resources Worker Training Program
- Special-Status Wildlife Species Protections
- Biological Monitoring
- Construction Period Restrictions

Because all special-status fish with potential to occur in the Project Site are covered under the SMP EIS/EIR, and due to the Proposed Project's adherence to the ECs and BMPs summarized in the SMP EIS/EIR MMRP, potential impacts to special-status fish would be within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

Special-status Plants

SMP EIS/EIR

The SMP EIS/EIR evaluated the potential direct and indirect impacts of restoration activities to the following special-status plant species: soft bird's-beak (*Chloropyron molle* var. *molle*; FE/CRPR 1B.2), Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum* FE/CRPR 1B.1), Suisun Marsh aster (*Symphyotrichum lentum*; CRPR 1B.2), Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*; CRPR 1B.2), Mason's lilaeopsis (*Lilaeopsis masonii*; CRPR 1B.2/ state listed as rare), and Delta mudwort (*Limosella australis*; CRPR 2B.1). The SMP EIS/EIR concluded that vegetation could be temporarily and permanently impacted by restoration activities such as levee breaching, introduction of noxious weeds, loss of special-status plants or tidal native plant species during tidal inundation, grading, or temporary stockpiling and sidecasting of soil, construction materials or construction debris. Based on implementation of ECs and BMPs, which are summarized in Chapter 2 and in Appendix F, *Mitigation Monitoring and Reporting Program* (MMRP) of the SMP EIS/EIR, and the long-term benefits of tidal restoration, such as an overall increase in tidal marsh habitat and the increased range of marsh elevations and associated plant habitats, the SMP EIS/EIR determined that restoration would have a less-than-significant impact on special-status plant species.

Current Conditions and Proposed Project

Floristic surveys were conducted on the Project Site by ESA on July 9 and September 8, 2016, and again on June 12 and September 5, 2018, within the managed marsh and at the five proposed breach locations. The objective of the surveys was to locate and document special-status plant populations to inform tidal marsh restoration design by incorporating avoidance at the initial design stage. Special-status plant surveys are also a requirement of the Suisun Marsh Plan (U.S. Bureau of Reclamation, 2013) and Suisun Marsh Plan Biological Opinion (USFWS, 2013a) which guide tidal marsh restoration planning in Suisun Marsh. With the completion of two years of floristic surveys, programmatic Conservation Measures 1 and 2 under USFWS (2013b) have been completed. The Mason's lilaeopsis and special status plant survey was completed by NRG on June 5, 2019 to document the extent of the Mason's lilaeopsis population along the Project Site's exterior and in adjacent areas, and to confirm the locations of other special status plants identified in the 2016 and 2018 surveys.

Populations of Delta tule pea, Mason's lilaeopsis, Suisun Marsh aster, and Bolander's water hemlock (*Cicuta maculata* var. *bolanderi*; CRPR 2.1) were observed within the survey area during the 2016, 2018, and 2019 surveys. No federal endangered or threatened plants were observed, and none are previously reported in the Project Site (CDFW, 2016). Environmental conditions during the 2016, 2018, and 2019 growing seasons are considered to be average for this location; therefore, the surveys are considered representative of onsite conditions.

ESA queried special-status plant species from the California Natural Diversity Database (CNDDB) (CDFW, 2019) and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS, 2019) for the Denverton and Fairfield South USGS 7.5 quadrangles (**Appendix D** and **Appendix E**). In addition, the USFWS IPaC was queried for the Project Site vicinity. No additional special-status plant species with a moderate to high potential to occur in the Project Site were identified, and all species originally identified were covered by the SMP EIS/EIR.

As described in Chapter 2, *Project Description*, of this document, the Proposed Project would include excavation associated with breaching five locations on the existing levee to restore tidal influence and maximize tidal exchange and movement of sediments, nutrients, and biota. Breaches are

located to capitalize on existing water control structures, which would minimize impacts to special-status plants and wildlife. The Proposed Project would also create new channels and enhance existing channels to maximize tidal action and distribute water to and from the interior of the Project Site. Existing channels used for accessing duck blinds by boat would be enhanced to improve water transport to the interior of the Project Site. Once the channels are completed, channel plugs would be constructed using excavation spoils to guide water movement within the Project Site and encourage full tidal exchange. In addition, the cross berm at the southwest boundary of the site adjacent to WCGC, would be converted from an interior berm to exterior berm once the Project Site is restored and reinforced, making it taller and narrower. A pre-existing borrow ditch adjacent to the improved cross berm would be filled with excavation spoils and restored to a vegetated tidal marsh. As discussed in the SMP EIS/EIR, conversion of managed wetland to tidal wetland, spreading invasive plants during the construction process, occurrence of scour adjacent to the breach location, and upstream tidal muting could potentially impact special-status plants. Additionally, the Proposed Project could inundate upland/high marsh special-status plant species following breaching.

Special-status Plant ECs and BMPs

ECs and BMPs for special-status plants are described in detail in Appendix A. The following is a brief overview of the ECs and BMPs that will avoid and minimize the Proposed Project's potential impacts on special-status plants to the maximum extent feasible, including avoiding impacts to individuals growing adjacent to the construction work areas and access routes:

- Biological Resources BMPs
 - Special-status Plant Species Protection
 - Non-native plant control measures
 - Biological monitoring;
 - Environmental Resources Worker Training Program

With implementation of these avoidance and minimization measures, impacts to special-status plants cannot be entirely avoided. Mason's lilaeopsis, a California rare plant, is present immediately adjacent to two water control structures and would be relocated prior to levee breach construction activities at Breaches 1 and 5. Suisun Marsh aster plants are also located within the construction footprint at a levee breach and three structure removal locations, and one Delta tule pea is in the impact area of Breach 1, as shown below in **Table 3.2-2**.

**TABLE 3.2-2
ANTICIPATED DIRECT IMPACTS TO SPECIAL-STATUS PLANTS**

Project Element	Mason's lilaeopsis # of individuals (total area)	Delta tule pea # of individuals (total area)	Suisun Marsh aster # of individuals (total area)
Levee Breaches			
Breach 1	22 (14.9 ft ²)	1	N/A
Breach 2	N/A	N/A	24 (147 ft ²)
Breach 5	65 (39.5 ft ²)	N/A	N/A

Project Element	Mason's lilaeopsis # of individuals (total area)	Delta tule pea # of individuals (total area)	Suisun Marsh aster # of individuals (total area)
Structure Removal			
Structure Removal 1	N/A	N/A	18 (55.0 ft ²)
Structure Removal 2	N/A	N/A	5 (38.5 ft ²)
Structure Removal 5	N/A	N/A	3 (22.6 ft ²)
Total	87 (54.4 ft ²)	1	50 (263.1 ft ²)

The SMP EIS/EIR concluded that vegetation could be temporarily and permanently impacted by restoration activities such as levee breaching, loss of special-status plants or tidal native plant species during tidal inundation, grading, and more. Based on implementation of ECs and BMPs and the long-term benefits of tidal restoration, the SMP EIS/EIR determined that restoration would have a less-than-significant impact on special-status plant species.

Although avoidance is not possible for all special-status plant individuals, the Proposed Project's impacts would be less-than significant for the following reasons:

The Proposed Project would implement the ECs and BMPs listed above on the entire Project Site as applicable, but cannot avoid special-status plants within the areas listed in Table 3.2-2. Mason's lilaeopsis in unavoidable areas would be relocated as a requirement of the Proposed Project's Incidental Take Permit from CDFW. Relocation is described in **Appendix D** and would include:

- If avoidance is not possible, DWR would salvage and transplant Mason's lilaeopsis plants that would be directly impacted by construction activities prior to construction. Relocation sites would consist of suitable habitat within the Project Site.
- Transplanted material shall be replanted along the interior channels or exterior levee at Wings Landing, outside of construction impact areas.
- Location of transplanted material would be recorded using a submeter accuracy GPS unit (e.g., Trimble GPS) to enable monitoring. Annual mitigation monitoring of relocated plants shall be conducted during the flowering period and shall include information on the number of surviving plants and/or patch size, vigor of plantings, plant associates, any observed population threats, and photographs of transplanted material. Monitoring would be required for seven years following restoration.

The areas with unavoidable special-status plants constitute very minimal portions of onsite occupied habitat:

- Mason's lilaeopsis is a California rare plant found throughout exterior levees at the Project Site: Floristic Surveys observed 5,662.8 ft² of occupied habitat onsite. The Proposed Project would result in impacts to 54.4 ft² of occupied habitat, or approximately 0.96% of the documented occupied habitat onsite. Individuals within this area would be relocated to suitable onsite locations as required by the Proposed Project's Incidental Take Permit.
- Delta tule pea was observed throughout the survey area on the water-side of the levee at high marsh elevations. In total, 5,481.5 ft² of occupied habitat was observed onsite. Only 1 individual would be impacted by the Proposed Project, which can be conservatively assumed

to occupy 5 ft². Using this estimate, only 0.09% of the documented occupied habitat onsite would be impacted.

- Suisun Marsh aster is locally abundant in high marsh elevations on the water side of the exterior levee. Floristic Surveys mapped 27,081.47 ft² of occupied habitat onsite. The Proposed Project would result in impacts to 263 ft² of occupied habitat, or approximately 0.97% of the documented occupied habitat onsite.

As analyzed in the SMP EIS/EIR, restoration of the Project Site would result in substantial long-term benefits to special status plants, making the impact less-than-significant. The Proposed Project would create a substantial amount of suitable habitat for each species, benefitting long-term success:

- Mason's lilaeopsis: Estimates indicate that up to 3.93 miles of suitable new habitat would be created by Project Site restoration. This long-term benefit would more than offset the Proposed Project's impact to 54.4 ft² during construction, and would be further offset by relocation.
- Delta tule pea: Restoration would expand the available habitat onsite to inboard of the remnant levees, along the brood pond levee, and to high marsh mounds within the restored marsh plain. Regular disturbance from duck club management would no longer occur, facilitating expansion to new habitat and improving the quality of existing habitat. This would more than offset the Proposed Project's impact to one individual during construction.
- Suisun Marsh aster: Breaching would provide the necessary tidal hydrology to support recruitment in high marsh inboard of the levees and along interior mounds. Occupied Suisun Marsh aster habitat on and near levee tops would be removed from the threat of disturbance from duck club management to support future success. This benefit to Suisun Marsh aster far outweighs the Proposed Project's impact to 0.97% of the documented occupied habitat onsite.

Potential impacts to special-status plant species habitat from temporary tidal restoration actions would be offset by the resulting amount of suitable habitat created for colonization by restoration of the Project Site. Additionally, the Proposed Project would result in an increased range of marsh elevations and habitat complexity, consistent with the scope of the impacts identified in the SMP EIS/EIR. Adherence to the ECs and BMPs summarized in the SMP EIS/EIR MMRP would result in a less-than-significant impact to special-status plants.

Special-Status Wildlife

SMP EIS/EIR

The SMP EIS/EIR identified 14 special-status wildlife species that could be potentially affected by restoration activities covered under the Suisun Marsh Plan. The special-status species known to be present or with potential to occur within Suisun Marsh included salt marsh harvest mouse (*Reithrodontomys raviventris*; FE/CE/ California fully protected [FP]), Suisun shrew (*Sorex ornatus sinuosus*; CSC), California Black Rail (*Laterallus jamaicensis coturniculus*; CT/FP), California Ridgway's Rail (*Rallus longirostris obsoletus*; FE/CE/FP), California Least Tern (*Sterna antillarum browni*; FE/CE/FP), Northern Harrier (*Circus cyaneus*; CSC), Saltmarsh Common Yellowthroat (*Geothlypis trichas sinuosa*; CSC), Short-eared Owl (*Asio flammeus*; CSC), Suisun Song Sparrow (*Melospiza melodia maxillaris*; CSC), Swainson's Hawk (*Buteo swainsoni*; CT), Tricolored Blackbird (*Agelaius tricolor*; CSC), Western Burrowing Owl (*Athene cunicularia hypugea*; CSC), White-tailed Kite (*Elanus leucurus*; FP), and

western pond turtle (*Clemmys marmorata*; CSC) (USFWS et al., 2011; see Table 6.3-2 of the SMP EIS/EIR). In addition, Suisun Marsh provides nesting, foraging and wintering habitat for migrating and overwintering waterfowl, ducks, and shorebirds, which are protected by the Migratory Bird Treaty Act.

Based on implementation of ECs and BMPs, summarized in Chapter 2 and in Appendix F, *Mitigation Monitoring and Reporting Program* (MMRP) of the SMP EIS/EIR, and due to the long-term benefits of tidal restoration which would offset impacts to managed wetlands and increase habitat values as tidal wetland vegetation becomes established, the SMP EIS/EIR determined that restoration would have a less-than-significant impact on special-status wildlife.

Current Conditions and Proposed Project

For the Proposed Project, ESA analyzed special-status wildlife species that are known to occur or have a moderate to high likelihood to occur within the vicinity of the Project Site. This data was compiled based on the following sources: California Natural Diversity Database (CNDDDB) (CDFW, 2019), the U.S. Fish and Wildlife Service (USFWS) list of Federal Endangered and Threatened Species (USFWS, 2019), and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS, 2019) (**Appendix D**). Based on ESA's analysis, all of the special-status wildlife species the SMP EIS/EIR identified as being potentially affected by restoration projects in Suisun Marsh, as well as Yellow Rail (*Coturnicops noveboracensis*), are known to occur or have a moderate to high potential to occur at the Project Site. All of these species were covered under the SMP EIS/EIR except for Yellow Rail, which is addressed below.

As described in Chapter 2, *Project Description*, of this document, the Proposed Project would include excavation associated with breaching five locations on the existing levee to restore tidal influence and maximize tidal exchange and movement of sediments, nutrients, and biota. Breaches are located to capitalize on existing water control structures, which would minimize impacts to wildlife. The Proposed Project would also create new channels and enhance existing channels to maximize tidal action and distribute water to and from the interior of the Project Site. As discussed in the SMP EIS/EIR, special-status wildlife could be impacted due to loss or degradation of habitat resulting from levee breaching, grading, and increased scour, conversion of managed wetlands to tidal wetlands, vegetation removal and grading, temporary placement and side-casting of soil or construction materials, and direct impacts to wildlife as a result of tidal restoration.

Special-status Wildlife ECs and BMPs

ECs and BMPs for special-status wildlife are described in detail in **Appendix A**. The following is a brief overview of the ECs and BMPs that will minimize the Proposed Project's potential impacts on special-status wildlife species and their habitats:

- Biological Resources BMPs
 - Environmental Resources Worker Training Program
 - Special-Status Plant Species Protection
 - Special-Status Wildlife Species Protection
 - Mammals

- Birds
- Raptors
- California Clapper Rail and California Black Rail
- California Least Tern
- Western Pond Turtle
- Biological Monitoring
- Construction Period Restrictions

The Proposed Project would implement all approved programmatic ECs and CMs, with new and revised salt marsh harvest mouse measures that would be equally or more protective for the mouse as the ones in the SMP. In addition to the approved programmatic ECs and CMs, the Project Proponents would follow the following supplemental proposed avoidance and minimization measures:

Duck Club Maintenance to Prevent the Establishment of Habitat:

- Current duck club-related vegetation maintenance, specifically mowing, will continue within the Project Disturbance Area in order to prevent the development of desirable habitat. Vegetation will be mowed to as short as possible and will be mowed at least four times per year or as needed to prevent vegetation from growing taller than 1 inch.

Exclusion Fencing:

In accordance with the SMP, the Project Proponents intend to install fencing that would exclude wildlife in the staging area, where equipment would be parked overnight throughout the construction season. This would be subject to other SMP requirements, including inspection of the exclusion fencing. In the rest of the Project Site, the Project Proponents would implement the following protective measure in lieu of fencing:

- In lieu of fencing that excludes mice from entering the construction area, vegetation clearing and construction, except hand clearing, will not occur in salt marsh harvest mouse habitat. .

Other Proposed Changes:

The Project Proponents would adhere to the following EC, which has been edited from the approved SMP EC to improve protection for salt marsh harvest mouse:

- If any small rodent is discovered, construction activities will cease in the immediate vicinity of the individual until CDFW and USFWS are contacted or the individual has been allowed to leave the construction area on its own.

The proposed changes would improve feasibility of minimization measures and increase effectiveness of other measures, ensuring protection of the mouse. Additional details can be found in **Appendix F**, the Revised Mammal Best Management Practices.

Yellow Rail:

As was described above, additional analysis of the Yellow Rail is necessary due to the fact that all special-status species were addressed in the SMP EIS/EIR except for Yellow Rail. Although the Yellow Rail is still considered extremely rare in California, recent records indicate that small numbers winter (early October to mid-April) regularly in the Suisun Marsh region and a few coastal marshes (Shuford and Gardali, 2008). CNDDB records of Yellow Rails in Suisun Marsh exist from 2009, 2004, and 2003 (CDFW 2019). Yellow Rails likely forage in areas of shallow water concealed by dense vegetation, picking food from the ground, vegetation, and sometimes just below the water's surface (Leston and Bookhout, 2005; Shuford and Gardali, 2008). Their diet consists of small snails, earthworms, insects, and other invertebrates, with seeds becoming an important component in fall and winter (Leston and Bookhout, 2015). Because Yellow Rails do not breed in Suisun Marsh, nesting success would not be impacted by restoration activities. Construction-related activities, the inundation of suitable habitat in managed wetlands, and the impacts of increased scour and tidal muting could result in the temporary loss of Yellow Rail foraging habitat, but, as discussed in the SMP EIS/EIR tidal restoration is expected to benefit rails in the long-term, and adjacent areas would continue to provide suitable habitat for rails between breaching the levees and establishment of a functioning tidal wetland.

Yellow Rails would only be expected in the Project Site while overwintering between early October and mid-April. The Project Site provides suitable overwintering habitat for foraging and resting, which could be disrupted by Proposed Project activities; however, the Project Site is a relatively small portion of the total available overwintering habitat for Yellow Rails in Suisun Marsh. Overwintering Yellow Rails could move to nearby suitable overwintering habitat if disturbed by Proposed Project activities in the Project Site. The SMP EIS/EIR includes ECs that would protect overwintering Yellow Rails if present in the Project Site during construction, including Environmental Resources Worker Training Program, removal of vegetation using hand tools, the presence of a biological monitor during vegetation removal who will temporarily stop work if a special-status species is detected, and allowing that species an opportunity to leave the area before work resumes. No additional mitigation measure is recommended for Yellow Rail.

There have been no changes to the existing conditions in the Project Site relative to the existing conditions described in the SMP EIS/EIR. In addition, all special-status species with potential to occur in the Project Site would be protected through adherence to the ECs and BMPs summarized in the SMP EIS/EIR MMRP, as well as the updated avoidance and minimization measures for salt marsh harvest mouse and Suisun shrew. Therefore, potential impacts to special-status wildlife would be within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

b) Would the Proposed Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service. (Less-than-significant impact)

Sensitive natural communities are those identified by CDFW as terrestrial natural communities native to California, listed in the *California Sensitive Natural Communities list* (CDFW, 2018) Natural communities with State ranks of S1 – critically imperiled, S2 – imperiled, and S3 – vulnerable are considered sensitive. The state ranks for vegetation types in the survey area are given in **Table 3.2-3**, below.

Critical habitat for special-status wildlife or plant species can also be considered sensitive natural communities. The entire Project Site is within Delta Smelt critical habitat (USFWS, 2019).

In addition, tidal, non-tidal and seasonal wetlands can be considered sensitive natural communities. Since jurisdictional waters, including wetlands, are analyzed under Section c), below, they are not discussed here.

SMP EIS/EIR

The SMP EIS/EIR analyzed the impacts of tidal restoration on managed marsh, as described in Section c), below; however, the SMP EIS/EIR did not analyze sensitive natural communities as defined by CDFW terrestrial natural communities.

The SMP EIS/EIR determined that vernal pool fairy shrimp and vernal pool tadpole shrimp critical habitat is in Potrero Hills in the Secondary Management Area, and therefore would not be affected by tidal restoration projects. The SMP EIS/EIR also summarized that four critical habitat units have been identified in Suisun Marsh for soft bird's-beak, and are located in Unit 2, Hill Slough Wildlife Management Area, and in Unit 4, Rush Ranch/Grizzly Island Wildlife Management Area (72 FR 18528, April 12, 2007). In addition, three critical habitat units have been identified for Suisun thistle, and are located in Unit 1, Hill Slough Marsh, Unit 2, Peytonia Slough Marsh, and Unit 3, Rush Ranch/Grizzly Island Wildlife Area (72 FR 18527, April 12, 2007), and that construction activities associated with tidal wetland restoration could affect populations of soft bird's beak. However, critical habitat for soft bird's beak is not present in the Project Site (located in Unit 1).

Delta Smelt critical habitat is discussed in the SMP EIS/EIR along with effects on Delta Smelt habitat and individuals. The SMP EIS/EIR concluded that "any adverse effects on special-status fish species or critical habitat will be addressed by the project proponent, and any additional measures will be followed in compliance with ESA. In general, these issues are expected to be less-than-significant in both the short and long term" (USFWS, 2011).

**TABLE 3.2-3
VEGETATION TYPES WITHIN THE PROJECT SITE AND SURROUNDING AREAS, MAPPED BY CDFW**

Vegetation type	Acres in the Floristic survey area	Natural Community Rank
<i>Atriplex lentiformis</i>	0.47	G4, S4
<i>Atriplex prostrata</i> – <i>Cotula coronopifolia</i>	26.97	No community rank
<i>Baccharis pilularis</i> / Annual Grass-Herb	0.48	G5, S5
Barren (unvegetated)	0.02	n/a
<i>Cotula coronopifolia</i>	1.49	No community rank
<i>Cynodon dactylon</i> - <i>Crypsis spp.</i> - <i>Paspalum spp.</i>	15.17	No community rank
<i>Eucalyptus spp.</i> - <i>Ailanthus altissima</i> - <i>Robinia pseudoacacia</i>	2.15	No community rank
Lacustrine (unvegetated)	0.95	n/a
Lacustrine, Estuarine	158.39	n/a

Vegetation type	Acres in the Floristic survey area	Natural Community Rank
Mediterranean California Naturalized Annual and Perennial Grassland	13.65	No community rank
<i>Phragmites australis</i>	0.35	G5, S5
<i>Polygonum lapathifolium</i> - <i>Xanthium strumarium</i>	0.81	G5, S5
<i>Rosa californica</i>	0.78	G3, S3
<i>Rubus armeniacus</i> - <i>Sesbania punicea</i> - <i>Ficus carica</i>	0.52	No community rank
<i>Sarcocornia pacifica</i> Tidal	5.02	G4, S3
<i>Schoenoplectus (acutus, californicus)</i>	15.33	GU, S3
<i>Schoenoplectus americanus</i>	0.28	G5, S1
<i>Schoenoplectus californicus</i> - <i>Schoenoplectus acutus</i> / <i>Rosa californica</i>	4.79	GU, S3
<i>Typha (angustifolia, domingensis, latifolia)</i>	15.62	G5, S5
Urban (unvegetated)	3.78	n/a
Total	267.02	

NOTE:

Natural communities with State ranks of S1 – critically imperiled, S2 – imperiled, and S3 – vulnerable are considered sensitive. Natural communities with Global Ranks of G3 – 21-80 viable element occurrences, G4 – apparently secure, G5 – Population demonstrably secure, GU – globally unrankable. Natural community rank is given in the California Sensitive Natural Communities List, dated October 15, 2018. Available: <https://www.wildlife.ca.gov/data/vegcamp/natural-communities#sensitive%20natural%20communities>. SOURCE: CDFW, 2015; CDFW, 2018.

Current Conditions and Proposed Project

Floristic surveys were conducted by ESA in 2016 and 2018 within the managed marsh and at the five proposed breach locations. Vegetation in Suisun Marsh has been mapped at the alliance level by CDFW every three years for the purpose of detecting vegetation changes over time. Table 3.2-3 summarizes the area by vegetation type for the Wings Landing floristic survey area based on the CDFW vegetation data (CDFW, 2015).

With restoration of tidal marsh, several of the S3 types are expected to increase in extent (*Schoenoplectus [acutus, californicus]*, *Sarcocornia [pacifica]*). These would be replacing areas currently mapped as “lacustrine” and the alliances *Atriplex prostrata* – *Cotula coronopifolia* and *Cynodon dactylon* - *Crypsis spp.* - *Paspalum spp.* Therefore, consistent with the discussion of VEG-3 in the SMP EIS/EIR, existing sensitive natural communities within the Project Site (*Schoenoplectus [acutus, californicus]*, *Sarcocornia [pacifica]*) are expected to increase as tidal wetlands become established. Therefore, potential impacts to sensitive natural communities would be within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

c) Would the Proposed Project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? (Less-than-significant impact)

Under CWA Section 404, the USACE regulates activities that result in the discharge of dredged or fill material into Waters of the United States. Waters of the United States include wetlands as well as streams, rivers, lakes, reservoirs, ponds, bays, and oceans (33 CFR 328.3[e]). Wetlands are those areas that are

inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 328.3[b]). Wetlands, streams, reservoirs, sloughs, and ponds are protected by Section 404 of the CWA and the state Porter-Cologne Water Quality Control Act. Activities that may alter streams or ponds are regulated under Section 1602 of the California Fish and Game Code.

SMP EIS/EIR

The SMP EIS/EIR analyzed the effects of tidal restoration and potential impacts including temporary loss or degradation of tidal wetland and tidal perennial aquatic communities due to increased scour, loss or degradation of small areas of tidal wetlands in the vicinity of levee breaches, and permanent loss of managed wetlands. The SMP EIS/EIR concluded that tidal restoration would result in hydrological connectivity between Suisun Marsh and restoration sites, and that, while this would initially result in open water habitat, tidal wetland vegetation would establish as sediment accrues over time, creating a net increase in tidal wetlands. The SMP EIS/EIR also concluded that creation of tidal wetlands would more than offset any temporary loss or degradation of tidal wetland habitat or tidal perennial aquatic habitat, and that tidal wetlands would increase the variety of wetland function and values relative to managed wetlands.

Current Conditions and Proposed Project

Jurisdictional waters, including state and federally protected wetlands within the Project Site include managed marsh and open water channels on the interior of the outboard levees, and tidal marsh on the exterior of the levees. Restoration activities would result in a conversion of certain types of jurisdictional waters to other types of jurisdictional waters. As shown in **Table 2-2**, Marsh, Wetland, and Water Types Pre- and Post-Construction in the Chapter 2, *Project Description*, approximately 261.37 acres of tidal marsh habitat will be restored, enhanced, and protected including approximately 7.22 acres of enhanced (0.50 acres) and restored (6.72 acres) tidal channels, approximately 236.98 acres of restored tidal marsh, and approximately 17.17 acres of enhanced tidal marsh.

The result would be no net loss of jurisdictional waters, including state and federally protected wetlands. Therefore, potential impacts to jurisdictional waters, including state and federally protected wetlands, would be within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

d) Would the Proposed Project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? (Less-than-significant impact)

Suisun Marsh is an important resource for native and migratory fish passage as well as for fish rearing. Impacts of tidal restoration on fish passage, as well as reproduction and rearing habitat, are evaluated in Section a), above.

Suisun Marsh also provides important wintering habitat along the Pacific Flyway, where it serves as the resting and feeding ground for thousands of migrating waterfowl (Suisun Marsh Ecological Workgroup, 2001; Audubon, 2019). In addition, the eucalyptus grove at the north end of the Project Site could potentially support a heron or egret rookery. Analysis of impacts to these species is discussed below.

SMP EIS/EIR

The SMP EIS/EIR analyzed the potential effects of tidal restoration on waterfowl and shorebirds that overwinter or make migration stopovers in Suisun Marsh. Specifically, the SMP EIS/EIR considered the potential impact to migratory waterfowl and shorebirds due to the permanent and temporary loss of tidal wetlands, managed wetlands or other habitats because of construction-related activities, and the conversion of overwintering habitat from managed wetlands to tidal wetlands. The SMP EIS/EIR did not analyze the potential effect of tidal restoration on heron or egret rookeries because, although suitable habitat is present in Suisun Marsh, “project actions would not affect this species because mature trees will not be removed and nearby work will occur outside the nesting season” (USFWS, 2011).

Based on implementation of ECs and BMPs, which are summarized in Chapter 2 and in Appendix F, *Mitigation Monitoring and Reporting Program* (MMRP) of the SMP EIS/EIR, and due to the long-term benefits of tidal restoration which would offset impacts to managed wetlands and increase habitat values as tidal wetland vegetation becomes established, the SMP EIS/EIR determined that restoration would have a less-than-significant impact on special-status wildlife.

Current Conditions and Proposed Project

The Project Site provides suitable nesting and foraging habitat for migratory waterfowl and shorebirds within managed marsh, open water, and seasonal wetland habitats. As described in more detail in Chapter 2, *Project Description*, of this document, the Proposed Project would include excavation associated with breaching five locations on the existing levee to restore tidal influence and maximize tidal exchange and movement of sediments, nutrients, and biota, resulting in an increase in invertebrate food sources for shorebirds and certain species of waterfowl. In addition, breaches are located to capitalize on existing water control structures, which would minimize impacts to special-status plants and wildlife. Seven tidal depressions would be created in the Project Site, which would increase bathymetric diversity. Channel plugs would be installed in the Project Site to guide water movement, and would remain below the mean higher high water mark elevation to ensure that they support vegetated tidal marsh plants. Cross berm improvements at the southwest boundary of the Project Site are designed to include gentle transitional slopes with a diversity of marsh elevation and vegetation types between the tidal marsh and upland habitats, providing foraging opportunities and cover for migrating shorebirds and waterfowl. Conversion of managed wetland to tidal wetland is expected to have a neutral effect on migratory waterfowl and shorebirds. While use of the Project Site would be expected to decrease, suitable adjacent areas would continue to provide habitat, and the restoration activities described above would offset the loss of managed wetland. Diving ducks may benefit during the initial increase in open, deeper water following tidal breaching, and would continue to use deeper areas of wetlands and channels once the tidal marsh is established.

The north end of the Project Site provides potential habitat for a heron or egret rookery in the eucalyptus trees near the brood pond. There are no CNDDDB records of heron rookeries at this location, and no mature trees are planned for removal. The SMP EIS/EIR includes ECs to protect rookeries, including conducting preconstruction nesting bird surveys during the nesting season, not removing mature trees, and avoiding work in the vicinity of great blue heron rookeries during the nesting season. Therefore, potential impacts to wildlife movement, migratory corridors, and nursery sites, would be within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

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3.4 Cultural Resources

The SMP EIR/EIS did not specifically analyze impacts to paleontological resources or unique geologic features. However, because Appendix G of the CEQA 2019 Guidelines includes these resources, and because impacts to these resources have not been previously assessed for the Proposed Project, an analysis of potential impacts to paleontological resources and unique geologic features is included in this section.

3.4.1 Existing Conditions

For the purposes of this analysis, the term *cultural resource* consists of indigenous and historic-era sites, structures, districts, and landscapes, or other evidence associated with human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or other reason. Such resources encompass the following types of CEQA-defined resources: historical resources, archaeological resources, human remains, and tribal cultural resources.

The term *indigenous*, rather than *prehistoric*, is used as a synonym for Native American-related (except when quoting), while *pre-contact* is used as a chronological adjective to refer to the period prior to Euroamerican arrival in the subject area. Indigenous and pre-contact are often, but not always, synonymous, since the former refers to a cultural affiliation and the latter chronological.

This section relies upon the information and findings presented in the SMP EIR/EIS and the following technical report prepared for the Proposed Project: *Wings Landing Tidal Habitat Restoration Project, Solano County, California: Cultural Resources Inventory and Evaluation Report* (Sims et al., 2019). Additional details on background context, Native American correspondence, and cultural resources identified are presented in the technical report, which is provided in **Appendix G**, Cultural Resources Report.

Cultural Resources

Archival Research

On October 25, 2016, ESA staff conducted a records search for the Proposed Project at the Northwest Information Center (NWIC) at Sonoma State University, Rohnert Park (File # 16-0640). The NWIC maintains the official California Historical Resources Information System (CHRIS) records of previous cultural resources studies and recorded cultural resources for the Project Site and vicinity. The study area for the records search consisted of the Project Site with a 0.5-mile buffer. The purpose of the records search was to: (1) determine whether known cultural resources have previously been recorded in a 0.5-mile radius of the Project Site; (2) assess the likelihood for unrecorded cultural resources to be present based on historical references and the distribution of nearby resources; and (3) develop a context for the identification and preliminary evaluation of cultural resources. The records search consisted of an examination of the following documents:

NWIC base maps: Fairfield South, CA

Resource Inventories: *National Register of Historic Places, California Inventory of Historical Resources, California Historical Landmarks, California Points of Historical Interest, Historic Properties Directory Listing* (Solano County, through May 2012), *Archaeological Determinations of Eligibility*

(Solano County, through April 5, 2012), Caltrans Historic Bridge Inventory (Solano County, through August 2016)

The NWIC has record of one previously recorded cultural resource in the 0.5-mile search area, outside but immediately adjacent to the Project Site. The resource consists of the Suisun Channel, one of five navigable historic-era channels in the Suisun Marsh recorded together as P-48-000978 by Brookshear and Roberts in 2013. The Suisun Channel includes the harbor and turning basin at Suisun City, and a wide cut (channel) extending south from Suisun City for approximately 2 miles. The channel runs north-south immediately adjacent to the east edge of the Project Site. The channel cut is approximately 100 feet wide and approximately 8 feet deep. The channel, harbor, and turning basin were constructed in 1913-1914 and improved in 1945-1946. P-48-000978 was evaluated by JRP Historical Consulting, LLC in 2013 and recommended as not eligible for listing in the National Register of Historic Places (National Register) and the California Register of Historical Resources (California Register). There are no known ethnographic Native American villages or other indigenous archaeological sites in or within 0.5 mile of the Project Site.

The NWIC has record of eight previous cultural resources studies that have been conducted in or within 0.5 mile of the Project Site, two (S-43268, S-43268a) of which included a portion of the Project Site. All of these studies except S-43268 included field surveys, though S-43268a analyzed only built environment resources. S-43268 consisted of a records search, background research, and geoarchaeological analysis of the entire Suisun Marsh. Neither of the two studies that included the Project Site identified any cultural resources in the Project Site.

Archaeological Sensitivity

The detailed archaeological sensitivity models conducted as part of the SMP EIR/EIS and also those done for previous study S-43268 both covered the entire Project Site. The models concluded that the Project Site has a very low potential for buried or surficial pre-contact archaeological deposits. However, historic-era activities may have resulted in archaeological deposits in the Project Site.

Native American Outreach

ESA contacted the California Native American Heritage Commission (NAHC) on March 25, 2019 in request of a search of the NAHC's Sacred Lands File (SLF) and a list of Native American representatives who may have interest in the Project. The NAHC replied to ESA on April 25, 2019, in which they stated that the SLF has no record of sacred sites at the Project Site. Documentation of the NAHC outreach for the Project is provided in the cultural resources technical report (**Appendix G**).

Field Survey

On July 9, 2019, ESA archaeologists conducted a cultural resources pedestrian survey of the Project Site. Intensive pedestrian survey methods were used in non-inundated areas without dense vegetation cover (which did not allow for any ground visibility). Reconnaissance-level pedestrian survey methods were used in all other areas. Intensive survey methods consisted of walking parallel transects spaced at no more than 10 meters apart and inspecting the surface for cultural material (archaeological or architectural) or evidence thereof, while reconnaissance-level survey methods consisted of visiting select locations to assess ground conditions and inspect the surface for cultural material. Intensive survey methods were used at the proposed staging area and at the majority of proposed access routes, while reconnaissance

survey methods were used for the remainder of the Project Site. The entirety of the Project Site was not surveyed because this area would not be directly impacted by Project construction-related activities. While the Project would result in increased water levels in this area, currently subsurface or underwater cultural resources not identified during the pedestrian survey due to a lack of survey coverage would not be affected by the increased water level, since the introduced water would be slow-moving and not prone to scouring. Some modern duck hunting blinds and signage, and modern water control features (levee culverts) are present at various locations in the Project Site. Several modern buildings (clubhouse, cabin, sheds/garages, dog kennels, boathouse), wooden walkways and docks, storage containers, and mechanical equipment are present in the staging area portion of the Project Site.

During the pedestrian survey, ESA identified one cultural resource, a historic-era levee designated WL-01, in the Project Site. WL-01 consists of a 3-mile-long ring of earthen trapezoidal levee, which surrounds Wings Landing, in addition to a roughly east-west earthen trapezoidal levee that crosses through the northern portion of Wings Landing (i.e., Project Site). Sims et al. (2019) evaluated the significance of WL-01, recommending it not eligible for the California Register of Historical Resources (California Register) and National Register of Historic Places (National Register). Therefore, WL-01 does not appear to qualify as an historical resource, as defined by CEQA.

Paleontological and Geologic Setting

Paleontological resources are the fossilized remains of plants and animals, including vertebrates (animals with backbones), invertebrates (e.g., starfish, clams, ammonites, and marine coral), microscopic plants and animals (microfossils), and trace fossils (footprints, burrows, etc.). The age and abundance of fossils depend on the location, topographic setting, and particular geologic formation in which they are found. Fossil discoveries not only provide a historical record of past plant and animal life but can assist geologists in dating rock formations. Fossil discoveries can expand understanding of the time periods and the geographic range of existing and extinct flora and fauna. Paleontological resources are considered to be older than recorded human history and/or older than the middle Holocene (i.e., 5,000 radiocarbon years).

The Society of Vertebrate Paleontology (SVP) established guidelines for the identification, assessment, and mitigation of adverse impacts on nonrenewable paleontological resources (SVP, 2010). Most practicing paleontologists in the United States adhere closely to the SVP's assessment, mitigation, and monitoring requirements as outlined in these guidelines, which were approved through a consensus of professional paleontologists. Many federal, state, county, and city agencies have either formally or informally adopted the SVP's standard guidelines for the mitigation of adverse construction-related impacts on paleontological resources. The SVP has helped define the value of paleontological resources and, in particular, indicates that geologic units of high paleontological potential are those from which vertebrate or significant (uncommon) invertebrate or plant fossils have been recovered in the past (i.e., are represented in institutional collections). Geologic units of low paleontological potential are those that are not known to have produced a substantial body of significant paleontological material. As such, the sensitivity of an area with respect to paleontological resources hinges on its geologic setting and whether significant fossils have been discovered in the area or in similar geologic units.

In its "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources," the SVP (2010) defines four categories of paleontological sensitivity

(potential) for rock units: high, low, undetermined, and no potential: High Potential, rock units from which vertebrate or uncommon invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources; Low Potential, rock units that are poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule; Undetermined Potential, rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment; and No Potential, rock units like high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites) that will not preserve fossil resources.

It is important to note that while paleontological potential as defined above can provide a rough idea of whether subsurface fossils may exist, the uniqueness or significance of a fossil locality is unknown until it is identified to a reasonably precise level (Scott and Springer, 2003). As such, any fossil discovery should be treated as potentially unique or significant until determined otherwise by a professional paleontologist.

Geologic mapping by Wagner and Gutierrez (2017) indicates that Holocene bay mud (Qhbm) comprises the entirety of the surficial deposits within the Project Site. Additionally, while not mapped at the surface, geologic mapping indicates the presence of Holocene alluvium (Qa) and Pleistocene-age fan or terrace deposits (Qop) at depth below the Bay Mud. Boring logs and Cone Penetration Tests (CTPs) included in the Geotechnical Investigation performed by Geocon Consultants (2019), confirm the presence of Bay Mud at the surface, to depths of approximately 20 to 27 feet below ground surface (bgs). The subsurface data also confirms the presence of alluvium underlying the Bay Mud, to a maximum depth explored of 60.5 feet bgs.

Holocene bay mud (Bay Mud) (Qhbm): These sediments are Holocene in age (11,700 years ago to recent) and were deposited at or near sea level in San Pablo Bay. These deposits consist of estuarine silts, clay, peat, and fine sand (Wagner & Gutierrez, 2017b).

A review of geologic and paleontologic literature indicates numerous fossils have been discovered within Bay Mud, including marine mollusks and mammals, bony fishes, amphibians, reptiles, birds, and a diversity of extinct land mammals (CH2MHILL, 2004). While there have been several fossils recovered from the Bay Mud, they have been restricted to the older (i.e., deeper) portions of this unit (CH2MHILL, 2004). Radiocarbon dating indicates the upper portions (i.e., approximately 30 feet) of Bay Mud were deposited approximately 2,000 years ago (Schlocker, 1974).

Additionally, ESA conducted a search of the online paleontological locality database of the University of California, Museum of Paleontology (UCMP) to identify possible fossil localities within Solano County, and within the geologic units that could be impacted by the Proposed Project. While several localities were identified during the database search (UCMP, 2019), none of the listed sites can be confirmed as being located within the Project Site. In an attempt to discern whether there are fossil localities within the Project Site, ESA submitted a formal request for a records search of the surrounding area; the results of that were not received by the time of this analysis.

3.4.2 SMP EIS/EIR

The SMP EIS/EIR determined that there would be significant and unavoidable impacts on cultural resources due to inundation of certain lowland and marsh areas, construction in unsurveyed areas, and potential damage to character-defining features of the Montezuma Slough Rural Historic Landscape. The SMP EIS/EIR also determined that there would be less-than-significant impacts on cultural resources due to potential damage to or destruction of cultural resources from ground-disturbing activities in restoration areas. As stated earlier in this section, the SMP EIR/EIS did not specifically analyze impacts to paleontological resources or unique geologic features; an analysis of such potential impacts is included in this section.

Cultural Resources ECs and BMPs

ECs and BMPs for Cultural Resources are described in detail in **Appendix A**. The following SMP EC, also applicable to the Proposed Project, will minimize the Proposed Project's potential impacts on archaeological resources and human remains in the event that any are encountered during Proposed Project implementation:

- Protocols for Inadvertent Discovery of Cultural Resources

Table 3.3-1 summarizes the SMP EIS/EIR impact analysis for cultural resources.

• **TABLE 3.3-1**
SUISUN MARSH PLAN EIS/EIR CULTURAL RESOURCES IMPACT ANALYSIS

SMP EIS/EIR IMPACT	SMP EIS/EIR: SIGNIFICANT BEFORE MITIGATION	SMP EIS/EIR MITIGATION MEASURES	SMP EIS/EIR: SIGNIFICANCE AFTER MMS
CUL-1: Damage to Montezuma Slough Rural Historic Landscape as a Result of Ground-Disturbing Activities along Montezuma Slough	S	CUL-MM-1: Document and Evaluate the Montezuma Slough Rural Historic Landscape, Assess Impacts, and Implement Mitigation Measures to Lessen Impacts	SU
CUL-2: Damage to or Destruction of Known Cultural Resources as a Result of Ground-Disturbing Activities in Restoration Areas	S	CUL-MM-2: Evaluate Previously Recorded Cultural Resources and Fence NRHP- and CRHR-Eligible Resources prior to Ground-Disturbing Activities	LTS
CUL-3: Damage to Known Cultural Resources as a Result of Inundation	S	CUL-MM-3: Protect Known Cultural Resources from Damage Incurred by Inundation through Plan Design (Avoidance) CUL-MM-4: Resolve Adverse Effects prior to Construction	SU
CUL-4: Inadvertent Damage to or Destruction of As Yet-Unidentified Cultural Resources as a Result of Ground-Disturbing Activities in Restoration Areas	S	CUL-MM-5: Conduct Cultural Resource Inventories and Evaluations and Resolve Any Adverse Effects	LTS

SMP EIS/EIR IMPACT	SMP EIS/EIR: SIGNIFICANT BEFORE MITIGATION	SMP EIS/EIR MITIGATION MEASURES	SMP EIS/EIR: SIGNIFICANCE AFTER MMs
CUL-5: Damage to or Destruction of Human Remains as a Result of Ground-Disturbing Activities	LTS	NA	NA

NOTES:

LTS = Less-than-Significant

NA = Not Applicable

S = Significant

SU = Significant and Unavoidable

3.4.3 Impact Analysis

To avoid redundancy, the impact analysis below discusses impacts to historical resources, under Section a), as those impacts apply to only historic-era architectural resources, including buildings, structures, and objects. The following impact analysis discusses archaeological resources, both as historical resources, according to CEQA Guidelines § 15064.5, as well as unique archaeological resources, as defined in PRC § 21083.2(g), under Section b).

a) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?

Based on the results of the background research and field survey, one architectural resource older than 50 years of age has been identified in the Project Site. The resource, designated WL-01, consists of a 3-mile-long ring of earthen trapezoidal levee, which surrounds Wings Landing, in addition to a roughly east-west earthen trapezoidal levee that crosses through the northern portion of the Project Site. The resource has been evaluated as not eligible for the California Register as an individual resource or as a contributor to any historic district; thus, it does not qualify as a historical resource, as defined in CEQA Guidelines § 15064.5. Additionally, no elements of the Montezuma Slough Rural Historic Landscape were identified in the Project Site through background research and field survey. Therefore, no known historical resources, as defined in CEQA Guidelines § 15064.5, are present in the Project Site, and no impacts to historical resources are anticipated to result from the Proposed Project. Therefore, impacts on historical resources as a result of the Proposed Project would be less than those identified in the SMP EIS/EIR. No mitigation is required.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?

SMP EIS/EIR Mitigation Measure CUL-MM-5 requires cultural resources inventory of restoration areas and resolution of potential significant impacts on identified archaeological resources prior to project implementation. Such an inventory, including background research and pedestrian survey, was conducted for the Proposed Project, resulting in no archaeological resources identified in the Project Site. The detailed archaeological sensitivity models conducted as part of the SMP EIR/EIS and also those done for previous study S-43268 both covered the entire Project Site. The models concluded that the Project Site has a very low potential for buried or surficial pre-contact archaeological deposits, though historic-era

activities may have resulted in archaeological deposits in the Project Site. Therefore, no known archaeological resources that may qualify as historical resources (as defined in CEQA Guidelines § 15064.5) or unique archaeological resources (as defined in PRC § 21083.2[g]) are present in the Project Site. As a result, the Proposed Project is not expected to impact any archaeological resource, pursuant to CEQA Guidelines Section 15064.5. Per SMP EIS/EIR Mitigation Measure CUL-MM-5, if no archaeological resources are identified in restoration areas, any potential impact on archaeological resources resulting from projects would be less-than-significant.

Although the Proposed Project is not expected to impact any archaeological resources, the Proposed Project would involve ground-disturbing activities that may extend into undisturbed soil. It is possible that such activities could unearth, expose, or disturb subsurface archaeological resources that have not been identified on the surface. Because previously unrecorded archaeological deposits could be present in the Project Site, and they could be found to qualify as archaeological resources pursuant to CEQA Guidelines § 15064, impacts of the Proposed Project on archaeological resources could be potentially significant. As stated in the SMP EIR/EIS, SWP ECs include protocol for Inadvertent Discovery of Cultural Resources. If any previously unknown archaeological resources were identified during Proposed Project activities, implementation of this protocol would reduce any potential impact to archaeological resources to a less-than-significant level. Therefore, impacts on archaeological resources as a result of the Proposed Project would be less-than-significant and would be less than those identified in the SMP EIS/EIR. No mitigation is required.

c) Would the project disturb any human remains, including those interred outside of formal cemeteries?

No human remains have been identified in the Project Site through archival research, field surveys, or Native American correspondence. Also, the land use designations for the Project Site do not include cemetery uses. Therefore, the Proposed Project is not anticipated to disturb any human remains.

However, the Proposed Project would involve ground-disturbing activities, and it is possible that such activities could unearth, expose, or disturb previously unknown human remains. Should human remains be discovered and be disturbed or damaged during construction activities, impacts of the Proposed Project on the human remains would be significant.

As stated in the SMP EIR/EIS, SWP ECs include protocol for Inadvertent Discovery of Cultural Resources, including human remains. If any human remains were encountered during Proposed Project activities, implementation of this protocol would reduce any potential impact to human remains to a less-than-significant level. Therefore, impacts on human remains as a result of the Proposed Project would remain within the scope of the impacts that were identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

d) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

A review of the scientific literature and the online collections database of the UCMP indicates that the Holocene-age Bay Mud present at the Project Site has a high potential by SVP standards.

Proposed Project construction would include grading, excavation, and redistribution of excavated materials. Prior to any earthwork (i.e., grading and excavation), the top six inches of soil would be removed. These activities could have an impact on paleontological resources if any excavation associated with the Proposed Project was deep enough to reach the sensitive lower portions of the Bay Mud unit underlying the Project Site. However, as described in Table 2-3 in Chapter 2, *Proposed Project Description*, construction associated with the Proposed Project would reach approximately 2 feet below mean sea level (MSL). Therefore, it is expected that earthwork associated with construction would disturb only the upper portions of the Bay Mud and would not disturb the more sensitive lower portions of the Bay Mud unit.

Given the limited extent of the planned ground disturbance, the shallow excavation depth, and the relatively recent age associated with the upper portions of the Bay Mud, the possibility of encountering paleontological resources is low. Although the SMP EIR/EIS did not specifically analyze impacts on paleontological resources or unique geologic features, impacts on paleontological resources were analyzed in this addendum and it was concluded that the Wings Landing Tidal Habitat Restoration would not result in new significant impacts on paleontological resources. No mitigation is required.

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3.5 Greenhouse Gas Emissions

3.5.1 Existing Conditions

The environmental setting of the Project Site in terms of greenhouse gas emissions has not changed since certification of the SMP EIS/EIR. The Project Site, approximately 267.02 acres at the northern end of the Suisun Marsh, remains a managed wetland.

3.5.2 SMP EIS/EIR

The SMP EIS/EIR determined that, without mitigation, impacts to climate change would be less-than-significant, as summarized in **Table 3.4-1**. Two of the three impacts were determined to be beneficial before mitigation due to carbon sequestration functions performed by both managed wetlands and restored tidal wetlands.

Greenhouse Gas Emissions ECs and BMPs

ECs and BMPs for Greenhouse Gas Emissions are described in detail in **Appendix A**. The following SMP EC, also applicable to the Proposed Project, will minimize the Proposed Project's potential impacts on greenhouse gas emissions:

- Pre-Construction and Final Design BMPs
- Construction BMPs
-

• **TABLE 3.4-1**
SUISUN MARSH PLAN GREENHOUSE GAS EMISSIONS IMPACT ANALYSIS

SMP EIS/EIR Impact	SMP EIS/EIR: Significance Before Mitigation	SMP EIS/EIR Mitigation Measures	SMP EIS/EIR: Significance after MMs
CC-1: Construction-Related Changes in Greenhouse Gas Emissions	LTS	NA	NA
CC-2: Permanent Changes in Greenhouse Gas Sources and Sinks	B	NA	NA
CC-3: Degradation of Wetland Habitat and Ecosystem Health as a Result of Inundation Associated with Sea Level Rise	B	NA	NA

- NOTES:
- B = Beneficial
 - LTS = Less-than-Significant
 - NA = Not Applicable

3.5.3 Impact Analysis

a) Would the Proposed Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

GHG emissions were estimated using CalEEMod (refer to Section 2.1.3 of this document for assumptions). The BAAQMD does not identify a significance threshold for construction-related GHG emissions. However, it is standard practice to amortize construction-related emissions over the life of a project, combine them with operational emissions, and compare the total against BAAQMD's operational significance threshold. As discussed in Section 2.1 of this document, operational emissions at the Project Site would decrease with implementation of the Proposed Project and are assumed to be negligible. Thus, operational emissions were not analyzed. Construction emissions were amortized over the life of the project and compared to BAAQMD's operational significance threshold, as shown in **Table 3.4-2**.

**TABLE 3.4-2
PROPOSED PROJECT CONSTRUCTION GREENHOUSE GAS EMISSIONS**

	CO ₂ e (MT/year)
Construction GHG Emissions	523
Emissions Amortized Over 11 Years	48
BAAQMD Threshold	1,100

NOTES: CO₂e = carbon dioxide equivalent, MT = metric tons
SOURCE: ESA, 2019.

As shown above, the Proposed Project would result in combined GHG emissions well below the BAAQMD threshold of significance. Additionally, the Project Site is currently a managed wetland, and, with implementation of the Proposed Project, it would be restored to natural tidal wetland. The restoration of natural wetland would decrease the amount of required management activities, which would, in turn, reduce associated GHG emissions from mobile sources, e.g. maintenance vehicles and other sources. For these reasons, impacts resulting from Proposed Project-related GHG emissions are within the scope of impacts identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

b) Would the Proposed Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

In 2006, the California legislature passed Assembly Bill (AB32; California Health and Safety Code Division 25.5, Sections 38500, et seq.), also known as the Global Warming Solutions Act, which requires the California Air Resources Board (CARB) to design and implement feasible and cost-effective emissions limits, regulations, and other measures, such that statewide GHG emissions are reduced to 1990 levels by 2020 (representing a 25-percent reduction in emissions). Pursuant to AB32, the CARB adopted a *Climate Change Scoping Plan* in December 2008 outlining measures to meet the 2020 GHG reduction goals, which was most recently updated in 2017.

In order to meet the targets identified in AB32, Solano County adopted a Climate Action Plan (CAP) in 2011. The CAP summarizes the County's emissions inventory and calculates the reduction necessary to meet its goals, and commits Solano County to reducing communitywide GHG emissions 20 percent below 2005 baseline emission levels by 2020.

Since the BAAQMD GHG significance threshold would not be exceeded, as described above, the Proposed Project would not result in a cumulatively considerable increase in GHG emissions that would impair the State's ability to implement AB32 or the County's opportunity to meet the CAP's GHG reduction goals.

In May 2012, the DWR adopted the DWR Climate Action Plan-Phase I: Greenhouse Gas Emissions Reduction Plan (GGERP), which details DWR's efforts to reduce its GHG emissions consistent with Executive Order S-3-05 and AB32. DWR also adopted the Initial Study/Negative Declaration prepared for the GGERP in accordance with the CEQA Guidelines review and public process. Both the GGERP and Initial Study/Negative Declaration are incorporated herein by reference and are available at: <http://www.water.ca.gov/climatechange/CAP.cfm>. The GGERP provides estimates of historical (back to 1990), current, and future GHG emissions related to operations, construction, maintenance, and business practices (e.g. building-related energy use). The GGERP specifies aggressive 2020 and 2050 emission reduction goals and identifies a list of GHG emissions reduction measures to achieve these goals.

DWR specifically prepared its GGERP as a "Plan for the Reduction of Greenhouse Gas Emissions" for purposes of CEQA Guidelines section 15183.5. That section provides that such a document, which must meet certain specified requirements, "may be used in the cumulative impacts analysis of later projects." Because global climate change, by its very nature, is a global cumulative impact, an individual project's compliance with a qualifying GHG Reduction Plan may suffice to mitigate the project's incremental contribution to that cumulative impact to a level that is not "cumulatively considerable." (See CEQA Guidelines, § 15064, subd. (h)(3).)

More specifically, "later project-specific environmental documents may tier from and/or incorporate by reference" the "programmatic review" conducted for the GHG emissions reduction plan. "An environmental document that relies on a greenhouse gas reduction plan for a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and, if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project." (CEQA Guidelines § 15183.5, subd. (b)(2).)

Section 12 of the GGERP outlines the steps that each DWR project will take to demonstrate consistency with the GGERP. These steps include: (1) analysis of GHG emissions from construction of the Proposed Project, (2) determination that the construction emissions from the project do not exceed the levels of construction emissions analyzed in the GGERP, (3) incorporation of DWR's project level GHG emissions reduction strategies, (4) determination that the Proposed Project does not conflict with DWR's ability to implement any of the "Specific Action" GHG emissions reduction measures identified in the GGERP, and (5) determination that the Proposed Project would not add electricity demands to the State Water Project (SWP) system that could alter DWR's emissions reduction trajectory in such a way as to impede its ability to meet its emissions reduction goals.

Consistent with these requirements, the GGERP Consistency Determination Checklist and Proposed Project emission estimates are included as **Appendix H**, documenting that the Proposed Project has met the required elements of the GGERP.

Based on the analysis provided in the GGERP and the demonstration that the Proposed Project is consistent with the GGERP (as shown in **Appendix H**), DWR, as the lead agency, has determined that

the Proposed Project's incremental contribution to the cumulative impact of increasing atmospheric levels of GHGs is less than cumulatively considerable and, therefore, remains less-than-significant and within the scope of impacts identified in the SMP EIS/EIR.

3.6 Hydrology and Water Quality

3.6.1 Existing Conditions

The Project Site is located in the north-central portion of the Suisun Marsh, within Suisun Marsh Plan Region 1. The Project Site is bounded by sloughs on three sides including: Peytonia Slough to the north, Suisun Slough to the east, and Boynton Slough to the south; additionally, a cross berm bounds the Project Site on the west. The Overall Property is managed as a duck club and contains managed marsh (managed wetland), open water, and uplands. Within the Project Site are over 3 miles of levees and 10 water control structures. The Project Site also includes perennial and seasonal channels that distribute water throughout the Project Site.

Methylmercury and Dissolved Oxygen

The estuary has elevated mercury (Hg) concentrations in fish, sediment, and water, as compared to other North American estuaries, due to the history of Hg mining in the Coast Range mountains and the use of Hg for gold extraction in the Sierra Nevada mountains in the 19th century (SFBRWQCB, 2018). Sulfate- and iron-reducing bacteria in anaerobic environments convert Hg to methylmercury (MeHg). In 2018, the San Francisco Bay Regional Water Quality Control Board published a Staff Report, *Establish Water Quality Objectives and A Total Maximum Daily Load for Dissolved Oxygen in Suisun Marsh and Add Suisun Marsh to SF Bay Mercury TMDL*, which outlines the levels of mercury (total Hg) and methylmercury (MeHg) at the Project Site that are slightly higher than other areas within the Suisun Marsh. The levels for total Hg are documented at 5.8 nanograms per liter (ng/L) and average MeHg is documented at 1.07 ng/L. Managed wetlands are typically considered sources of total Hg and MeHg because wetlands provide opportunities for MeHg production, or methylation, because of their wet/dry cycling, potential for elevated water temperatures, sources of labile carbon, and low redox conditions that enable sulfate and iron reducing bacteria to flourish (SFBRWQCB, 2018). Fish in Suisun Marsh have Hg concentrations that exceed the levels of concern for human health and wildlife. Hg concentrations in Mississippi silversides, a small fish approximately 3 inches long, were measured in Suisun Marsh in 2005 to 2010. All concentrations observed in silversides were consistently above 0.03 mg/kg (30 ng/g), the water quality objective for prey fish established to protect wildlife by the Bay Mercury Total Maximum Daily Load (TMDL; SFBRWQCB, 2018). Although the concentrations in silversides caught in Suisun Marsh sloughs are still above the objective, they are lower than those in the South Bay and generally comparable to the levels of Hg found in fish from managed ponds and sloughs in the Napa-Sonoma marshes (Grenier et al., 2010) and in the North Bay. The average concentrations in the 40-70 ng/g range were considered as indicative of the low-end Hg concentrations in the Napa-Sonoma region. The 1.5 to 2 fold differences in concentrations between the lowest and highest seasonal levels or differences between years observed in Suisun Marsh are also typical of the variation observed in the Napa-Sonoma marshes (SFBRWQCB, 2018).

On April 11, 2018 the California State Water Resources Control Board adopted the Basin Plan amendment to establish site-specific objectives and a TMDL for dissolved oxygen (DO) in Suisun Marsh and added Suisun Marsh to the waterbodies addressed by the San Francisco Bay mercury TMDL. The San Francisco Bay TMDL was approved in 2008 by the U.S. Environmental Protection Agency, which has a goal for total Hg in suspended sediment of 0.2 milligram per kilogram (mg/kg;). As part of establishing the Suisun Marsh

TMDL, Hg and MeHg monitoring will occur within Suisun Marsh to determine compliance of Hg TMDL targets for human health and wildlife.

Similar to levels of Hg and MeHg, the documented low levels of DO at the Project Site are generally consistent with, but slightly lower than, levels in other areas of the marsh and managed wetlands. Dissolved oxygen concentrations in western Suisun Marsh vary seasonally; however, many of the sloughs monitored typically have DO levels above 5 mg/L. DO sags tend to occur in late summer and fall (mid-September through mid-November) and are linked to the water management cycle at the managed wetlands (SFBRWQCB, 2018). During the managed wetland discharge season, DO in the back-end sloughs of the western Marsh is generally depressed (i.e., below 5 mg/L). Low DO concentrations following managed wetland discharge events can last from several days to upwards of a week. Although sloughs fully surrounded by tidal marshes are not common in the Suisun Marsh, or the Peytonia and Boynton Sloughs, which border the Project Site, both have tidal marshes connected to them. Accordingly, tidal marshes may be a significant source of dissolved organic carbon in these sloughs (SFBRWQCB, 2018).

Salinity

Salinity conditions in Suisun Marsh are dependent on Delta water management regulations and decisions and affected by the overall hydrology of the Central Valley watershed (ranging from wet to critically dry). The salinity of Suisun Marsh is affected by many factors including:

- Tides
- Delta outflow
- Suisun Marsh Salinity Control Gates operations
- Creek inflows
- Managed wetland operations
- Urban runoff
- Climate: precipitation, wind, evaporation, and barometric pressure
- Fairfield-Suisun Sewer District Treatment Plant effluent inflows

Tidal exchange has a significant influence on tidal sloughs that are more directly connected to Suisun Bay. Sloughs that are more towards the interior of the marsh are less affected by tidal exchange. Salinity monitoring in Suisun Marsh has suggested that some regions of the marsh experience more of an impact on salinity from tides than other regions (Tetra Tech, 2013). In general, salinity increases with high tide and decreases with low tide. Sloughs in the vicinity of the Project Site (Peytonia Slough and Boynton Slough) showed salinity measurements mostly between 1 ppt and 4 ppt whereas Goodyear Slough, which is closer to Suisun Bay, showed salinity within the 1 ppt to 8 ppt range (Tetra Tech, 2013).

Delta outflow is the primary source of fresh water to Suisun Marsh. During periods of low Delta outflow, saline water from Suisun Bay can enter Suisun Marsh which results in higher salinity. Conversely, salinity decreases when Delta outflow increases. North-central Suisun Marsh salinity is primarily affected by inflow from the watersheds to the north and northwest.

Many studies have demonstrated the significant influence of Delta outflow on water salinity in Suisun Marsh. Since approximately the 1920s, salinity in Suisun Marsh has increased as a result of out-of-basin diversion of freshwater from the Delta. More recently there is a negative relationship between Delta outflows and salinity in the marsh. Water salinity in Suisun Marsh is higher during low Delta outflow when high salinity water from Suisun Bay can enter Suisun Marsh, raising the salinity in Suisun Marsh and threatening aquatic life support. There is a salinity gradient which increases from east to west because the east side of the channel is the closest to the Delta outflow. To control salinity in Suisun Marsh, the Suisun Marsh Salinity Control Gates (SMSCG) were installed in Montezuma Slough. The gates are operated from October to May when salinity standards are in place, typically between 10-20 days per year.

Hydrology and Water Supply

The hydrology of Suisun Marsh is affected by several factors, including Delta outflows, rainfall, tides, local creek inflow, and the Fairfield Suisun Sewer District (FSSD) Wastewater Treatment Plant discharge. Additionally, the flooding and draining operations of the managed wetlands affect hydrology in the sloughs.

Tides are the dominant driver of flows in the sloughs of Suisun Marsh, which experiences mixed semi-diurnal tides, with two daily tides of unequal height (Siegel et al., 2011). In Boynton Slough, tidal flows ranged between -800 and +1200 cubic feet per second (cfs) and in Peytonia Slough, tidal flows ranged between about -700 and + 800 cfs. The variations of tidal stage depend upon three time scales of tidal processes: daily unequal high and low tides, biweekly spring-neap tidal cycle, and quarterly seasonal tides (Schureman, 1971; cited in Siegel et al., 2011).

Several creeks drain large, urbanized watersheds located in the northern portion of Suisun Marsh, including Green Valley Creek, Suisun Creek, Ledgeewood Creek, Laurel Creek, Union Creek, and Denverton Creek. For instance, Ledgeewood Creek flows along the west edge of the City of Fairfield. The creeks convey seasonal freshwater to Suisun Marsh as well as urban runoff, which could be a source of biological oxygen demand (BOD) (Siegel et al., 2011).

The FSSD advanced secondary Wastewater Treatment Plant is located in the northwest portion of the marsh and serves more than 130,000 residential, commercial, and industrial customers, and discharges approximately 13 million gallons per day (mgd). Approximately 90 percent of the plant's effluent discharges into Boynton Slough with the remainder of the discharge recycled for landscape irrigation. A smaller discharge point exists on Ledgeewood Creek in the event of high effluent flows or failure of the primary discharge point to Boynton Slough.

Suisun Marsh receives about 25 inches of annual precipitation in comparison to tidal exchange of 4–11 inches per week and 3–8 inches per week measured at two intensively-monitored wetlands (Siegel et al., 2011). Precipitation to Suisun Marsh is of small hydrologic influence compared to tidal exchange.

3.6.2 SMP EIS/EIR

The SMP EIS/EIR determined there would be less-than-significant impacts on water quality, surface hydrology, and water from restoration activities within the marsh because implementation of the plan, including restoration projects, would not increase the production and export of methylmercury when

compared to baseline conditions in managed wetlands and could increase DO levels when compared to baseline conditions in managed wetlands. Additionally, the SMP EIS/EIR determined the Proposed Project would not result in substantial changes in salinity that would affect the water quality of designated beneficial uses (e.g., drinking water supplies) and would not significantly alter tidal elevations or velocities, as described in **Table 3.5-1**. Therefore, no mitigation was required.

**TABLE 3.5-1
SUISUN MARSH PLAN HYDROLOGY AND WATER QUALITY IMPACT ANALYSIS**

SMP EIS/EIR Impact	SMP EIS/EIR: Significance Before Mitigation	SMP EIS/EIR Mitigation Measures	SMP EIS/EIR: Significance after MMs
WTR-1: Reduction in Water Availability for Riparian Water Diversions to Managed Wetlands Upstream or Downstream of Restoration Areas	LTS	NA	NA
WTR-2: Increased Tidal Velocities from Breaching of Managed Wetlands Levees	LTS	NA	NA
WTR-3: Improved Water Supply as a Result of Improved Flooding and Draining of Managed Wetlands	B	NA	NA
WTR-4: Increased Tidal Flows and Improved Water Supply as a Result of Dredging	B	NA	NA
WQ-1: Increased Salinity in Suisun Marsh Channels from Increased Tidal Flows from Suisun Bay (Grizzly Bay) as a Result of Restoration	LTS	NA	NA
WQ-2: Changes to Salinity of Water Available for Managed Wetlands from October to May	LTS	NA	NA
WQ-3: Increased Salinity at Delta Diversions and Exports	LTS	NA	NA
WQ-4: Possible Changes to Methylmercury Production and Export as a Result of Tidal Restoration	LTS	NA	NA
WQ-5: Improved Dissolved Oxygen Concentrations in Tidal Channels from Reduced Drainage of High Sulfide Water from Managed Wetlands	B	NA	NA
WQ-6: Temporary Changes in Water Quality during Construction Activities	LTS	NA	NA
WQ-7: Temporary Degradation of Water Quality during Implementation of Managed Wetland Activities	LTS	NA	NA
WQ-8: Temporary Degradation of Water Quality during Dredging, Including Possible Increases in Mercury Concentrations	LTS	NA	NA

NOTES:

B=Beneficial

LTS = Less-than-Significant

NA = Not Applicable

3.6.3 Impact Analysis

a) **Would the Proposed Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?**

The Proposed Project is not expected to reduce DO levels from existing low levels because managed wetland activities would cease once the Project Site is restored to tidal marsh. An increase in tidal prism and flushing as well as reduced residence time are expected to result in increased DO concentrations. Natural tidal flushing would occur in the restored tidal marsh, reducing residence time of the water on-site and increasing mixing and dilution.

MeHg concentrations in tidal wetlands are up to an order of magnitude lower than those reported from diked wetlands managed for agriculture and/or waterfowl habitat; accordingly, the restoration of tidal flows and circulation is expected to reduce MeHg significantly. Some level of MeHg production would continue to persist, as tidal wetlands processes support methylation. However, shorter wetting and drying cycles and higher volume of water exchange (twice daily) are expected to make the tidal marshes less conducive to methylmercury production (SFBRWQCB, 2018). Because there is no evidence for concluding that tidal restoration would lead to increased problems with respect to MeHg for fish, wildlife, or consumers above baseline conditions, and that tidal restoration would be expected to increase tidal prism and flushing and reduce residence time, a decrease in MeHg concentrations may occur as a result of the Proposed Project. In addition, the Proposed Project would contribute to a methylmercury monitoring program to document and provide evidence for MeHg fate and transport as a result of tidal restoration. To reduce impacts from sediment, a drawdown of the water levels onsite would be implemented to ensure the managed marsh and interior channels are as dry as possible through carefully timed opening and closing of water control structures.

Hydrologic modeling indicates that the Proposed Project would not negatively affect salinity either onsite or in the vicinity of the Project Site (RMA, 2018). The model results confirmed that the very small changes in salinity are within the objectives of the SMP EIS/EIR for maintaining increases in baseline salinity to below 10 percent. Therefore, as confirmed by model results, the seasonal magnitude of the marsh would continue to be governed primarily by Delta outflow and the operation of the SMSCG and the seasonal salinity pattern would remain similar to existing conditions.

Water Quality ECs and BMPs

ECs and BMPs for water quality are described in detail in **Appendix A**. In addition, adherence to the following ECs and BMPs incorporated from the SMP EIS/EIR would minimize the Proposed Project's potential impacts on water quality:

Standard Design Features and Construction Practices

- Erosion and Sediment Control Plan
- Stormwater Pollution Prevention Plan
- Hazardous Materials Management Plan

Biological Resources BMP

- Construction Period Restrictions

Therefore, impacts on water quality as a result of the Proposed Project would remain within the scope of the impacts that were identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

b) Would the Proposed Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Restoring tidal connectivity and increasing the acreage of tidal wetland in Suisun Marsh would increase the area exposed to saline and brackish surface water. However, in normal water years, restoration would most likely have little to no effect due to freshwater flushing. In dry periods, when recharge is diminished, there could be infiltration of saline waters into shallow subsurface areas in the marsh. However, wells in Suisun Marsh are not used for potable, municipal, or agricultural supply; even if producing aquifers were affected, there would be little or no effect on the use of well water. Therefore, impacts on groundwater supply and groundwater recharge as a result of the Proposed Project would remain within the scope of the impacts that were identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

c) Would the Proposed Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

- i) result in substantial erosion or siltation on- or off-site;**
- ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;**
- iii) create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;**
or
- iv) impede or redirect flood flows?**

The Proposed Project would restore managed wetlands to tidal marsh which would reestablish tidal connectivity and increase the acreage of tidal wetland in Suisun Marsh, resulting in an increase in tidal prism and flushing. Ground-disturbing activities would have the potential to increase the rate and extent of soil erosion during and immediately after construction, before vegetation has fully re-established. Restoring tidal action to portions of Suisun Marsh would increase the mobility of sediment in reconnected tidal channels and mudflat areas. Breach sizes, side slopes of 1H:1V, and breach locations were strategically selected based on hydraulic modeling (RMA, 2018), historic site conditions, and expert and regulatory agency feedback to result in maximum tidal exchange and to promote favorable natural conditions. Hydrologic modeling indicates that the Proposed Project would not negatively affect velocity both onsite and in the vicinity.

The Proposed Project is consistent with the SMP's objective to maintain and improve the Suisun Marsh levee system's integrity to protect property, infrastructure, and wildlife habitats from catastrophic flooding. The Proposed Project would not involve the construction of structures and would not impede or

redirect flood flows within 100-year flood hazard areas. As part of the Proposed Project, the cross berm would be improved such that it continues to provide the WCGC with protection from unplanned inundation, wave, and wind action.

The Proposed Project does not involve construction of stormwater drainage systems; therefore, there is no potential for the Proposed Project to exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

In summary, impacts related to alteration of the existing drainage pattern of the Project Site as a result of the Proposed Project would remain within the scope of the impacts that were identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

d) Would the Proposed Project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

As discussed in Chapter 3.8, *Other Resources*, the Project Site has not been used for agriculture since the 1800's and pesticide use is not a regular part of duck club management, but has occurred infrequently for invasive species control. Long-term management of the Project Site may include as-needed removal of *Phragmites australis* and other highly invasive plants as described in the Invasive Vegetation Management Plan (**Appendix I**). Furthermore, a records review did not identify soil or groundwater impairments or documentation of potential impairments; therefore, there is a low probability of soil or groundwater contamination on the Project Site. No buildings or structures, including hazardous materials storage, are located on the Project Site. As part of the Proposed Project, the cross berm would be improved such that it would continue to provide WCGC with protection from unplanned inundation, wave, and wind action. Therefore, impacts related to the risk or release of pollutants from flooding, tsunami, or seiche are within the scope of the impacts identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

e) Would the Proposed Project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The Project Site is located within the San Francisco Bay Basin. The Basin Plan was most recently revised in December 2018. As discussed previously, impacts from the Proposed Project on water quality would not result in increased methylmercury and salinity compared to existing conditions. Sediment released as a result of the Proposed Project could result in temporary localized increases in suspended solids; however, an increase in tidal prism and flushing as well as reduced residence time are expected to result in increased in DO concentrations. Through the implementation of the ECs and BMPs, the Proposed Project would comply with the Basin Plan.

The Proposed Project is located within the Suisun-Fairfield Valley Groundwater Basin which is not managed by a groundwater management agency. Restoring tidal connectivity and increasing the acreage of tidal wetland in Suisun Marsh would increase the area exposed to saline and brackish surface water which may lead to infiltration of saline waters into shallow subsurface areas in the marsh during dry periods. Because wells in Suisun Marsh are not used for potable, municipal, or agricultural supply, there would be little or no effect on the use of well water and would not affect water supply or demand.

Therefore, impacts related to conflicting or obstructing a water quality control plan or sustainable groundwater management plan as a result of the Proposed Project would remain within the scope of the impacts that were identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

3.7 Land Use and Land Use Planning

3.7.1 Existing Conditions

The approximately 267.02-acre Project Site is located in the north-central portion of the Suisun Marsh, within Suisun Marsh Plan (SMP) Region 1. The Project Site is surrounded on three sides by water, including Peytonia Slough to the north, Suisun Slough to the east, and Boynton Slough to the south, and bounded by a cross berm to the west. The Overall Property is managed as a duck club and contains managed marsh, open water, and uplands. Infrastructure on the site includes over three miles of levees and ten water control structures. The Project Site also includes perennial and seasonal channels that distribute water throughout the Project Site and are used to transport hunters via boat. Elevations within the marsh range from 0 to 9 feet above mean sea level with relatively gradual slopes decreasing from north to south as well as from the center outward. The Project Site is zoned by Solano County as Marsh Preservation (MP) and designated as Marsh with a Resource Conservation overlay (Solano County, 2012; Solano County, 2008).

3.7.2 SMP EIS/EIR

The SMP EIS/EIR determined there would be no impacts or less-than-significant impacts on land uses because implementation of the SMP, including restoration projects, would not alter existing land use patterns; conflict with existing land use plans, policies, and regulations; or conflict with any applicable habitat conservation plan or natural community conservation plan, as described in **Table 3.6-1**. Therefore, no mitigation was required.

The Travis Air Force Base Land Use Compatibility Plan (Travis AFB LUCP) was updated in 2015, after the SMP EIS/EIR was finalized (ESA, 2015). The Travis AFB LUCP contains policies to ensure that future land uses in the surrounding area remain compatible with the realistically foreseeable aircraft activity at the base. As adopted by the Solano County Airport Land Use Commission (ALUC), these policies guide the ALUC in land use development review in accordance with Section 21670 et seq. of the California State Public Utilities Code. Because the updated Travis AFB LUCP was not contemplated by the SMP EIS/EIR, an analysis of the Proposed Project's compatibility is included below.

**TABLE 3.6-1
SUISUN MARSH PLAN LAND USE AND LAND USE PLANNING IMPACT ANALYSIS**

SMP EIS/EIR Impact	SMP EIS/EIR: Significance Before Mitigation	SMP EIS/EIR Mitigation Measures	SMP EIS/EIR: Significance after MMs
LU-1: Alteration of Existing Land Use Patterns	LTS	NA	NA
LU-2: Conflict with Existing Land Use Plans, Policies, and Regulations	NI	NA	NA
LU-3: Conflict with Any Applicable Habitat Conservation	NI	NA	NA

SMP EIS/EIR Impact	SMP EIS/EIR: Significance Before Mitigation	SMP EIS/EIR Mitigation Measures	SMP EIS/EIR: Significance after MMs
Plan or Natural Community Conservation Plan			

NOTES:

NI = No Impact

LTS = Less than Significant

NA = Not Applicable

3.7.3 Impact Analysis

a) Would the Proposed Project physically divide an established community?

The SMP EIS/EIR did not evaluate this impact because activities described and analyzed in the SMP would not physically divide an established community as it would continue to support and maintain private land uses within the existing marsh. Consistent with the SMP, the Proposed Project would not involve dividing an established community because no established communities exist within the Project Site. Therefore, no impact would occur and impacts of the Proposed Project would remain within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

Implementing the Proposed Project would not alter the existing land use patterns; conflict with existing land use plans, policies, and regulations; or conflict with the existing SMP. The Project Site is designated as “Marsh” and “Resource Conservation” and the construction and restoration activities associated with the Proposed Project would be consistent with these land use designations (Solano County, 2008). The Proposed Project is a restoration project that is allowed under the SMP, as its purpose and objectives, design, location, and implementation are consistent with the SMP, as described in Chapter 2, *Proposed Project Description*. Additionally, because the Proposed Project is consistent with the SMP, which does not conflict with the Solano County General Plan, the Suisun Marsh Protection Act of 1977, or the Delta Plan, the Proposed Project would also be consistent with these plans and policies.

The Proposed Project is consistent with the 2015 Travis Air Force Base Land Use Compatibility Plan (Travis AFB LUCP) and would not be expected to increase wildlife hazards. The 2015 Travis AFB LUCP designates an Airport Influence Area (AIA), which is defined as an area that is routinely affected by aircraft operations at an airport. Locations within the AIA, which includes the Project Site, are subject to review by the Solano County Airport Land Use Commission (ALUC). Within the Travis Air Force Base AIA, the Travis AFB LUCP defines 6 compatibility zones that each contain general, noise, safety, aircraft protection, and overflight regulations and supporting criteria (ESA, 2015). The Project Site is predominately located within AIA Zone D (~99% by area), with less than one percent in AIA Zone C. The Proposed Project is consistent with the applicable restrictions of both zones, as described in **Table 3.6-2**.

TABLE 3.6-2

TRAVIS AIR FORCE BASE LAND USE COMPATIBILITY PLAN ANALYSIS

Prohibition/Restriction	Zone	Proposed Project Compatible	Justification
Maximum Densities/Intensity	C, D	Yes	The Proposed Project contains no development that will increase the number of people on the Project Site.
Children's schools, day care centers, and libraries	C	Yes	The Proposed Project contains no schools, day care centers, or libraries.
Hospitals and nursing homes	C	Yes	The Proposed Project contains no hospitals or nursing homes.
Hazards to flight	C, D	Yes	The Proposed Project contains no physical (e.g., tall objects), visual, and electronic forms of interference with the safety of aircraft operations. The Proposed Project is not within the Bird Strike Hazard Zone, and will therefore not require additional analysis of wildlife attractants.
Noise Level Reduction in residential developments	C	Yes	The Proposed Project contains no residential developments.
Review of objects over 100 or 200 feet AGL	C, D	Yes	The Proposed Project contains no objects over 100 feet AGL.
Deed Notice of airport activities on new residential developments	C	Yes	The Proposed Project contains no residential developments.
Wind turbine requirements	C, D	Yes	The Proposed Project contains no wind turbines.
Commercial scale solar requirements	C, D	Yes	The Proposed Project contains no commercial solar developments.
Meteorological tower requirements	C, D	Yes	The Proposed Project contains no meteorological towers.
Bird Strike Hazard Zone requirements	C, D	Yes	The Proposed Project is not within the Bird Strike Hazard Zone.
Outer Perimeter Requirements	C, D	Yes	The Proposed Project is within the Outer Perimeter and consists of the conversion of managed marsh wetlands, actively managed to increase bird usage, to tidal marsh wetland habitat for the benefit of native fish species. As designed, the Proposed Project will reduce hazardous wildlife attractants. See Bird Strike Risk Assessment below.

Bird Strike Risk Assessment

The Project Site is located outside of the Bird Strike Hazard Zone but lies within the “Outer Perimeter”, which is defined as an area within five miles of the Air Force Base’s air operations area (ESA, 2015). The Project Site is currently actively managed as a duck club to maximize bird usage of the Project Site. The Project Site is almost entirely managed marsh wetlands, with 94.57% currently delineating as Jurisdictional Wetlands (92.38%) and Waters of the United States (2.19%). Based on the Travis AFB LUCP’s table of land use types and the species the land use types attract, the Project Site land use classification is “Estuarine/Wetland Habitat” (ESA, 2015). The Proposed Project would maintain this land use classification by converting the managed marsh to tidal marsh. The Proposed Project does not constitute an “expansion of existing wildlife attractants” because it is converting the Project Site from an area actively managed to maximize bird usage to an area designed to benefit fish. The nature of the Proposed Project is anticipated to reduce the risk of bird strikes to flights originating or terminating at Travis Air Force Base.

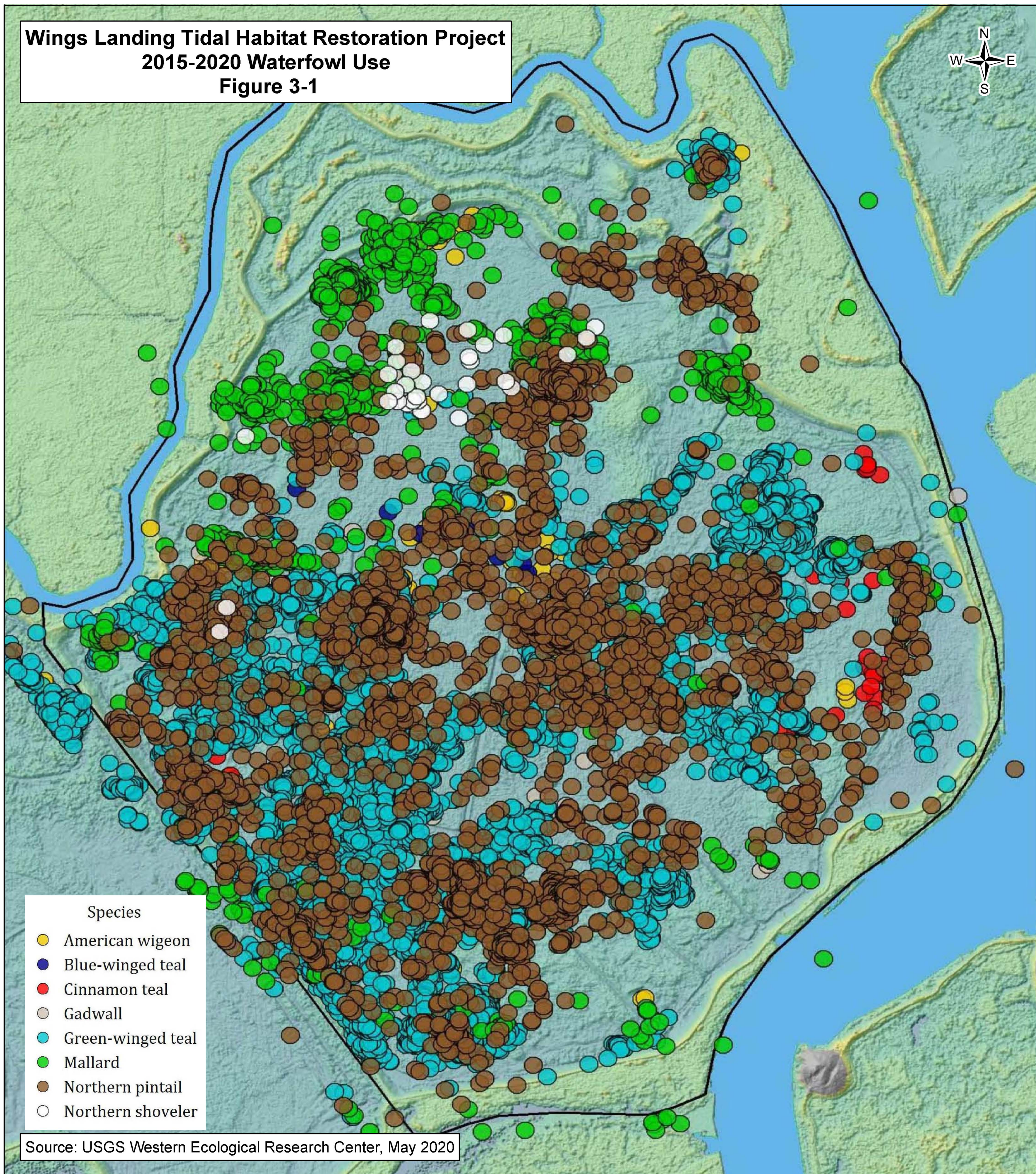
The current land use of the Project Site is as the Wings Landing Duck Club (Wings Landing). Duck clubs in the Suisun Marsh, including Wings Landing, are heavily managed to maximize the number of migratory geese and waterfowl species through a combination of flood management, mowing, discing, and pond bottom grading. Waterfowl are responsible for 28% of the strikes that cause damage to the aircraft (FAA, 2018). Wings Landing in particular has been the subject of multiple years of studies due to its high waterfowl usage. Studies of radio-marked waterfowl by the US Geological Survey indicate that Wings Landing receives greater usage by waterfowl than most other Suisun Marsh duck clubs over the past 5 years (**Table 3.6-3** and **Figure 3-1**) (USGS, Unpub. 2020). Furthermore, the study found relatively low waterfowl use of tidal areas, which would be the Project Site’s restored habitat type. It is expected that restoration to tidal marsh would result in significantly lower use by waterfowl in the future (Mike Casazza, USGS, personal communication, email on May 5, 2020).

TABLE 3.6-3
EXISTING WINGS LANDING AND SUISUN MARSH USE BY WATERFOWL

Species	Wings Landing, 267 acres	Suisun Marsh Total, 116,000 acres
	Individuals	Individuals
American Wigeon	9	42
Blue-Winged Teal	1	4
Cinnamon Teal	2	31
Gadwall	2	85
Green-Winged Teal	16	17
Mallard	15	178
Northern Pintail	56	133
Northern Shoveler	3	28

Source: USGS, Unpublished data, 2020

Wings Landing Tidal Habitat Restoration Project
2015-2020 Waterfowl Use
Figure 3-1



Species

- American wigeon
- Blue-winged teal
- Cinnamon teal
- Gadwall
- Green-winged teal
- Mallard
- Northern pintail
- Northern shoveler

Source: USGS Western Ecological Research Center, May 2020

A recent study of Northern Pintails in the Suisun Marsh found strong evidence for the selection of managed wetlands and avoidance of tidal marshes (Coates et al., 2012). **Table 3.6-4**, adapted from the SMP EIS/EIR (Table 6.3-5; USBR et al., 2011), demonstrates waterfowl use of managed wetlands (current state at the Project Site) versus tidal wetlands (future state of the Project Site). The table shows that for all species analyzed, managed wetland habitat is used for equal or more uses than tidal wetland, indicating that restoration to a tidal wetland is not expected to increase waterfowl use of the Project Site.

TABLE 3.6-4
HABITAT USE BY WATERFOWL

Species	Managed Wetland	Tidal Wetland
Waterfowl—Dabbling Ducks		
Mallard	F, L, B	F, L
Gadwall	F, L, B	F, L
Green-winged teal	F, L	-
American widgeon	F, L	F, L
Northern pintail	F, L, B	F, L
Northern shoveler	F, L, B	F, L
Cinnamon teal	F, L, B	-
Wood duck	F, L, B	-
Waterfowl—Diving Ducks		
Ruddy duck	F, L, B	F, L
Canvasback	F, L	F, L
Redhead	F, L	F, L
Ring-necked duck	F, L	F, L
Greater scaup	F, L	F, L
Lesser scaup	F, L	F, L
Barrow's goldeneye	F, L	F, L
Common goldeneye	F, L	F, L
Bufflehead	F, L	F, L
Common merganser	F, L	-
Waterfowl—Geese		
Canada Goose	F, L, B	F, L, B
Greater white-fronted goose	F, L	F, L
Tule white-fronted goose	F, L	-
Snow goose	F, L	-
Ross' goose	F, L	-
Waterfowl—Swans		
Tundra swan	F, L	F, L

F: foraging; L: loafing; B: breeding; -: None Source: SMP EIS/EIR- USBR et al., 2011

Localized increases of shore and wading birds that are attracted to tidal marsh are expected to increase upon restoration, but these species are expected to use the restored Project Site in lower densities than current densities

of geese and waterfowl, and shore and wading birds are not known to make up a significant portion of reported bird aircraft strikes.

Given the Project Site's existing level of use by geese and waterfowl (the birds most commonly involved in aircraft strikes), and that these species do not favor tidal marsh, restoration to tidal marsh is expected to decrease the Project Site's contribution to wildlife hazards at the Travis Air Force Base.

Given that the Proposed Project would not conflict with applicable land use plans policies or regulations, conclusions regarding land use impacts have not changed relative to those disclosed in the SMP EIS/EIR impact analysis. Therefore, no impact would occur and impacts of the Proposed Project would remain within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

c) Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?¹

The Proposed Project would not conflict with the existing Suisun Marsh Protection Plan, and there are no other known conservation plans that cover the Project Site. Therefore, no impact would occur and impacts relating to habitat conservation plans and natural community conservation plans would remain within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

3.9 Recreation

3.9.1 Existing Conditions

As described in Section 2.1.2, *Proposed Project Background*, the Overall Property, including the Project Site, is managed as a duck club. As part of this duck club management, it is necessary to flood up and draw down water onsite to coincide with vegetation management, mosquito abatement, and the beginning and end of duck hunting season. The nearest duck club, WCGC, is adjacent to the Project Site, southwest of the shared levee. The Project Site includes channels that are maintained to a depth and width that facilitates water movement both on and off the Project Site, as well as facilitating movement of hunters, via boats, to and from the clubhouse and duck blinds in the managed marsh. Duck hunting season occurs between October and January. Additional recreation activities that occur year-round at the Project Site include fishing, wildlife observation, and photography. Because the Overall Property is privately owned, all recreation is at the approval of the property owner; there is no public access.

3.9.2 SMP EIS/EIR

As described in **Table 3.7-1** below, the SMP EIS/EIR determined there would be no impacts to recreation because implementation of the plan, including restoration projects, would not alter existing recreational facilities; increase the use of existing recreational facilities, or require the construction of additional recreational facilities. Therefore, no mitigation was required as part of the SMP EIS/EIR.

¹ This impact is addressed within the Land Use section because this impact category most aligned with the Significance Criteria for Land Use, as described in the SMP EIS/EIR. This CEQA Appendix G Checklist threshold corresponds with IV Biological Resources f).

**TABLE 3.7-1
SUISUN MARSH PLAN RECREATION IMPACT ANALYSIS**

SMP EIS/EIR Impact	SMP EIS/EIR: Significance Before Mitigation	SMP EIS/EIR Mitigation Measures	SMP EIS/EIR: Significance after MMs
No Impact to recreation	NI	NA	NA

NOTES:

NI = No Impact

NA = Not Applicable

3.9.3 Impact Analysis

- a) Would the Proposed Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?**

Restoration of the tidal marsh may result in greater use by wildlife at the Project Site, increasing opportunity for wildlife viewing and other public recreational opportunities in the Suisun Marsh area. The nearest recreational facility, WCGC, adjacent to the Project Site to the southwest, would continue its operations during implementation of the Proposed Project. Although the Proposed Project would decrease opportunity for hunting at Wings Landing, these changes were anticipated and addressed in the SMP EIS/EIR.

Furthermore, the Proposed Project does not propose new housing development and would therefore not result in new population growth or demand for use of regional parks or recreational facilities in the vicinity. Therefore, no impact would occur and potential impacts on recreation would be within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

- b) Does the Proposed Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?**

Under the Proposed Project, as described in Section 2.2.1, *Public Access*, existing channels will be enhanced and new channels created as part of the overall tidal marsh restoration design. Once created or enhanced, these channels would be navigable waters utilized for the proposed kayak routes, as shown in **Figure 2-4**. The kayak routes themselves are not a separate physical alteration as they occur within the channels. Therefore, the addition of recreational kayak access to the Project Site would not conflict with the SMP EIS/EIR. No additional off-site recreational improvements are proposed or required as part of the Proposed Project. Accordingly, there would be no potential impacts related to the construction and expansion of recreational facilities, which is within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

3.10 Other Resources

As discussed in Chapter 1, *Introduction*, impacts associated with several resources areas would already occur under the approved SMP, were analyzed in the SMP EIS/EIR, and would not increase in magnitude even though they would occur in different locations in some cases. These resources topics are described below:

- Aesthetics

- Agricultural Resources
- Geology, Soils, and Mineral Resources
- Hazards and Hazardous Materials
- Noise
- Transportation and navigation
- Utilities and public services
- Population and housing

3.10.1 Aesthetics

There are no sensitive view receptors within close proximity of the Project Site that would be affected by any changes in view during or following construction activities, and no buildings would be constructed under the Proposed Project. Furthermore, the visual character of the area would be consistent with the surrounding landscape, as revegetation would quickly occur in disturbed areas following construction, both naturally and through replanting of salvaged marsh vegetation in some areas. Therefore, visual resources related to the Proposed Project would have no impact and would remain within the scope of the impacts that were identified in the SMP EIS/EIR. No mitigation is required.

3.10.2 Agricultural Resources

There are no agricultural lands within the Proposed Project vicinity and the Project Site has not been used for agriculture since the 1800's. As such, there would be no impact on agricultural resources due to implementation of the Proposed Project. No mitigation is required.

3.10.3 Geology, Soils, and Mineral Resources

During construction of the Proposed Project, the area may be subject to ground shaking and increased ground pressures from heavy equipment or placement of fill. 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. However, construction equipment access and placement of fill would be controlled to maintain acceptable loading based on the shear strength of the foundation material, as part the Proposed Project's ECs.

The Proposed Project would not involve the construction or operation of buildings and would not bring substantial amounts of people to Suisun Marsh; therefore, neither people nor structures would be exposed to potential substantial adverse effects, including the risk of loss, injury, or death associated with geologic activities.

Ground-disturbing activities, such as earthwork (excavating and grading) could result in the loss of topsoil and erosion. Breaching of the levees could result in scour and localized sediment deposition but would reflect the restoration of natural tidal processes. As such, the Proposed Project would implement a Stormwater Pollution Prevention Plan (SWPPP) and an Erosion and Sediment Control Plan, which are also ECs of the Proposed Project.

There are no known mineral resources within the Project Site. Given that the Proposed Project would not substantially affect geologic or mineral resources, or soils and that the Proposed Project design and ECs would be

implemented to ensure this, impacts are within the scope of the impacts identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

3.10.4 Hazards and Hazardous Materials

Proposed Project activities would not create significant hazards to the public or environment through exposure to hazardous materials because the Proposed Project does not involve the handling, transportation, or distribution of large quantities of hazardous materials. The Project Site has not been used for agriculture since the 1800's and pesticide use is not a regular part of duck club management, but has occurred infrequently for invasive species control. Long-term management of the Project Site may include as-needed spraying of *Phragmites australis* and other highly invasive plants (see **Appendix I**, Invasive Vegetation Management Plan). Furthermore, a records review did not identify physical evidence of soil or groundwater impairments and there is no known documentation of potential impairments (DTSC, 2019; SWRCB, 2019). Given the Project Site characteristics and the results of the records review, there is a low probability of soil and groundwater contamination.

As discussed in Chapter 3.6, Land Use and Land Use Planning, the Project Site is within the Travis Air Force Base Airport Influence Area's (AIA) according to the 2015 Travis Air Force Base Land Use Compatibility Plan (Travis AFB LUCP) (ESA, 2015). The Project Site is located outside of the Bird Strike Hazard Zone but lies within the "Outer Perimeter", which is defined as an area within five miles of the Air Force Base's air operations area (ESA, 2015). Impacts from the Proposed Project to air traffic and air traffic safety are unlikely because restoration of the Project Site would not increase bird usage of the area, and public visitors to the Proposed Project Site would not be at risk of increased safety hazards or excessive noise.

The Project Site is currently actively managed as a duck club to maximize bird usage of the Project Site. It is expected that restoration to tidal marsh would result in significantly lower use by waterfowl in the future (Mike Casazza, USGS, personal communication, email on May 5, 2020). Therefore, the nature of the Proposed Project is anticipated to reduce the risk of bird strikes to flights originating or terminating at Travis Air Force Base. Because future bird activity at the Project Site would not increase, there would be no effect on air traffic safety.

Additionally, given the location of the Project Site, there would be no potential to expose people or structures to wildland fires, or to impede emergency access. Therefore, impacts related to hazards and hazardous materials are within the scope of the impacts identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

3.10.5 Noise

There would be temporarily increased noise in the Project Site and immediately adjacent areas due to construction activities associated with the Proposed Project. As such, the nearest sensitive receptor, located 2,200 feet north of the Project Site, would be exposed to a noise level of 43 dBA Leq during project construction. The Federal Transit Administration's Transit Noise and Vibration Impact Assessment has identified a daytime 1-hour Equivalent Continuous Sound Level (Leq) level of 90 A-weighted decibels (dBA) as a noise level where adverse community reaction could occur at residential land uses (FTA, 2018). Therefore, people would not be exposed to excessive noise or ground borne vibrations. Accordingly, there would be no impact related to potential noise and the Proposed Project would remain within the scope of the impacts that were identified in the SMP EIS/EIR. No mitigation is required.

3.10.6 Transportation and Navigation

Given the nature of the Proposed Project (less than 300 truck trips over a duration of approximately 230 days), it would not conflict with any applicable plan, ordinance or policy related to the performance effectiveness or level of service of land transportation. The Proposed Project would not increase road hazards because activities would occur away from existing major road networks. Additionally, the Proposed Project would not interfere with air traffic

Although the Proposed Project would require the transport of construction equipment, it would not require the import or export of fill materials and therefore damage to roadway surfaces is expected to be limited. Additionally, all construction work would be limited in magnitude and duration such that it would not be a navigation hazard. Therefore, potential impacts on transportation and navigation are within the scope of the impacts identified in the SMP EIS/EIR and remain less-than-significant. No mitigation is required.

3.10.7 Utilities and Public Services

There are no underground or aboveground natural gas lines, petroleum lines, or overhead power lines on the Project Site, and therefore, implementation of the Proposed Project would not damage or disrupt utilities. As such, the mitigation measures identified in the SMP EIS/EIR relating to utilities are not applicable to the Proposed Project. Similarly, the Proposed Project would not require the construction of new water, wastewater, or stormwater drainage facilities; the use of wastewater facilities; a water supply; or landfills and, therefore, would not affect these public services. In addition, although construction vehicles associated with the Proposed Project would be traveling on local roadways, they would be limited in number, for a limited duration (no more than one year), and thus would not be expected to affect emergency services. Lastly, the Proposed Project does not involve or require construction or expansion of new housing and therefore would not affect schools, parks, or other community services. Accordingly, potential impacts on utilities and public services are within the scope of the impacts identified in the SMP EIS/EIR and would have no impact. No mitigation is required.

3.10.8 Population and Housing

Because this is a tidal wetlands restoration project, the Proposed Project would not result in direct or indirect population growth, displacement of existing housing, construction of new housing, or the displacement of people such that construction of replacement housing would be necessary. Therefore, there would be no impact and potential impacts on population and housing are within the scope of the impacts identified in the SMP EIS/EIR. No mitigation is required.

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3.11 Cumulative Impacts

Cumulative impacts that could result from implementation of the Proposed Project and the type and severity of potential impacts are consistent with those evaluated in the SMP EIS/EIR, as described below.

3.11.1 SMP EIS/EIR

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

- 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, BDCP/California Water Fix, Delta Vision, DRERIP, SF Bay LTMS, DRMS, SF 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 implementation period. These projects are considered with the SMP to determine whether the combined effects of all of the projects would be cumulatively considerable and, therefore, result in significant cumulative impacts.

The SMP EIS/EIR determined that, for all resources, except cultural resources, cumulative impacts would either not occur or the SMP incremental contribution to the cumulative impact would not be cumulatively considerable and significant. For cultural resources, restoration activities would be cumulatively considerable and significant because significant impacts on numerous cultural resources, including the Montezuma Hills Rural Historic Landscape, would occur. Impacts on the Montezuma Hills Rural Historic Landscape resource are especially consequential, as several constituent features—some of which are likely to have individual significance—would be affected by restoration activities described in the SMP.

3.11.2 Proposed Project

Table 3.9-1 provides a list of wetland restoration and enhancement projects and other projects that potentially result in cumulative impacts. Some of these projects were identified in the SMP EIS/EIR and their statuses have been updated; others are projects that have been proposed 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.

**TABLE 3.9-1
UPDATED CUMULATIVE PROJECT LIST**

Project	Status at the Time of SMP Certification	County	Total Acres	Current Status
Blacklock Tidal Marsh Restoration	Completed	Solano	70	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	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	In Progress
Prospect Island Tidal Restoration Project	Not Included	Solano	1,600	Planned
Tule Red Restoration Project	Not Included	Solano	610	In progress
Bradmoor Island and Arnold Slough Tidal Restoration Project	Not Included	Solano	617	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
Other Projects				
Sacramento Deep Water Ship Channel Dredging	Planned	Sacramento	-	In progress
Potrero Hills Landfill Expansion Project	Planned	Solano	250	In progress
Industrial Development (south of SR 12 and north of Cordelia Road)	Planned	Solano	-	In progress

As disclosed in the SMP EIS/EIR, the combination of all of the projects 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 Transportation and navigation
- Air Quality

- Noise
- Utilities and Public Services
- Cultural Resources
- Sediment transport

The Proposed Project is consistent with the cumulative impact analysis and conclusions in the SMP EIS/EIR because the Proposed Project:

- would be restricted to areas within the marsh; many of the other projects that could result in a cumulatively considerable impacts to resources such as air quality, biological resources, cultural, noise, traffic, water quality, and utilities would occur well outside the marsh;
- would occur on a different temporal and geographic scale than some of the restoration and development/infrastructure projects;
- includes design criteria and ECs to reduce substantial changes related to water supply, water quality, terrestrial and aquatic biological resources, sediment and geology, and transportation and navigation;
- would be small, sporadic, and short term in nature and magnitude over the entire marsh and through plan implementation;
- would result in an increase in habitat quality and quantity for sensitive terrestrial and aquatic biological resources;
- would not need to implement mitigation measures related to cultural resources or utilities and public services;
- would not need to implement new mitigation measures related to air quality;
- would not result in impacts on some resources, such as aesthetics, recreation, flood control and levee stability, noise, and land use.

Therefore, although past, present, and reasonably foreseeable future projects may result in cumulatively considerable impacts on certain resources, the Proposed Project would remain within the scope of the cumulative impacts that were identified in the SMP EIS/EIR.

CHAPTER 4

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