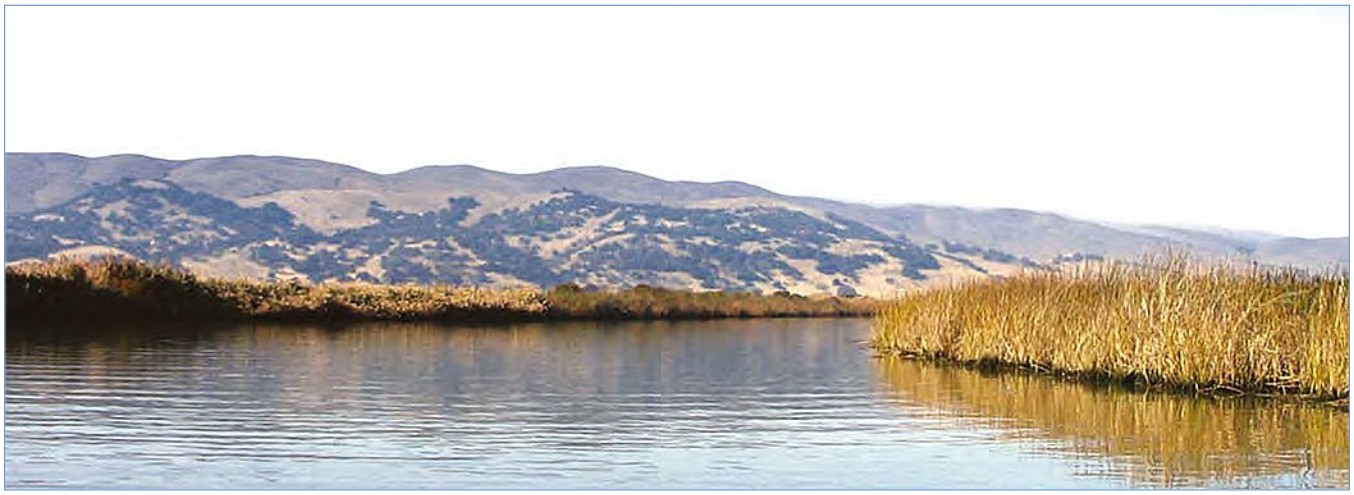
Addendum to the Suisun Marsh Plan Final Environmental Impact Statement/ Environmental Impact Report



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March 2023

1 This document was prepared using information and text from the Bradmoor Island and Arnold Slough Tidal Habitat Restoration Project Addendum to the Suisun Marsh Plan Final Environmental Impact Statement/Environmental Impact Report (prepared by AECOM, March 2020)

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ACRONYMS AND ABBREVIATIONS

µS/cm	microsiemens per centimeter
BAAQMD	Bay Area Air Quality Management District
BCDC	San Francisco Bay Conservation and Development Commission
BDCP	Bay Delta Conservation Plan
BiOp	biological opinion
Blacklock	Blacklock restoration project
BMP	best management practice
Bradmoor	Bradmoor Island
CAAQS	California Ambient Air Quality Standards
CALFED	CALFED Bay-Delta Program
CalEEMod	California Emissions Estimator Model
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CIWQS	California Integrated Water Quality System
cm	centimeter(s)
CNEL	community noise equivalent level
CO	carbon monoxide
CO_2	carbon dioxide
CRHR	California Register of Historical Resources
dB	decibel(s)
dBA	A-weighted decibel(s)
DFG	California Department of Fish and Game (now CDFW)
DO	dissolved oxygen
DPM	diesel particulate matter
DSC	Delta Stewardship Council
DWR	California Department of Water Resources
EB	exterior breach
EC	electrical conductivity
EIR	environmental impact report
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ER	Engineering Regulation
ERPP	Ecosystem Restoration Program Plan
ESA	Endangered Species Act
FHWA	Federal Highway Administration
ft/s	foot (feet) per second
GHG	greenhouse gas
Guidelines	Bay Area Air Quality Management District California Environmental Quality Act Air Quality Guidelines
IB	interior breach

ITE	Institute of Transportation Engineers
IVMP	Bradmoor Island and Arnold Slough Invasive Vegetation Management Plan
L_{eq}	equivalent continuous sound level
LiDAR	light detection and ranging
Marsh	Suisun Marsh
MHHW	mean higher high water
MLLW	mean lower low water
mS/cm	millisiemens per centimeter
MT CO_2e	metric tons of carbon dioxide equivalent
NAAQS	National Ambient Air Quality Standards
NAVD88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PG&E	Pacific Gas and Electric Company
PM	particulate matter
PM_{10}	particulate matter 10 micrometers in diameter or smaller
$PM_{2.5}$	particulate matter 2.5 micrometers in diameter or smaller
POD	Pelagic Organism Decline
Proposed Project	Bradmoor Island and Arnold Slough Restoration Project
Reclamation	U.S. Bureau of Reclamation
RMA	Resource Management Associates
RWQCB	Regional Water Quality Control Board
SFBAAB	San Francisco Bay Area Air Basin
SMP	*Suisun Marsh Habitat Management, Preservation, and Restoration Plan*, aka Suisun Marsh Plan
SMPA	Suisun Marsh Preservation Agreement
SRCD	Suisun Resource Conservation District
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
UC	University of California
URBEMIS	Urban Land Use Emissions Model
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WCS	water control structure

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1 INTRODUCTION

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

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

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

The SMP is intended to guide near-term and future actions related to restoring tidal wetlands and managed wetland activities and sets the regulatory foundation for future actions in the Marsh. The SMP is a comprehensive plan that relies on the incorporation of existing science and information developed through adaptive management to addresses various conflicts regarding the use of Marsh resources, with a focus on achieving an acceptable multi-stakeholder approach to restoration of tidal wetlands and management of wetlands and their functions. the SMP is a flexible, science-based management plan for the Marsh, consistent with the revised (2005) Suisun Marsh Preservation Agreement (SMPA) and the CALFED Bay-Delta Program (CALFED), the predecessor of the Delta Stewardship Council.

The SMP EIS/EIR provided a programmatic evaluation of restoration of tidal habitat in the Marsh and associated activities, including an Adaptative Management Plan and a Mitigation Monitoring and Reporting Plan. The SMP developed environmental commitments for implementation during restoration activities in the Marsh. These environmental commitments, where applicable, would be implemented as part of the Proposed Project. Applicable Environmental Commitments are outlined in Chapter 3, "Supplemental Environmental Review," and

are provided in more detail in Appendix A. Additionally, the SMP developed an Adaptive Management Plan and identified Habitats and Ecological processes to be one of the Suisun Marsh Plan Objectives, specifically restoration and protection of habitats in the Marsh and reduction of stressors such as invasive species.

The EIS/EIR evaluated the SMP and documented all potentially significant environmental impacts that could result from implementing the SMP and activities associated with managed wetlands and tidal restoration. The SMP EIS/EIR disclosed that impacts on most environmental resources from tidal restoration and enhancement activities either would be less than significant or would not occur (i.e., no impact). To reduce potentially significant impacts to a less-than-significant level, mitigation was incorporated in the SMP EIS/EIR with respect to the effects of restoration activities on environmental resources, as shown in Table 1-2. The SMP EIS/EIR found that impacts on air quality and utilities would be less than significant with proposed mitigation. Mitigation measures for air quality and utilities do not apply to the Proposed Project because no construction or ground-moving activities are planned. Due to the less impactful nature of work and smaller degree of required equipment and operating times, impacts of the Proposed project on air quality and utilities would be less than significant or have no impact without the use of mitigation measures as described in the SMP EIS/EIR.

Table 1-1. Additional Responsible and Trustee Agencies.

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

Notes:
Trustee Agency: State agency with jurisdiction over certain resources that are held in trust for citizens of California but does not necessarily have legal authority with respect to approving or carrying out the project.
Responsible Agency: Public agency with some discretionary authority over a project or portion of it, but which is not the lead agency

For cultural resources, the analysis determined that restoration activities could significantly and unavoidably affect known and as-yet-unidentified cultural resources by damaging or destroying them. Although mitigation measures were included in the SMP EIS/EIR (as summarized in Table 1-2), the analysis determined that the measures would not reduce the impacts to a less-than-significant level. Thus, impacts on cultural resources were identified as significant and unavoidable in the SMP EIS/EIR. In contrast, the Proposed Project is expected to have a less than significant impact on cultural resources because no ground-disturbing activities will take place.

1.1 ADDENDUM

This Addendum has been prepared pursuant to State CEQA Guidelines Section 15164. An agency may prepare an addendum to a certified EIR pursuant to CEQA Guidelines Section 15164 which states, in pertinent part, that an addendum may be prepared "if some changes or additions are necessary but none of the conditions described in

Section 15162 calling for the preparation of a subsequent EIR have occurred." Section 15162 states that a subsequent EIR is required if any of the following conditions exist:

1. Substantial changes are proposed in the project which will require major revisions to 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 effects.

2. Substantial changes occur with respect to the circumstances under which the project is undertaken which 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; or

3. 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 of 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;

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 which 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.

Substantial evidence presented in this Addendum demonstrates that no new significant impacts would occur as a result of the Blacklock Restoration Phragmites Control and Revegetation Project (as described in Chapter 2), nor would there be a substantial increase in the severity of any previously identified significant environmental impacts. In addition, no new information of substantial importance shows that mitigation measures or alternatives that were previously found not to be feasible or that are considerably different from those analyzed in the certified EIR would substantially reduce one or more significant effects on the environment. Therefore, none of the conditions described in CEQA Guidelines Section 15162 have occurred. For this reason, an Addendum to the Final EIR is the appropriate document to comply with CEQA requirements for the Proposed Project.

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

Resource	**Final SMP EIS/EIR Environmental Commitments**
Water Supply and Management	
Water Quality	EC-1:EC-2, EC-9
Geology and Groundwater	
Flood Control and Levee Stability	
Sediment Transport	
Transportation and Navigation	EC-1, EC-2
Air Quality	EC-10, EC-10.3
Noise	EC-1, EC-2, EC-5
Climate Change	

Resource	**Final SMP EIS/EIR Environmental Commitments**
Fish	EC-1:EC-2, EC-9, EC-13, EC-14,, EC-15
Recreation	EC-1, EC-7
Vegetation and Wetlands	EC-1, EC-2, EC-7, EC-13, EC-13.1:EC-13.4, EC-13.4a, EC-13.4b, EC-14, EC-15
Wildlife	EC-1:EC-2, EC-13, EC-13.1:EC-13.4, EC-13.4a, EC-13.4b, EC-14
Land Use	
Visual Aesthetic Resources	
Cultural Resources	EC-12, EC-16
Public Health and Environmental Hazards	
Growth-Inducing Impacts, including Population and Housing	
Cumulative Impacts	

2 PROJECT DESCRIPTION

2.1 INTRODUCTION

Prior to restoration, Blacklock was used for livestock grazing and waterfowl hunting activities since 1946 (DWR 2006). The site was historically part of the larger Blacklock Ranch. Management of the wetland area was minimal, consisting primarily of flooding and circulation water throughout the area during waterfowl hunting season (October through January). DWR purchased the property in 2003 and began planning for tidal restoration of 70 acres of the site. Blacklock became tidally inundated due to an unplanned breach during the planning phase of the restoration project, and a subsequent breach was then constructed as planned on the levee bordering Little Honker Bay in 2006. Ten years of post-restoration monitoring for the Blacklock Restoration Project found tidal flows continue to drive the recovery of historic and new tidal channels. Total vegetation cover increased by 15% between 2009 and 2016, with native plant cover decreasing from 59% to 39%, and Phragmites cover increasing from 38% to 59% (DWR 2017). The site continues to accrete sediment, averaging an increase of 0.3 feet total across the site over five years (2008-2013).

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

2.2 PROJECT LOCATION

Blacklock is a tidal restoration parcel owned by DWR, located in the northeastern corner of Suisun Marsh, south of the City of Suisun City in Solano County in Region 3 of the SMP (Figure 2-1). Little Honker Bay (north), Denverton Slough/Nurse Slough (northeast and northwest), and Arnold Slough (south) border the site. The Blacklock parcel is bordered by one adjacent property (Arnold Restoration Site) located to the east and separated by a 1,100-foot long cross levee, that serves as the property line. The northeastern border of Blacklock includes remnant levee and tidal wetland bordering Arnold. The Bradmoor Restoration site is located north of Blacklock across Little Honker Bay and Nurse Slough. Other surrounding properties are currently used for cattle grazing and waterfowl hunting. Following the restoration of Arnold in 2021, Blacklock is no longer accessible by land.

2.3 PROJECT BACKGROUND

Blacklock is directly adjacent to two FRP sites (Bradmoor Island and Arnold Slough Restoration Projects) which are in pre- and early post-restoration stages and, along with several other FRP sites in the Delta and Suisun Marsh, are threatened by Phragmites establishment. The invasive Eurasian lineage of Phragmites (australis) has invaded the San Francisco Estuary and Suisun Marsh and has negative impacts in tidal ecosystems (Chambers et al. 1999, Crooks 2002). A variety of studies have investigated methods for Phragmites control across regions of the U.S. (Reviewed by Hazelton et al. 2014; also, Cheshier et al. 2012; Derr 2008a; Kay 1995; Monteiro et al. 1999). However, no control method is currently permitted on a sitewide scale in tidal marshes, as there is concern for negative impacts on sensitive species with the potential to occur within the Bay-Delta environment. For example,

uncertainty exists regarding the toxic effects of herbicide overspray/runoff on listed fish species such as Delta smelt (*Hypomesus transpacificus*), and disturbance of wetland habitat associated with Phragmites control practices may interfere with other listed species that may occur within those wetland habitats, such as the salt marsh harvest mouse (*Reithrodontomys raviventris*) and California black rail (*Laterallus jamaicensis coturniculus*). Importantly, Studies testing herbicide efficacy for Phragmites control indicate that glyphosate and imazapyr are most effective (Hazelton et al. 2014). While Mozdzer et al. (2008) found that application earlier in the summer (June) resulted in higher pesticide efficacy for both imazapyr and glyphosate, this is contrary to what is recommend by the herbicide labels and much of the literature. Derr et al. (2008b) found that June or September applications worked equally well. In addition, application by foliar spray provides much better control than wiper applications (Kay 1995) and agencies such as the Suisun Resource Conservation District Phragmites/Pest Weed Control Program utilizes hand application and aerial spray application for managing Phragmites. In addition, aerial application by helicopter has been used to control Phragmites at the adjacent Bradmoor Island. Phragmites and other emergent vegetation are not currently included under California Parks and Recreation Division of Boating and Waterways' Aquatic Invasive Plant Control Program jurisdiction.

Between 2019-2021, DWR conducted the Blacklock Restoration Phragmites Control Study (Control Study) to assess the feasibility, efficacy, and environmental impacts of Phragmites control methods alone and in combination on a small scale within Blacklock. Following the 3-year Study, DWR proposes to scale up implementation of Phragmites control and revegetation at the Blacklock Restoration site. Results of the project will be used to inform the adaptive management of this sitewide implementation. Implementation actions will occur between August and October over six years, starting fall 2022 or 2023, with annual maintenance thereafter as needed. Sitewide treatment will expand upon the study results to reduce Phragmites cover, as well as to help fill data gaps by investigating integrated pest management approaches and elaborate on methods already evaluated in literature and tested in the Study to provide tools to project managers for the Fish Restoration Program (FRP) and other programs.

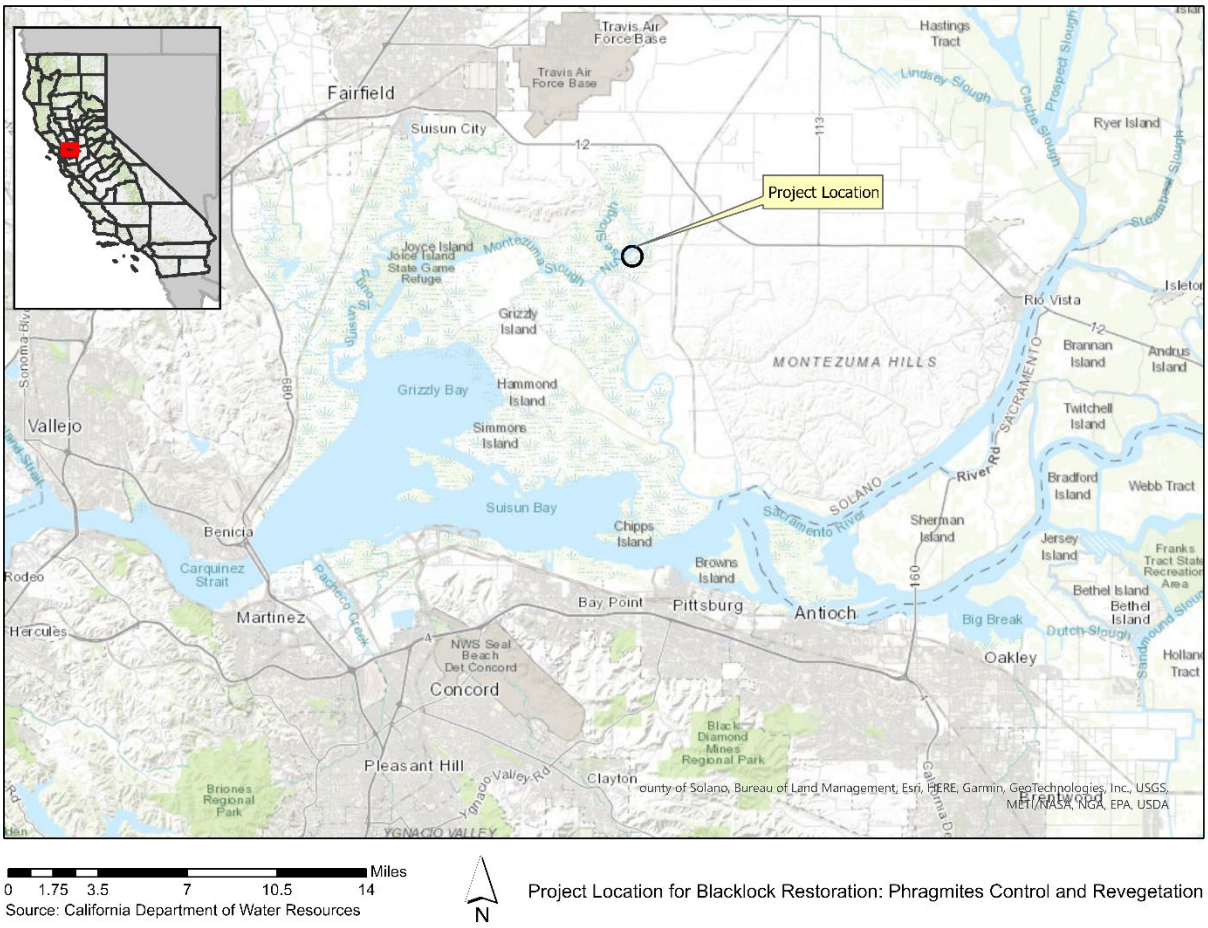


Figure 2-1. Vicinity Map

2.3.1 BLACKLOCK RESTORATION PHRAGMITES CONTROL STUDY SUMMARY

The purpose of the Control Study was to characterize the feasibility, efficacy, and environmental impacts of several small-scale Phragmites control methods to inform site-wide Phragmites control for long-term improvement within Blacklock. The study employed several established Phragmites control methods individually and in combination, including mowing and application of two herbicides, glyphosate and imazapyr. An amphibious vehicle mounted with an herbicide applicator was used to apply herbicides at designated 10-meter x 10-meter treatment plots. Methods were tested in a randomized design of five treatments and a control, replicated four times, totaling 24 plots (Figure 2-2). Water quality monitoring occurred adjacent to treatment plots, as well as four additional monitoring sites before and after treatments. Treatment efficacy was evaluated several times each year per plot using aerial imagery and subsequent processing of Normalized Difference Vegetation Index (NDVI) value analysis.

Analysis of 2019-2021 NDVI data indicates all treatments significantly reduced Phragmites growth as compared to the untreated control plots (Figure 2-3). No glyphosate nor nonylphenol were detected in post-treatment water samples. Imazapyr was detected, but all detections were orders of magnitude below NPDES monitoring trigger concentrations (Table 2-1). Additionally, no off-target plant mortality was observed, and native plants recruited into the treatment plots. Results of the study indicate that herbicide treatments of Phragmites in open tidal

wetlands are feasible, efficacious, and have minimal off-target negative impacts to water quality, food web, and non-target plants. See Appendix C for complete water quality and treatment efficacy (NDVI analysis) results.

Figure 2-2. Treatment and control plot, reference, and breach locations within the Blacklock Restoration site.

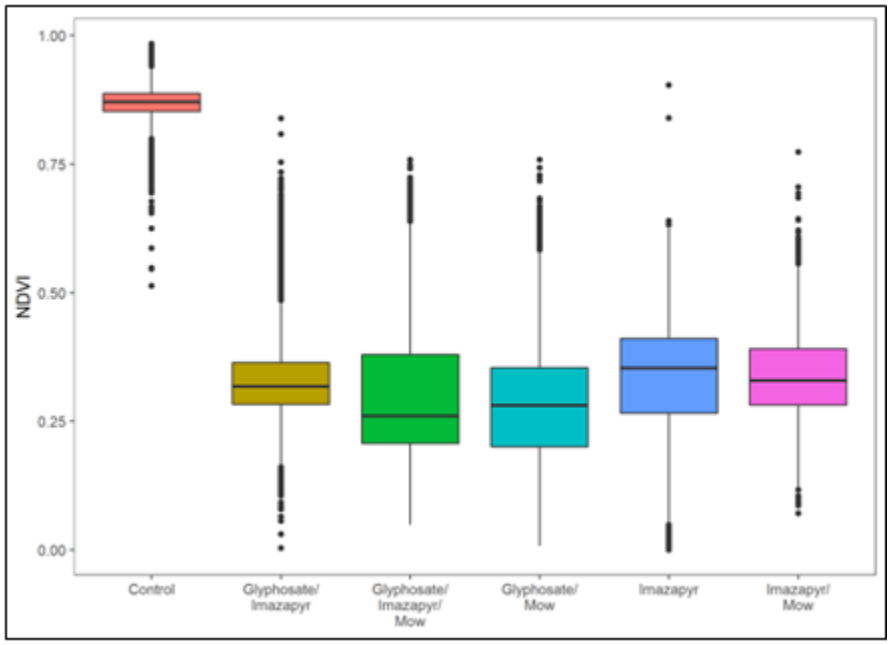


Figure 2-3. NDVI values among treatment and control plots. Survey taken on 6/11/2021, eight months after the second round of annual treatments. This graph illustrates the trend observed in all 3 treatment seasons.

Table 2-1. Summary of herbicide detection results in water sample taken pre-and post-treatment during 2019-2021 treatment events.

Herbicide	Total samples taken (2019-2021)	Positive Detections (2019-2021)	Maximum Detection (mg/L)	Average Detection (mg/L)	NPDES Receiving Water Limit/Monitoring Trigger (mg/L)
Glyphosate	196	0	NA	NA	0.7
Imazapyr	210	30	0.013	0.00127	11.2

2.4 PROJECT GOALS AND OBJECTIVES

The overarching goal of the Proposed Project is to reduce invasive Phragmites cover and increase native vegetation cover at Blacklock while minimizing impacts to sensitive species that have the potential to occur within and surrounding the study area. Results will provide information on the efficacy of Phragmites control actions in a restored tidal wetland on a site-wide scale to inform future management actions. In addition to enhancing habitat for native species within Blacklock, the Proposed Project also aims to enhance habitat in nearby restoration sites. Reducing phragmites cover at Blacklock will decrease the probability of phragmites spread between Blacklock and the nearby Arnold and Bradmoor restoration sites. In addition, lessons learned from invasive vegetation management at the project location can be applied to other restoration sites in Suisun Marsh. Managing invasive vegetation and enhancing habitat for native species at other restoration sites will benefit special status fish and wildlife species.

2.5 PROPOSED PROJECT

DWR is implementing adaptive management and restoration maintenance actions to control emergent invasive vegetation at the Blacklock restoration site (Blacklock) in Suisun Marsh. The proposed project will control invasive common reed, *Phragmites australis* (hereafter referred to as Phragmites), using herbicides treatments within the tidal wetlands of Blacklock. The invasive Eurasian lineage of Phragmites has invaded the San Francisco Estuary and Suisun Marsh and has negative impacts in tidal ecosystems. A variety of studies have investigated methods for Phragmites control across regions of the United States, including the 3-year (2019-2021) Blacklock Restoration Phragmites Control Study (Control Study). Feasibility, efficacy, and environmental impact results from the former study will be used to inform the adaptive management of this sitewide implementation. Results from the pilot Control Study indicate that all treatment methods significantly reduce Phragmites growth and that environmental impacts remain below threshold levels of concern.

This project will use foliar spray applications of glyphosate (as Rodeo or Roundup Custom product formulation) and imazapyr (as Habitat product formulation) treatments, over six years beginning in 2023 or 2024. Treatment will be staggered among three separate sections of the 90-acre site over the first three years of the project. Initial treatment of each section will be applied by Unmanned Aerial Vehicles (UAV), while follow-up treatments in the years following will be done with backpack sprayers to spot treat any regrowth. Using information gained from the Control Study, the optimal combination of treatments that provide the best control while minimizing impacts to sensitive resident species will be used. In addition to Phragmites control, planting of bulrush (*Schoenoplectus* sp.), cattails (*Typha* sp.), or other appropriate mid to high-marsh species is planned at the site following Phragmites removal.

The Proposed Project will employ the application of two herbicides, glyphosate (as the aquatic formulation, Rodeo or Roundup Custom) and imazapyr (as the aquatic formulation, Habitat). Herbicide applications will occur by an authorized and certified aquatic pest control applicator with experience in the Bay-Delta. An Unmanned Aerial Vehicle (UAV) mounted with an herbicide applicator will be used to apply herbicides to the treatment area. Herbicide applications using the UAV will occur during the first year of treatment when the plants are mature and beginning to reallocate resources from aboveground to belowground tissues, between August and October. Additionally, herbicide application with jon boats and backpack sprayers to spot treat any regrowth will be done in the years following the initial UAV herbicide treatment. Herbicide application using the UAV may be used in years following initial treatment if regrowth sections are large enough to warrant aerial treatment. The amphibious vehicle will only be operated during the treatment season to complement herbicide treatment and facilitate site access. All project activities will take place one hour after sunrise to one hour before sunset.

Table 2-2 below details the equipment used for all project actions and the duration of use. Action-associated monitoring will be conducted by means of drone survey and grab water sampling via kayak. Monitoring will occur prior to, and over multiple tidal cycles after, the application of each control method is applied, for all six years of treatment actions (refer to Table 2-3 for detailed timing estimates for project actions).

Table 2-2. Summary of equipment used for the proposed project

Equipment Type	# Used	Use	Use Duration
Drone (Leading Edge Aerial Technologies (LEAT) Precisionvision 35 or equivalent) mounted with herbicide applicator	1	Herbicide application	Up to 10 days per year
Pickup truck ¾ ton (300 hp gas or diesel, or equivalent)	2	Site access for project actions and monitoring, also kayak and drone transport	Up to 12 days per year, operation on site will be minimal (< 1-hour per visit)
Drone (DJI Phantom 4 for RGB imagery and DJI Matrice 200 for multispectral imagery or equivalent)	1	Vegetation monitoring	Up to 10 days per year, 5-hour period each day
Kayak	4	Water quality monitoring	Up to 10 days per year, 10-hour period maximum each day
Pontoon boat (10'x24' with 90 hp 4-stroke engine or equivalent)	1	Transporting applicator drone to site	Up to 10 days per year
Handheld weed trimmers	6	Removing phragmites and clearing drone launch/landing areas	Up to 10 days per year
Jon boats	3	Site access	Up to 10 days per year
Backpack sprayers	6	Herbicide application spot treatments	Up to 10 days per year

Treatment will be staggered among three separate sections of the 90-acre site over the first three years of the project. Phased implementation is designed to maximize treatment feasibility and control efficacy while minimizing potential for environmental impacts (Figure 2-4). Sections were delineated to incorporate equal area, ensure accessibility, follow subtidal channels, prioritize treatments in areas with more native vegetation, and order implementation based on proximity to the two Blacklock breach locations. Blacklock contains 33.5 acres of Phragmites total, with sections 1, 2 and 3 containing 12.5, 9.5, and 11.4 acres of Phragmites, respectively (Figure 2-6). The first year of herbicide treatments for each section will be applied by a UAV mounted with an herbicide

applicator with a programmed flight path to accurately treat areas delineated as Phragmites. A UAV mission will be flown each summer prior to treatment to obtain current aerial imagery, which will be delineated prior to treatment to obtain the most accurate flight path for each section. No more than 25 net acres of Phragmites will be treated with herbicide per year (see Table 2-3 for further clarification of planned treatment per year). This total will include approximately 10 acres of initial treatment of a section and up to 10 acres of follow-up treatment in previously treated sections, with some variability in Phragmites cover among sections. Using results of vegetation monitoring surveys conducted the summer prior to each treatment, spot treatments will be done where necessary (any regrowth of Phragmites from previously treated sections) with backpack sprayers, handheld vegetation removal tools, and the UAV herbicide applicator. Water quality monitoring will occur in accordance with National Pollutant Discharge Elimination System (NPDES) permit requirements, with some additional samples being taken to better assess sitewide treatment on water quality. Sampling design includes two sampling locations in each of the treated sections within each season, as well as four peripheral monitoring sites as shown in Figure 2-5. Two of the additional monitoring sites will be located at the Blacklock breaches to measure herbicide concentrations leaving the site as well as other water quality parameters (e.g. turbidity) that could impact habitat in the adjacent Little Honker Bay. Two additional monitoring sites will be located along other nearby inlets in Little Honker Bay to measure ambient water quality parameters including herbicide concentrations from other sources in the area.

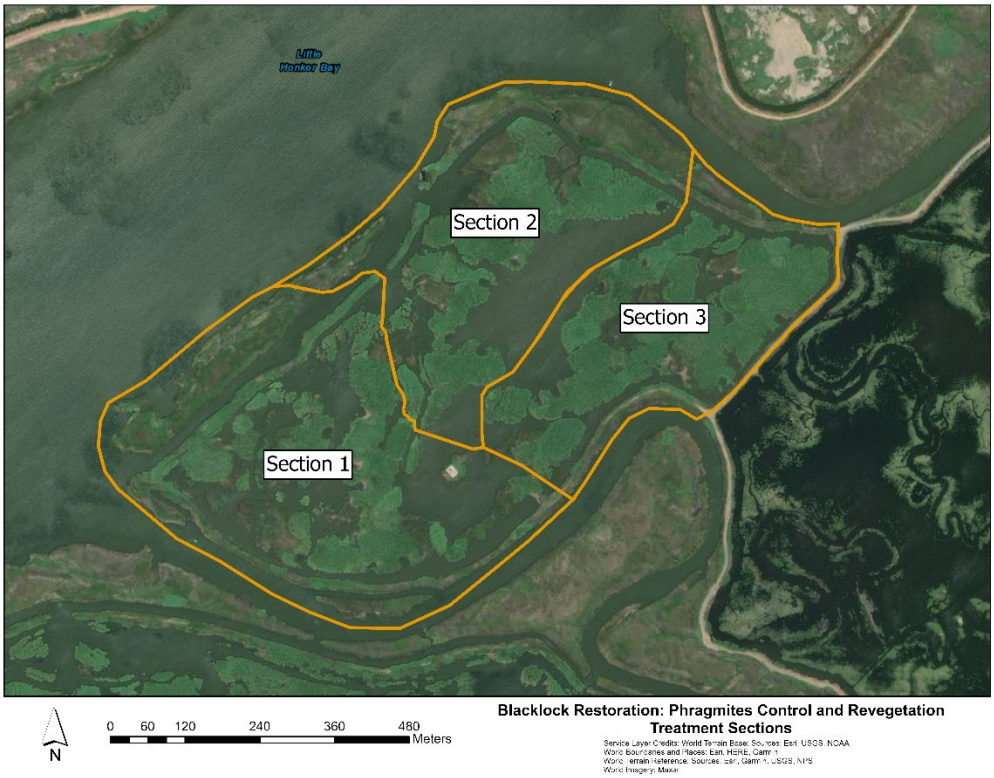


Figure 2-4. Project site showing the three treatment sections.

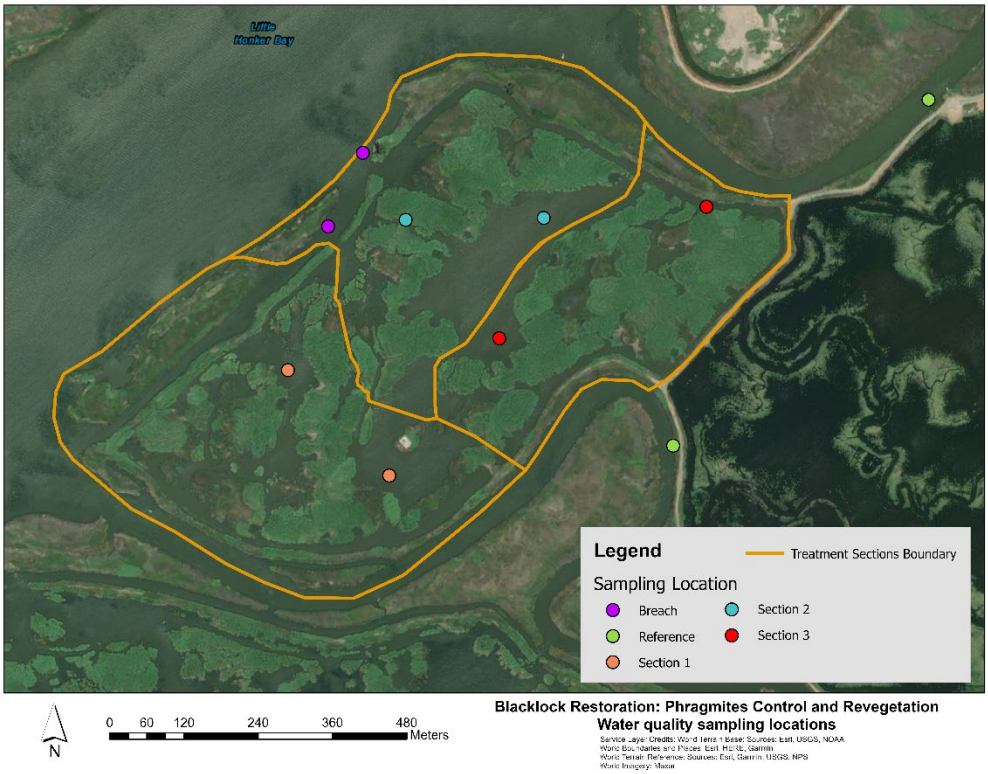


Figure 2-5. Water quality sampling locations.

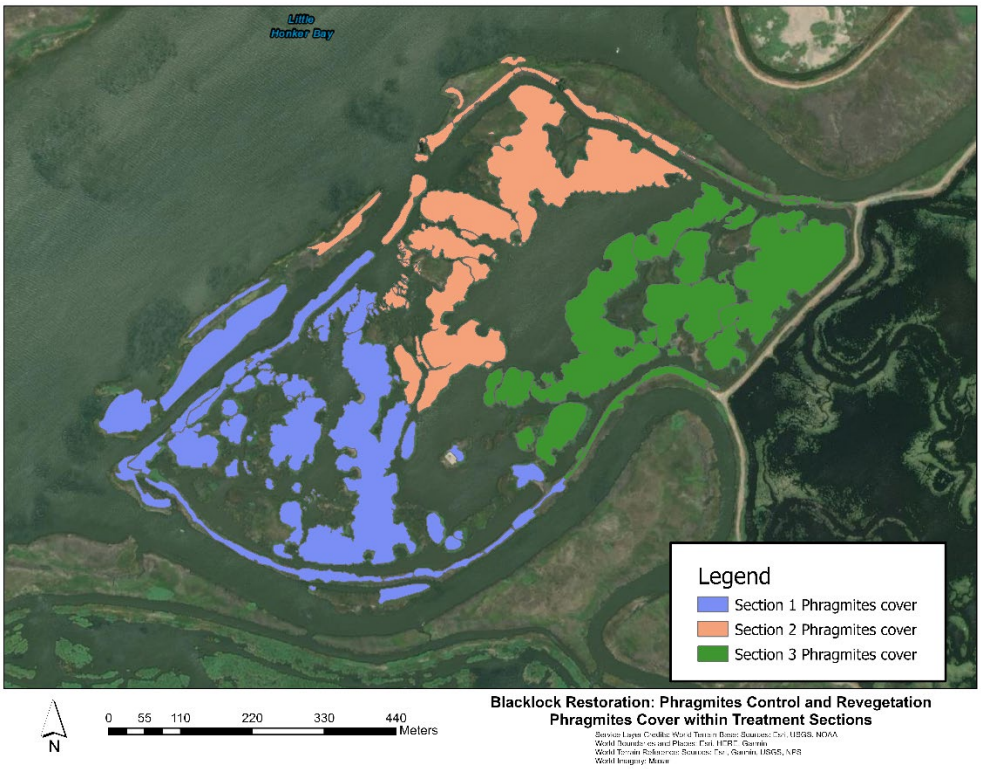


Figure 2-6. Map delineating Phragmites cover in the three treatment sections from aerial imagery collected in September 2021. Sections 1, 2 and 3 contain 12.5, 9.5, and 11.4 acres of Phragmites, respectively.

Herbicide treatments will include the aquatic glyphosate formulation (Rodeo or Roundup Custom) and the aquatic formulation of imazapyr (Habitat), used individually. Treatment will begin in summer of 2023 or 2024, between August and October. Herbicides will be mixed with water and a non-ionic or crop oil concentrate adjuvant (Liberate or equivalent), per label instructions, and will be applied using precision methods by foliar spray with a UAV mounted with an herbicide sprayer, backpack sprayer, or a small boom sprayer mounted to the amphibious vehicle. All herbicide applications will occur during low tide to maximize plant coverage and minimize water contamination (Figure 2-7). See Table 2-3 for a schedule of planned treatments and monitoring actions throughout the six years of treatments. Launching and landing areas for the applicator drone will be cleared on the Blacklock levee using handheld weed trimmers. Cleared areas will be approximately 10x4 meters long along the levee, adjacent to the treatment section to reduce drone travel distance (Figure 2-8). A boat will travel to the staging area (a subtidal area adjacent to the launching and landing area on the levee) with all treatment equipment. Mixing of herbicides and adjuvants will occur at the Grizzly Island Wildlife Area complex maintenance area in a 50-100 gallon chemical tank and brought to the launch area on the boat. The drone will be filled with herbicide by pumping directly from the tank with a hose which prevents spillage on the levee. Figure 2-8 illustrated expected launching, landing, and staging areas, which are subject to change due to tides, but will be limited to three locations per treatment section each year.

Figure 2-7. Blacklock, showing water elevations relative to the mudflat at low tide (low of -0.3 ft during the tide pictured).

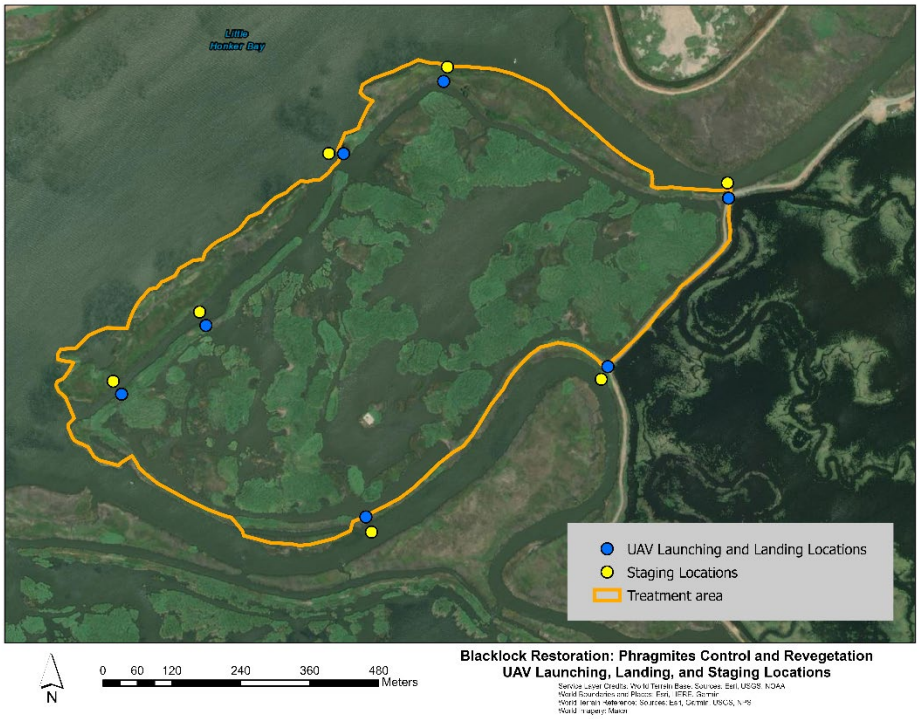


Figure 2-8. Planned UAV launching, landing, and staging locations

Following removal of *Phragmites*, native plants would be planted where feasible to reduce further establishment of invasive plants. Appropriate planting species and methods would be determined based on elevation and surrounding plant types. Planting methods will first be tested in the cleared plots previously treated in the Control Study, and planting locations will prioritize accessibility and favorable hydrology for seed and seedling success (i.e., locations with a minimal loss of seedlings to scour/erosion and areas cleared of *Phragmites*). Plantings would include bulrush (*Schoenoplectus* sp.), cattails (*Typha* sp.), or other appropriate mid to high-marsh species. Native vegetation may be seeds broadcasted or otherwise distributed, and/or may include bundles of rhizomes and vegetation, or adult plugs purchased.

The Proposed Project would incorporate the appropriate environmental commitments (or equivalent measures) identified in Section 2.5, "Environmental Commitments and Mitigation Measures," of the SMP EIS/EIR, as well as the project-specific best management practices (BMPs) provided in Appendix A of this document.

2.5.1 MONITORING ACTIONS

Efficacy monitoring will occur regularly over the course of the six years of treatments, while water quality monitoring will be strategically timed to capture pesticide overspray and fate/transport over several tidal cycles after treatment is applied. Monitoring results will be used to characterize the efficacy of treatments, water quality impacts, and non-target impacts on nearby vegetation and the aquatic food web.

Treatment efficacy will be evaluated by measuring Phragmites health over time via aerial imagery collected before and after treatment events up to ten times a year. Drones equipped with multispectral or hyperspectral cameras will capture images for analysis. Vegetation health will be quantified using a standardized index, such as the Normalized Difference Vegetation Index (NDVI), which measures photosynthetic capacity (Lowman et al. 2016; Majahan and Bundel 2017). Changes in proximal non-target vegetation will be monitored using the same technique in designated reference locations. Ground-truthing vegetation surveys will be done to confirm results

from aerial surveys and plan spot-treatment areas. Vegetation monitoring at the project site is subject to constraints of gear availability, staff availability, and budget.

The control effort will assess water quality impacts prior to and after each control action. Grab water samples will be collected to identify herbicide analytical chemistry within the immediate vicinity of each section (Figure 2-5). At each sampling location, one sample will be collected prior to herbicide application (within 24-hours before applications occur), as well as prior to or during the subsequent high slack tide after herbicide application, with a goal to quantify overspray or pesticide runoff. Samples will also be collected at all locations again, within one week on a high slack tide.

Standard water quality parameters will be monitored in concert with water sample collection. Impacts on primary productivity will be measured in receiving waters as chlorophyll-a via handheld YSI, along with turbidity, dissolved oxygen, pH, salinity, and temperature. Environmental conditions will also be recorded (e.g. wind speed, weather, recent precipitation, tidal stage, presence of species of concern).

2.5.2 TIME SCHEDULE

Control actions will begin in Summer or Fall of 2023 or 2024, between September and October. Table 2-3, below, describes treatment and monitoring actions to be used throughout the six years. Actual dates and timing of all actions depends on weather and environmental conditions, as required by herbicide labels and best management practices. In year 1, the entirety of *Phragmites* cover in section 1 will be treated with an herbicide applicator-mounted UAV, with handheld vegetation removal tools and backpack sprayers being used for spot treatments within 100-foot buffers of rare plants. In year 2, the entirety of *Phragmites* cover in section 2 will be treated with the UAV applicator as was done in Section 1 during the year prior, with spot treatments on areas of regrowth in section 1. In year 3, the entirety of *Phragmites* cover in section 3 will be treated with the UAV applicator, with spot treatments on regrowth in sections 1 and 2. In years 3-6, spot treatments will occur in all sections. Buffering of rare plants as described above will continue throughout all treatment years.

Table 2-3. (a) Planned treatment and monitoring actions expected throughout the six years of the project and (b) total herbicide use expected each year. Gallons of herbicide are rounded up to the nearest integer to account for variability in Phragmites growth and treatment needs between years. Total herbicide use may change based on Phragmites response to treatment. "B" indicates breach locations and "RS" indicates reference sites.

(a)

			Year					
Objective			1	2	3	4	5	6
Treatment	Herbicide Application with UAV	Section(s) treated	1	2	3			
		Treatment Area (Acres)	12.5	9.5	11.4			
		Glyphosate (gallons)	12	9	11			
		Imazapyr (gallons)	10	8	9			
	Spot treatments	Herbicide Treatment Area (Acres)		1	1, 2	1, 2, 3	1, 2, 3	1, 2, 3
		Acres treated		5 acres	10 acres	15 acres	15 acres	15 acres
		Glyphosate (gallons)		5	10	15	15	15
		Imazapyr (gallons)		4	8	12	12	12
Monitoring	Water quality monitoring	Location	Section 1, B, RS	Sections 1 and 2, B, RS	All sections, B, RS	All sections, B, RS	All sections, B, RS	All sections, B, RS
	Aerial image surveys	Location	Site-wide	Site-wide	Site-wide	Site-wide	Site-wide	Site-wide
	Rare-plant surveys	Location	Site-wide	Site-wide	Site-wide	Site-wide	Site-wide	Site-wide

(b)

	Year					
	1	2	3	4	5	6
Total area treated with herbicide (acres)	12.5	14.5	21.4	15	15	15
Glyphosate (gallons)	12	14	22	15	15	15
Imazapyr (gallons)	10	12	17	12	12	12

2.6 ENVIRONMENTAL COMMITMENTS AND MITIGATION MEASURES

DWR would incorporate applicable environmental commitments and mitigation measures from the SMP EIS/EIR into the Proposed Project. These environmental commitments are also summarized in Chapter 2 of the SMP EIS/EIR, with the exception of the new measures. Mitigation measures from the SMP EIS/EIR also would be applied, as necessary, to minimize potential adverse effects, and are discussed further in the impact assessments.

2.7 PERMITS, APPROVALS, AND REGULATORY REQUIREMENTS

As the lead agency, DWR has the principal responsibility for approving and carrying out the Proposed Project, and for ensuring that the requirements of CEQA and all other applicable regulations are met. Table 2-4 lists the agencies that also may have authority over portions of the Proposed Project.

Table 2-4. Regulatory Agencies and Approvals

Agency	Approval/Permit
U.S. Fish and Wildlife Service	ESA Section 7 consultation
National Marine Fisheries Service	ESA Section 7 consultation
State Water Resources Control Board	NPDES General Permit for Residual Aquatic Pesticide Discharges for Algae and Aquatic Weed Control Applications

Notes: DWR = California Department of Water Resources; ESA = Endangered Species Act;
NPDES = National Pollutant Discharge Elimination System

3 SUPPLEMENTAL ENVIRONMENTAL REVIEW

3.1 INTRODUCTION

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

- Water Quality
- Transportation and Navigation
- Air Quality
- Noise
- Greenhouse Gas Emissions and Climate Change
- Fish
- Recreational Resources
- Vegetation and Wetlands
- Wildlife
- Cultural Resources
- Public Health and Environmental Hazards
- Cumulative Impacts

Environmental resources topics that were analyzed in the SMP EIS/EIR, but were outside the scope of the effects of the Proposed Project, and thus were not analyzed in detail in this chapter include the following:

- Water Supply, Hydrology, and Delta Water Management
- Geology and Groundwater
- Flood Control and Levee Stability
- Sediment Transport
- Land Use and Delta Plan Policies
- Utilities and Public Services
- Visual/Aesthetic Resources
- Growth-Inducing Impacts, including Population and Housing

3.2 IMPACT CONCLUSIONS

The Proposed Project, as presented through the analysis in this addendum, would not result in any new significant environmental effects or any substantial increases in the severity of environmental effects identified in the certified Final SMP EIS/EIR. Furthermore, the Proposed Project would not require mitigation measures identified in the SMP EIS/EIR because we will avoid and minimize all potential impacts through adherence to all Environmental Commitments in the SMP EIR/EIS. The level of overall activities analyzed as part of the SMP EIS/EIR for restoration projects and the location are comparable to, or more significant than, those under the Proposed Project. The potential environmental impacts associated with the Proposed Project already were

identified and adequately addressed in the SMP EIS/EIR. The environmental commitments described in the SMP EIS/EIR would be adopted, as appropriate, for the Proposed Project. Based on further evaluation and because of a reduced project area and the absence of ground-disturbing activities, fewer impacts on several resources would occur compared to the SMP EIS/EIR.

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

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

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

Notes:
NI = No Impact; LTS = Less than Significant; SU = Significant and Unavoidable; LTCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable
1 The impact determinations summarized in this table reflect the most severe impact determination.
2 The SMP EIS/EIR did not evaluate these specific impacts listed in the CEQA Appendix G Environmental Checklist Form because activities under the SMP would not result in direct or indirect population growth, the construction of homes, or the displacement of people.

3.3 RESOURCES

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

3.4 WATER QUALITY

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

3.4.1 POTENTIAL FOR WATER CONTAMINATION FROM THE APPLICATION OF HERBICIDES

The fate and transport of the herbicides and adjuvants used in this project depends on their physicochemical properties as well as environmental conditions. Table 3-2 provides maximum expected concentrations of each herbicide and adjuvant in receiving waters, assuming dilution in one meter and two meters of water. The amount to be applied corresponds to the maximum allowable rate per ac for aquatic applications, as published on product labels, and represents the worst-case scenario for comparison. However, actual application concentrations could be lower than product labels. These calculations represent conservative and instantaneous concentrations, though mixing of any herbicide that reaches the water will occur over time. Tidal flows through the action area, with typical water fluctuations of four to six feet in each cycle, will likely dilute herbicide inputs in a short period of time.

Table 3-2. Calculated maximum instantaneous concentrations of each herbicide and adjuvant within water directly below application.

Chemical	Application rate	Overspray assumption	Dilution depth	Expected water concentration
Glyphosate (as Rodeo or Roundup Custom)	3.75 lbs ae /acre	20%	1 m	84 ppb
Glyphosate (as Rodeo or Roundup Custom)	3.75 lbs ae /acre	20%	2 m	42 ppb
Imazapyr (as Habitat)	1.5 Ibs ae (96 fluid oz) /acre	20%	1 m	34 ppb
Imazapyr (as Habitat)	1.5 Ibs ae (96 fluid oz) /acre	20%	2 m	17 ppb
Agridex	2% (v/v)	20%	1 m	1 ppb
Agridex	2% (v/v)	20%	2 m	0.5 ppb
Competitor	1% (v/v)	20%	1 m	0.5 ppb
Competitor	1% (v/v)	20%	2 m	0.25 ppb
LI - 700	0.5% (v/v)	20%	1 m	0.25 ppb
LI - 700	0.5% (v/v)	20%	2 m	0.125 ppb
Liberate	0.5% (v/v)	20%	1 m	0.25 ppb
Liberate	0.5% (v/v)	20%	2 m	0.125 ppb

Note: The herbicide and adjuvant concentrations are based on the specimen labels' tank mixture concentrations and maximum specified application rates per acre, and dilution factor based on the volume of water within one or two meter-acres.

A particle tracking model was developed for Blacklock, prior to its planned and natural breaches in 2006. An animation of the model was run using randomly selected insertion points throughout the site, to demonstrate the hypothetical movement of herbicides if they were to enter waterways. Figures 3-1 and 3-2 show the movement of particles on the site after 6 and 24 hours, respectively. The modelled hydrology is not perfectly representative of the present conditions on Blacklock. For example, the model assumes only one breach while there are presently two, and sediment accretion and vegetation establishment has occurred since the time the model was developed, all of which is likely to impact the hydrology of the site and the resulting tidal transport of particles. Model results shown below should, therefore, be considered qualitative and approximate.

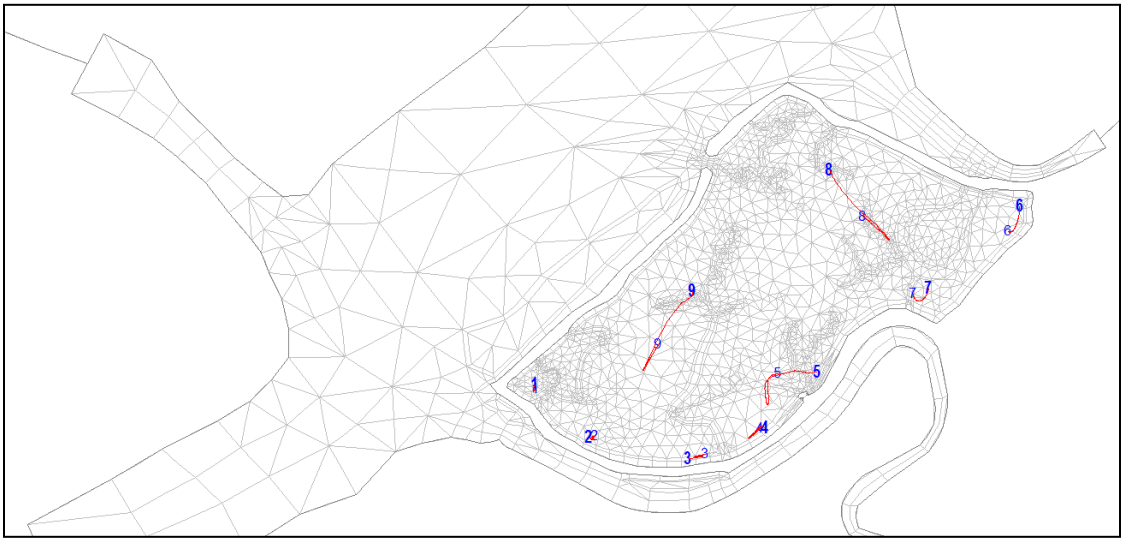


Figure 3-1. Particle tracking model showing the total range of movement of particles over 6 hours, originating from 9 randomly selected insertion points across the action area.

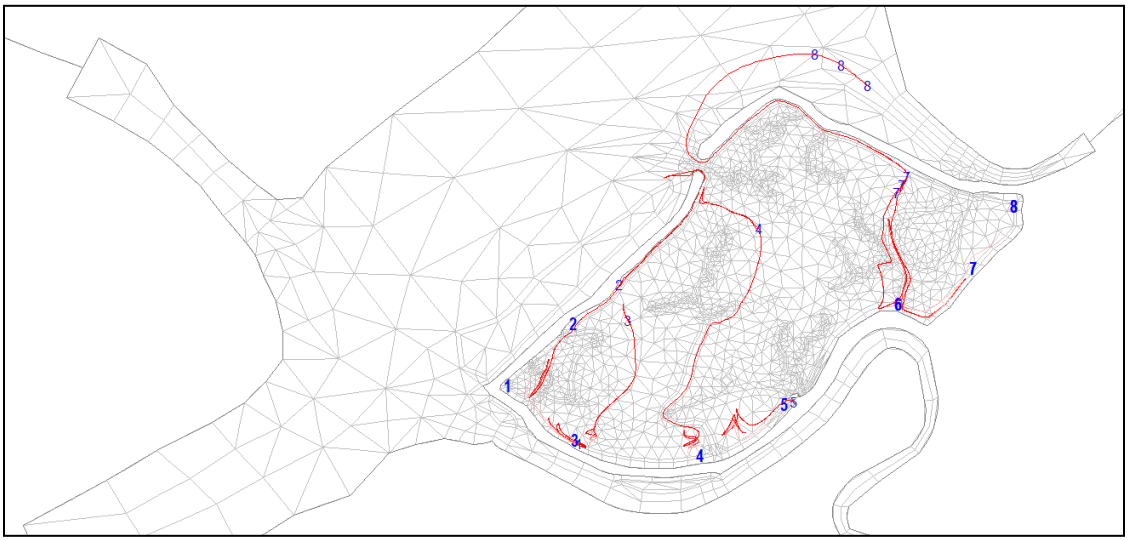


Figure 3-2. Particle tracking model showing the total range of movement of particles over 24 hours, originating from 8 randomly selected insertion points across the action area.

Results from the particle tracking model animation indicate that residence time is variable within the restoration site, but that particles from at least some parts of the site are likely to be exported off the site within 24 hours. Not accounted for in the calculated concentration in Table 3-2 or the particle tracking models shown above, is chemical loss due to sediment adsorption and degradation. These processes depend on the condition of the site and the herbicide's physicochemical properties. Historical water quality monitoring data from Department of Boating and Waterways (DBW)'s Water Hyacinth Control Program demonstrates that actual herbicide concentrations decrease rapidly in waterways following treatment to aquatic plants (DBW and USDA 2012). Water samples taken downstream of their treatment site, at two to three feet depth one-hour post treatment, show actual herbicide levels that are at least an order of magnitude below the calculated concentrations in 1-meter of water, indicated in Table 3-2. The discrepancy between modelled and actual concentrations, is likely due to dilution, sediment adsorption, and degradation. The organic carbon sorption coefficient (Koc) represents the soil sorption affinity of a chemical, and pesticides typically range from 5 to 30,000. The Koc of imazapyr is between 8 and 150, depending on the type of soil, indicating weak adsorption (AMEC Geomatrix, Inc. 2009; SERA 2004). In water, imazapyr degrades by photolysis, with a half-life of three to five days (USEPA 2006). Glyphosate has one of the highest adsorption coefficients of all herbicides, with a Koc of 24,000, indicating it binds tightly to sediment, removing the active ingredient from water. Studies conducted in a forest ecosystem found that glyphosate dissipates rapidly from surface water ponds high in suspended sediment, with first order half-lives ranging from 1.5-11.2 days (Feng et al., 1990; Newton et al., 1994), and in streams, residue was undetectable in 3-14 days (DPR 1998).

The Control Study took herbicide detection samples to measure treatment impacts on water quality at treatment and control plots, reference sites, and the breach locations within 24 hours prior to and following treatments, and within one week following treatments. Of the 210 Imazapyr samples taken during 2019 through 2021 treatment events, 30 had positive detections. No glyphosate or nonylphenol was detected during the 2019-2021 sampling events. With the maximum imazapyr concentration detected at 0.03 mg/L in a plot treated with imazapyr taken on the day of treatment, all detections were orders of magnitude below the 11.2 mg/L instantaneous monitoring trigger set forth in the NPDES General Permit. In addition, all detections were below the LC50 values listed in the U.S. EPA's Ecotoxicity Database included in the General Permit, the lowest of which was 100 mg/L.

Implementing the following project-specific BMPs would reduce the potential for water contamination that could have impacts on aquatic species to less-than-significant:

Project-Specific BMPs

1. Herbicide applications will occur by an authorized and certified aquatic pest control applicator with experience in the Bay-Delta.
2. Herbicides will be applied using precision methods by foliar spray with a UAV, backpack sprayer, or small boom sprayer.
3. Herbicide label recommendations will be followed regarding application rate and spray nozzle adjustments. Spray nozzles will be adjusted to the coarsest setting possible while maintaining efficacy, to minimize overspray.
4. Herbicide treatment will not occur when wind speeds are greater than 10 mph.
5. All herbicide applications will occur during low tide to maximize plant coverage and the non-wetted portion of the plant will be targeted to minimize water contamination.
6. A water-safe dye will be added to the herbicide formulations to enhance the precision and evenness of herbicide applications.

7. DWR has developed and will implement a Spill Prevention and Control Plan (SPCP) to minimize effects of spills of hazardous, toxic, or petroleum substances during proposed action activities (Appendix IV). The SPCP will be kept on site during *Phragmites* control and monitoring activities and will be made available upon request.

Additional project-specific BMPs related to herbicide application via UAV are included in Appendix A.

3.4.2 POTENTIAL FOR INCREASED TURBIDITY

Increased water turbidity from sediment disturbance will occur within the designated treatment sections where handheld vegetation removal tools are used, however because actions will occur at low tide when the mudflat is minimally inundated, there will be little overlying water to be impacted, and sediment is anticipated to be settled again by the time the area is rewetted. Turbidity will be measured periodically over the course of the project period, including directly prior to and directly after herbicide application. All water quality monitoring results will be documented, maintained, and made available upon request. Because of the short duration of restoration enhancement actions, limited extent of activities, implementation of the appropriate BMPs, and environmental commitments to minimize and control turbidity effects, these turbidity impacts would be less than significant. No new or more severe temporary impacts beyond those identified in the SMP EIS/EIR would occur to water quality.

3.4.3 POTENTIAL FOR DECREASED DISSOLVED OXYGEN

Vegetative waste resulting from the use of handheld vegetation removal tools that remains in the waterways for decomposition could have impacts on water quality, especially dissolved oxygen levels. For this reason, cleared biomass will be removed from the site to reduce the potential for dissolved oxygen decreases due to plant decomposition. Vegetative waste will be disposed of properly to avoid spreading, including bagging and disposal at a county landfill. The changes in DO levels resulting from the Proposed Project would be less severe than the changes identified in the SMP EIS/EIR. Implementation of the following project-specific BMP will reduce the potential for decreased dissolved oxygen to less than significant.

Project-Specific BMP

1. Vegetation waste will be removed from waterways after vegetation removal with handheld eqipment occurs in order to avoid impacts on water quality, dissolved oxygen levels.

3.4.4 SUMMARY

In addition to the project-specific BMPs, implementing the following environmental commitments identified for water quality in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to less-than-significant:

- EC-1: Standard Design Features and Construction Practices
- EC-2: Access Points/Staging Areas
- EC-9: Hazardous Materials Management Plans

Consistent with the findings in the SMP EIS/EIR, less-than-significant impacts would occur on water quality from implementing the Proposed Project. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to water quality. The analysis of potential water quality impacts in the SMP

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

3.5 TRANSPORTATION AND NAVIGATION

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

As described in the SMP EIS/EIR, Solano County maintains several roads in the interior Marsh that serve rural developments, managed wetlands, agricultural operations, and other uses. Currently, the Blacklock restoration site has no public access and cannot be accessed directly by vehicle. Vehicular access to an adjacent site (Arnold Restoration Site) requires driving through private property. DWR has an easement to access the site for scientific or management purposes, but this easement is not for public access. A private boat launch is located along Denverton Slough, north of the restoration site. Little Honker Bay and the adjacent sloughs are used year-around for boating and fishing. However, several "No Trespassing" signs have been installed along the exterior levee to discourage the public from accessing the site by boat. The primary regional roadway serving Arnold is State Route 12, a rural major arterial to the east and north. Arnold can be accessed via some combination of the local roadways, including Little Honker Bay Road and Shiloh Road, and by a gravel road, located at the intersection of Shiloh Road and Little Honker Bay Road.

Invasive vegetation treatment work would be temporary and would result in a negligible increase in traffic on roadways in the project vicinity. In addition, the Proposed Project would not result in substantial changes in traffic after completion. The Institute of Transportation Engineers (ITE) (1988) criterion for assessing temporary construction impacts recommends a threshold level of 50 or more new peak-direction (one-way) trips during the peak hour. The Proposed Project will not require any heavy equipment truck commutes, and will require a maximum of eight worker commutes per day (expected over five days per year during treatments) , which is substantially less than the ITE criterion of 50 per hour one-way trips. Thus, worker traffic would not conflict with an applicable plan, ordinance, or policy, establishing measures of effectiveness for the performance of the circulation system. Vehicles will be parked at Arnold; therefore, no traffic flow would be interrupted significantly on any roadway. Project-related traffic increases would be negligible relative to roadway capacity, would be temporary, and would occur in an area with low levels of existing traffic.

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

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

With respect to waterway navigations, Suisun Marsh waterways occasionally are used by emergency service providers. In-channel project work, such as travel to and from staging areas on the water, will not impede access in the major waterways surrounding the site. As described in the environmental commitments in the SMP EIS/EIR, DWR would coordinate with the U.S. Coast Guard and the Solano County Marine Patrol before beginning any activities that may impede their boats, to ensure that response times in the project vicinity would not be affected.

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

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

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

3.6 AIR QUALITY

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

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

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

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

The project site is within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The BAAQMD CEQA Air Quality Guidelines (Guidelines) is an advisory document that provides lead agencies, consultants, and project applicants with recommended procedures for addressing air quality in environmental documents. Since 2011, BAAQMD has updated its previous 1999 CEQA Guidelines to include new and more stringent quantitative thresholds for operation and construction-related criteria air pollutants and precursors, toxic air contaminants (TACs), odors, and greenhouse gases (GHGs) (BAAQMD 2017b). Although the CEQA Guidelines document has been updated since the SMP EIS/EIR, at the time of the air quality analysis for the SMP EIS/EIR, the BAAQMD had proposed draft revised Thresholds of Significance for evaluation of air quality impacts that were approved as part of the 2011 Air Quality Guidelines (BAAQMD 2010). Recommendations in the BAAQMD CEQA Guidelines are advisory and should be followed by local governments at their own discretion. Thus, the BAAQMD CEQA Guidelines may inform environmental review for development projects in the Bay Area, but they do not commit local governments or BAAQMD to any specific course of regulatory action. The thresholds for criteria air pollutants were developed through a quantitative examination of the efficacy of fugitive dust mitigation measures and a quantitative examination of regional nonattainment emissions. The draft revised Thresholds of Significance proposed by the BAAQMD in 2010 were used for the SMP EIS/EIR analysis and are consistent with the current BAAQMD recommended Thresholds of Significance in the 2017 BAAQMD CEQA Guidelines. Another update to the BAAQMD CEQA Guidelines currently is underway. Air quality in the area is generally good as the wind blows nearly every day in Suisun Marsh (Suisun- the Native American name for “west wind”). BAAQMD reports for Fairfield indicate that the average ozone for the area between 2017-2019, was 57 parts per billion (2020 BAAQMD). Criteria air pollutants are prevalent pollutants in the air that are known to be deleterious to human health. Criteria air pollutants are designated as nonattainment, attainment, and unclassified and include ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter (PM10 and PM2.5), and lead. There are no data available from the Fairfield station on carbon monoxide, nitrogen dioxide, sulfur dioxide and particulate matter (2020 BAAQMD).

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

The Proposed Action would involve temporary minor emissions. However, implementation of the Proposed Action would not result in an increase of long-term emissions from mobile, stationary, or area sources. Total emissions would be temporary and would not result in a cumulatively considerable net increase. The Proposed Action would involve worker commutes that would result an increase in temporary emissions. Emissions from worker trips made to the site and back, handheld equipment, and motorized boats are not expected to exceed baseline conditions, as emission resulting would be discountable. All drones used for herbicide application and monitoring are battery-operated and will not result in any emissions.

Project activities would result in the temporary increase in emissions of criteria air pollutants. Average daily emissions during project actions would not exceed the BAAQMD-recommended quantitative Thresholds of Significance. The SMP EIS/EIR incorporated mitigation measures AQ-MM-1 through AQ-MM-3 to reduce potential impacts to a less-than-significant level, and also included an environmental commitment to air quality BMPs to further reduce potential impacts on air quality. These mitigation measures would not be applicable to the Proposed Project as there will be no construction-related emissions. Thus, no air quality mitigation measures will be in place under the Proposed Project.

Consistent with federal regulations and the findings in the SMP EIS/EIR, the Proposed Project emissions estimates also were compared with general conformity Thresholds of Significance. As described in the SMP EIS/EIR, the de minimus thresholds applicable to the Proposed Project are 100 tons per year of ROG, NO_X, $PM_{2.5}$, and carbon monoxide (CO). Operations-related emissions from the Proposed Project would not exceed these de minimus thresholds.

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

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

- EC-10: Air Quality Best Management Practices
  - EC-10-3: Additional Air Quality Best Management Practices

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

3.7 NOISE

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

3.7.1 NOISE LEVEL MEASUREMENTS AND NOISE STANDARDS

As described in the SMP EIS/EIR, the project area is surrounded by rivers and agricultural lands. Ambient noise levels are affected by distant traffic and river navigation in the project vicinity. Noise from outdoor activities (e.g., people talking, dogs barking, and operation of landscaping and agricultural equipment), contribute to the existing noise environment to a lesser extent. Because of the rural and agricultural nature of the land surrounding the project area, ambient noise levels are expected to be quite low—at or below 55 A-weighted decibels (dBA) equivalent continuous sound level (L_{eq}), 50 dBA L_{eq}, and 45 dBA L_{eq} during the daytime, evening, and nighttime

hours, respectively. However, noise levels up to 59 dBA were recorded at Blacklock while Travis Air Force Base planes were flying within their airspace. Noise-sensitive land uses generally include those uses where exposure to noise would result in adverse effects, as well as uses where quiet is an essential element of the intended purpose. In the vicinity of the restoration site, sensitive land uses include habitat for waterfowl and listed species. These land uses could potentially experience noise impacts associated with project activities and/or increased traffic from associated project vehicles.

The loudness of sound preserved by the human ear is dependent primarily on the overall sound pressure level and frequency content of the sound source. The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. There is a strong correlation between the way humans perceive sound and A-weighted sound levels (abbreviated dBA). A-weighted sound levels are a standard tool to predict community response to environmental and transportation noise. Sound levels expressed as dB in this section are A-weighted sound levels, unless noted otherwise. Because of the ability of the human ear to detect a wide range of sound, noise levels are expressed in logarithmic units called decibels (dB) to avoid a very large and awkward range in numbers. The audible range of hearing in humans is 0 dB to 130 dB. Above 130 dB damage may occur to the ear.

Because the human ear is not equally sensitive to all audible frequencies, a frequency-dependent rating scale was devised to relate noise to human sensitivity. An A-weighted dB (dBA) scale performs this compensation by discriminating against frequencies that are more sensitive to humans. The basis for compensation is the faintest sound audible to the average ear at the frequency of maximum sensitivity. This dBA scale has been chosen by most authorities for the purpose of regulating environmental noise. With respect to how humans perceive and react to changes in noise levels, a 1 dBA increase is imperceptible, a 3 dBA increase is barely perceptible, a 6 dBA increase is clearly noticeable, and a 10 dBA increase is subjectively perceived as approximately twice as loud.

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

Solano County's Noise Ordinance is the primary enforcement tool for regulating local noise sources, such as mechanical equipment and construction activity (Solano County 2017). Section 28.1-30, "Interior Noise Standards," indicates that the allowable interior noise standards for residential dwelling units in residential zones or for noise generated by sources outside residential dwelling units is 45 dBA during both daytime and nighttime. Section 28.1-40, "Exterior Noise Standards," indicates that the exterior noise standards for residential and agricultural zones or areas are 55 dBA during the daytime (7 a.m. to 7 p.m.) and 50 dBA during the nighttime (7 p.m. to 7 a.m.). Section 28.1-50, "Specific Noise Regulations," states that construction and demolition activities in a residential district or within a radius of 500 feet are allowed only between 7 a.m. and 6 p.m. from

Monday through Friday, and between 8 a.m. and 5 p.m. on Saturday. The noise created by construction activity is not to cause the noise level to exceed a maximum noise at the receiving property line of more than 90 dBA at any time; and any construction that exceeds noise levels of 45 dBA during the daytime and nighttime, and noise levels of 55 dBA during the daytime (7 a.m. to 7 p.m.) and 50 dBA during the nighttime (7 p.m. to 7 a.m.) is to occur between 9 a.m. and 4 p.m. from Monday through Friday.

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

3.7.2 Comparison of Project Noise to the Applicable Noise Standards

The Proposed Project would generate temporary and short-term noise, primarily from drone operation. Noise associated with vegetation treatments would be highly localized. Noise from trucks would not be localized and would occur on roads used to access the project site. Noise from project-related truck use may contribute to traffic noise. Because of the small number of days and the sporadic nature of project implementation, project-related traffic noise would be minor. Construction equipment noise levels listed in Table 3-3 are the maximum levels at 50 feet to 3200 ft.

Table 3-3. Noise estimates from proposed equipment

	50 feet (ft)	100 ft	200 ft	400 ft	800 ft	1600 ft	3200 ft
Dump Truck	76	69.25	62.5	55.75	49	42.25	35.5
3/4 Ton Pickup	75	68.25	61.5	54.75	48	41.25	34.5
3/4 Ton Pickup	78	71.25	64.5	57.75	51	44.25	37.5
Drone	80	74	68	62	56	50	44

The noise levels resulting from the Proposed Action is expected to be greater than baseline conditions. The Proposed Action would incorporate BMPs for the minimization of generated noise levels, which generally result in a reduction. Additionally, sound from outdoor construction activities typically dissipates at a rate of 4.5 dBA to 6.0 dBA for each doubling of distance (FHWA 1980). The Solano County General Plan identifies dBA levels for new construction or development in the county (Table 3-4). While the table is intended to determine the level of acceptability for development projects, it provides a comparison point for anticipated noise increases.

Table 3-4. Land Use Noise Compatibility Guidelines

Land Use Category	Community Noise Exposure (Ldn or CNEL, dBA)	Community Noise Exposure (Ldn or CNEL, dBA)	Community Noise Exposure (Ldn or CNEL, dBA)
Agriculture	**Normally Acceptable**	**Conditionally Acceptable**	**Normally Unacceptable**
	<75	**70–80**	**75+**

Based on equipment noise emission levels and the incorporation of BMPs, implementation of the Proposed Action would result in noise greater than baseline conditions. Within 50 feet of the Proposed Action noise levels would exceed the normally unacceptable range for Agriculture set by the county's plan. The only sensitive group near the restoration site that could be impacted by the noise increase are listed wildlife, see Biological Resources. There are sensitive human communities, such as schools, hospitals or residential areas that could be impacted by the increase in noise.

Noise impacts would be temporary and localized and there would be no long-term operational noise sources. Equipment associated with the project would include the use of handheld vegetation removal tools, a dump truck, ¾-ton pickup and a drone. The Proposed Action would not generate high levels of ground vibration, such as that from blasting, pile driving, or pavement breaking.

However, these results overstate actual noise exposure because they do not consider noise attenuation associated with ground and atmospheric absorption. Actual noise levels would be substantially less because of the area's topography and the presence of earthen levees that project approximately 10 feet higher than the line of sight between the noise source (equipment at the site) and the receiver (the nearest home). An earthen berm (such as a levee or railroad berm) can provide noise attenuation up to 15 dBA, if it is several feet higher than the line of sight between the noise source and the receiver (FHWA 2011).

Furthermore, Section 28.1-50 of the County's Noise Ordinance exempts construction activities between 7 a.m. and 6 p.m. from Monday through Friday, and between 8 a.m. and 5 p.m. on Saturday. Site restoration and other project-related activities would not extend into the nighttime hours (7 p.m. to 7 a.m.), and thus would not exceed the applicable nighttime threshold of 45 dBA. Also, DWR would implement BMPs to reduce noise impacts. These measures would include limiting work to daytime hours as required by the Noise Ordinance, providing and maintaining noise control devices for construction equipment, coordinating routes and arranging equipment to minimize disturbance to noise-sensitive uses, designating a disturbance coordinator to respond to all public complaints, and minimizing equipment idling time. Therefore, because project noise levels would comply with the applicable daytime and nighttime noise exposure limits established by the Solano County General Plan (Solano County 2008) and Noise Ordinance, the noise impacts would be less than significant.

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

- EC-2: Access Points/Staging Areas
- EC-5: Noise Compliance

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

3.8 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

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

This section describes the current environment as it pertains to GHGs and climate change, the impacts of the restoration enhancement activities to GHG and climate change, and the Proposed Project's ability to provide anticipated beneficial impacts in response to climate change as considered in Section 5.9 of the SMP EIS/EIR.

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

The GHG emissions estimate for the SMP EIS/EIR was generated using URBEMIS 2006 (version 9.2.4), the model that was recommended at that time in the BAAQMD CEQA Guidelines. For this addendum, emissions estimates for the Proposed Project's short-term construction activities were modeled using the Internal Combustion Engines Air Emissions Calculator. A more detailed analysis of emissions for the SMP EIS/EIR and of that for the Proposed Project is presented in Section 3.6, "Air Quality." The data inputs and modeling approaches used for GHG emissions estimates were the same as those described for criteria air pollutants.

The SMP EIS/EIR estimated that approximately 276.3 tons of carbon dioxide (CO_2) per year would be generated from restoration activities and approximately 322.5 tons of CO_2 per year would be generated from management activities. However, these estimates were generated using the outdated URBEMIS emissions model. The Proposed Project would generate approximately 24 metric tons of carbon dioxide equivalent (MT CO_2e) over the 6 years of implementation, or an average of about 4 MT CO_2e per year for the 6-year period.

As a point of reference, the BAAQMD operation-related Threshold of Significance for GHG emissions is 1,100 MT CO_2e/year, which applies to long-term generation of emissions. GHG emissions from project implementation would be temporary and would be far less than the long-term operation-related threshold recommended by BAAQMD.

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

3.9 FISH

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

As summarized in the SMP EIS/EIR, implementing the SMP (including the Proposed Project) would primarily involve levee breaching and grading levee elevations down to restore managed wetlands to tidal wetlands, and vegetation management. These actions may affect fish and fish habitat in Suisun Marsh. Environmental commitments in the SMP EIS/EIR, including avoidance and minimization measures such as using construction

work windows, would be implemented to reduce impacts on water quality and fish in the immediate construction area. Therefore, levee breaching and grading levee elevations down would result in less-than-significant impacts. Creating subtidal and low intertidal wetland habitat through tidal restoration would provide resting and foraging habitat for special-status fish species, and aquatic food web benefits. Special-status fish species also would indirectly benefit from increased primary production (i.e., plankton and other plant food sources), flushed from mid- and high-intertidal wetlands into Little Honker Bay and the connecting sloughs.

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

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

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

The SMP EIS/EIR includes information regarding the status, life history, distribution, and description of any designated critical habitat for these listed and special-status species. The information in the SMP EIS/EIR is current, except for the federal listing for Longfin Smelt, which now is considered to be a candidate for listing. Adult and juvenile Chinook Salmon, steelhead, and Green Sturgeon are known to migrate through Suisun Bay and major sloughs of Suisun Marsh; juveniles are known or have the potential to occur in these waters and in the smaller sloughs and tidal wetlands of the Marsh. Delta Smelt, Longfin Smelt, and Sacramento Splittail are found throughout the Marsh. Subtidal, low-intertidal, low-marsh, mid-marsh, and high-marsh areas all provide habitat for special-status fish species (Reclamation et al. 2011:Section 6.1). The SMP EIS/EIR (in Tables 6.1-4 and 6.1-5) describes life-stage timing for these species in Suisun Marsh and their salinity and velocity tolerances. This information is current; however, Longfin Smelt (adults and juveniles) and Delta Smelt (estuarine-rearing adults and juveniles) may be found year-round in the project area, including the summer months. In general, juvenile native species use the Marsh as a rearing area in winter and spring, while nonnative species use the Marsh in summer and the early fall months when the water is warmer. The number of native fish found in Suisun Marsh has declined over the years (Moyle et al. 2016; Nobriga and Rosenfield 2016; Reclamation et al. 2011:Section 6.1).

3.9.1 PROJECT-SPECIFIC EXISTING CONDITIONS

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

The Denverton Slough trawl data show the 24 species sampled from 2012 to 2016, 11 of which were native and 13 of which were nonnative (Table 3-5). A total of 4,859 fish were caught (Table 3-5). Three of the four species identified as Pelagic Organism Decline (POD) species were caught in these trawls; Delta Smelt, which is federally listed as endangered, was the only POD species not found in any Denverton Slough trawl. The most abundant species caught in Denverton Slough trawls in the period from 2012 to 2016 was the native Sacramento Splittail; 1,800 individuals were caught (Table 3-5). The second most abundant fish was the nonnative, popular game fish Striped Bass (*Morone saxatilis*); 802 fish were caught.

The Denverton Slough seine data show a total of 26 species sampled from 2012 to 2016. Of these, 13 species were native and 13 were nonnative (Table 3-6). A total of 11,404 fish were caught in seines (Table 3-6). Three of the four species identified as POD species were caught in these seines; the federally listed endangered Delta Smelt was the only POD species not found in any Denverton Slough seines. The most abundant species caught in Denverton Slough seines in 2012 to 2016 were the nonnative Mississippi Silverside (*Menidia audens*); 8,017 individuals were caught (Table 3-6). The second most abundant fish was another nonnative species, Striped Bass; 1,553 fish were caught. The most abundant native species caught in Denverton Slough seines in 2012 to 2016 was the native Sacramento Splittail; 428 individuals were seined (Table 3-6).

Pelagic invertebrates are an important part of productivity in Suisun Marsh, and several species of caridean shrimp, mysids, rotifers, and calanoid copepods, and several species of amphipods (*Corophium* spp.) are common (Hennessy 2009; O'Rear and Moyle 2010). Benthic invertebrates also play an important role in productivity in the project area. Benthic invertebrates that occur in Suisun Marsh include cladocera, amphipods, polychaete worms (*Polychaeta*), several marine mollusks, and a freshwater species of clam (*Corbicula fluminea*) that is present when river inflow is unusually high. In more brackish portions of Suisun Marsh, the invasion of the overbite clam (*Corbula amurensis*) in the late 1980s caused a fundamental shift in the benthic community. Across the San Francisco Bay Estuary as a whole, these clams filter a volume of water equivalent to the entire North Bay one to two times per day (Schroeter et al. 2006); however, the center of distribution of the overbite clam and other benthic species varies with freshwater flow and the resulting annual salinity regime. Because of these environmental variations, the composition of the benthic invertebrate community at any particular location in the estuary can change substantially from year to year.

Table 3-5. Denverton Slough Fish Sampling Trawl Data by Year

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

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

Table 3-6. Denverton Slough Fish Sampling Seine Data by Year

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

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

3.9.2 PROJECT-SPECIFIC IMPACTS

The SMP EIS/EIR identified 40 different potential impacts on fish resources, determining that all of those potential impacts would be less than significant or beneficial. Of the 40 potential impacts, only one was considered for the Proposed Project. All other impacts were not considered because the project scope does not include any anticipated changes to channel morphology, hydrology, water velocity, sediment input and mobilization, or salinity, and will not include any managed wetland activities or convert managed wetlands to natural wetlands. Table 3-7 shows the fish resource impacts that were considered.

Table 3-7. Impacts on Fish Considered in the SMP EIS/EIR

FISH-9: Temporary Reduction of Delta Smelt Habitat Quantity or Quality through Removal and Destruction of Cover Attributable to Restoration Activities
FISH-10: Temporary Reduction of Chinook Salmon Habitat Quantity or Quality through Removal and Destruction of Cover as a Result of Restoration Activities
FISH-11: Temporary Reduction of Steelhead Habitat Quantity or Quality through Removal and Destruction of Cover as a Result of Restoration Activities
FISH-13: Temporary Reduction of Sacramento Splittail Habitat Quantity or Quality through Removal and Destruction of Cover as a Result of Restoration Activities
FISH-14: Temporary Reduction of Longfin Smelt Habitat Quantity or Quality through Removal and Destruction of Cover as a Result of Restoration Activities
FISH-23: Change in Fish Species Composition Attributable to Changes in Salinity or Water Quality from Managed or Natural Wetland Modifications

Notes:

1. Grayed cells indicate impacts for which no further project-specific analysis is required

For the majority of these potential impacts on fish, the Proposed Project would have impacts lesser in magnitude or duration than those presented in the SMP EIS/EIR, and no further analysis is required. To address the project-specific potential impacts requiring additional analysis, this addendum provides further analysis of:

- Changes in fish species composition attributable to changes in salinity or water quality from natural wetland modifications (FISH-23). This addendum includes an analysis of impacts on fish due to invasive vegetation management in tidal waters.

3.9.2.1 WATER QUALITY–RELATED EFFECTS

Herbicides and adjuvants may be introduced into waters adjacent to and within tidal range of the action area through overspray, discharge from plant material with tidal inundation, or surface runoff from staging areas. However, overspray and wind drift are unlikely to occur due to the size of the spray nozzle size, wind speed restrictions on application, and proposed buffer zones. The toxicity levels for the treatment sites in the risk assessment below overestimates the expected exposure concentrations of herbicides and adjuvants because the referenced data is from California's Department of Boating and Waterways Aquatic Weed Program, which sprays directly overwater, unlike the proposed herbicide treatments. Therefore, the analysis herein represents a worst-case scenario for comparison.

3.9.2.1.1 GLYPHOSATE

3.9.2.1.1.1 DELTA SMELT

Delta smelt are in their sub-adult to adult life stage during the proposed timing of the study. The species may be present in the open water sloughs within the action area, but unlikely to be within the restoration site concurrent

with study activities. The USEPA has classified glyphosate as "practically non-toxic" to fish. If an individual Delta smelt is exposed to glyphosate, applied in the aquatic formulation of Rodeo or Roundup Custom, a conservative and instantaneous estimate of glyphosate concentrations in water adjacent to treatment sites is 0.042 ppm – 0.084 ppm (equivalent to 42 ppb – 84 ppb). These values are far below the NPDES maximum limitation (0.700 ppm). Chemicals may be concentrated or partitioned from water into the tissues of fish species, referred to as bioconcentration, and cause acute and chronic adverse effects. Glyphosate does not bioaccumulate (Siepmann 1995) and has a low potential to accumulate in the tissues of mammals, birds, fish, or aquatic invertebrates (Franz et al. 1997, EXTONET 1996).

California's Department of Boating and Waterways commissioned toxicity testing of glyphosate on Delta smelt embryos and larvae (Stillway et al. 2017) and Riley and Finlayson (2003) conducted 96-hour acute toxicity screening for glyphosate on larval Delta smelt. Study actions will occur during the late summer and fall months when Delta smelt are at their sub-adult to adult life-stages, therefor effect estimates from embryo and larvae exposures may be overly protective. Still, Riley and Finlayson (2003) found that glyphosate toxicity values for larval Delta smelt were several orders of magnitude higher than detected concentrations in the environment, and Stillway et al. (2017) found embryo and larval LC50 values for glyphosate (as Roundup Custom) were also several magnitudes above expected environmental concentrations (Table 3-8). According to Stillway et al. (2017), the 96-hour LC50 for embryos is 3,490.4 ppm, and 1,184 ppm for larvae, and the 8-day LC50 for larvae is 1,099 ppm. The study found no significant effects to morphological endpoints of Delta smelt embryos nor larvae (Stillway et al. 2017). The study also examined Delta smelt endocrine effects and found that 0.64 ppm glyphosate exposure caused elevated 17ß-estradiol (E2) levels in male Delta smelt, which can potentially lead to the feminization of male fish (Stillway et al. 2017).

Jin et al. (2018) examined the sublethal effects of Roundup Custom on adult Delta Smelt by measuring 17β-estradiol (E2; a biomarker to evaluate endocrine disruption) and Glutathione (GSH; a bioindicator for oxidative stress) concentrations in the liver and Acetylcholinesterase (AChE; a biomarker for neurotoxicity) activity in the brain after six hours of exposure to the herbicide. The study found that glyphosate disrupted the E2 concentration and decreased GSH concentration in the liver. E2 concentrations were significantly increased in male fish exposed to 0.078, 0.70, and 890 ppm of glyphosate. GSH concentrations decreased in males exposed to 0.70 ppm glyphosate, while glyphosate did not affect AChE activity. Although results indicate endocrine disruption and oxidative stress due to glyphosate exposure at environmentally relevant concentrations, exposure time was six hours, which is unlikely to result from this study given the limited treatment area, glyphosate's affinity for binding, and the various BMPs used to minimize herbicide entering the water. In addition, no glyphosate was detected in any of the 196 samples analysed for glyphosate during Control Study treatments.

There are no laboratory studies evaluating the toxicity of Rodeo to sub-adult and adult life stages of Delta smelt, but toxicity tests using juvenile life stages of a surrogate laboratory test species, fathead minnow (Pimephales promelas), show that toxic concentrations are at least over one magnitude of order above those expected in receiving waters (Table 3-8), and the duration of the exposure to the maximum concentration is also expected to be less.

Table 3-8. Toxicity Response of Delta Smelt to Glyphosate. The range of maximum environmental concentrations from the proposed action activities is 0.042 – 0.084 ppm.

Species	Chemical	Endpoint (ppm)	Time Period	Reference
Delta Smelt, larvae	Glyphosate	LC_{50}: 270	96 hours	Riley and Finlayson 2003

Delta Smelt, early life stages	Glyphosate (as Roundup Custom)	LC_{50}: 1,184 – 3,490.4	96 hours	Stillway et al. 2017
Delta Smelt, early life stages	Glyphosate (as Roundup Custom)	LC_{50}: 1,099	8 days	Stillway et al. 2017
Fathead Minnow	Glyphosate (as Cuspide 480SL)	LC_{50}: >134	4 days	Currie et al. 2015
Fathead Minnow	Glyphosate (as Rodeo)	LC_{50}: 127	4 days	Henry 1992
Delta Smelt	Glyphosate (as Roundup Custom)	LOEC: 0.078	6 hours	Jin et al. 2018

Studies conducted in a forest ecosystem (Feng et al., 1990; Goldsborough et al., 1989; Newton et al., 1994) found that glyphosate dissipated rapidly from surface water ponds high in suspended sediment, with first order half-lives ranging from 1.5-11.2 days. In streams, residue was undetectable in 3-14 days. Robichaud and Rooney (2021) measured glyphosate and aminomethylphosphonic (AMPS; glyphosate's primary breakdown product) concentrations in water and sediment following aerial treatments of over 1000 acres of Phragmites per year in a Canadian lake. The maximum glyphosate concentrations were 0.320 ppm and 0.250 ppm in the water and sediment, respectively. Glyphosate concentrations in the water returned to pre-treatment levels within 20-30 days of application, were not detected further than 100 m from application, and did not reach levels of toxicological concern for aquatic biota. Glyphosate concentrations are not expected at Blacklock for as long an amount of time post-treatment due to the tidal system and only a fraction of the treatment acres. In addition, there were no positive detections of glyphosate of the 196 samples taken over three years during the Study at Blacklock.

While proposed actions will result in exposures similar in duration to Stillway et al. 2017, the anticipated herbicide concentrations are far below those indicated to have adverse effects on the species, and effects are anticipated to be even less likely in sub-adult to adult life stages of Delta smelt, which are the life stages relevant to the timing of our study. In addition, no glyphosate was detected during any sampling event during the control study (Appendix C).

3.9.2.1.1.2 SALMONIDS

The USEPA has classified glyphosate (tradename Round-up®) as "practically non-toxic" to fish. If an individual salmonid is exposed to glyphosate, applied in the aquatic formulation of Rodeo or Roundup Custom, a conservative and instantaneous estimate of glyphosate concentrations in water adjacent to treatment sites is 0.042 ppm – 0.084 ppm (equivalent to 42 ppb – 84 ppb). These values are far below the NPDES maximum limitation (0.700 ppm). Chemicals may be concentrated or partitioned from water into the tissues of fish species, referred to as bioconcentration, and cause acute and chronic adverse effects. Glyphosate does not bioaccumulate (Siepmann 1995) and has a low potential to accumulate in the tissues of mammals, birds, fish, or aquatic invertebrates (Franz et al. 1997, EXTONET 1996).

Data were queried from EPA's ECOTOX database and those data were used to generate Figure 3-3, below. The lowest effect concentration, per species and per manuscript, is plotted across species that occur in the Delta or are standard surrogate toxicity testing species. Note that the y-axes are on a log-scale. Discussion herein provides details on the studies that resulted in the lowest effect concentrations and lowest lethal concentrations found from the queried data.

Glyphosate is not likely to have an adverse effect on salmonids, due to large margin of safety between concentrations that induce toxicity in salmonids (in general) and the maximum concentration we expect in the environment due to study activities (Figure 3-3). It is important to note that aquatic species sensitivity to glyphosate-based herbicides to is highly formulation-dependent. For fish and zooplankton, the majority of the toxicity can be attributed to the surfactant portion of commercial glyphosate formulations, whereas algal species are typically more susceptible to the herbicidal action of glyphosate. For this reason, results from exposures to formulations other than Rodeo or Roundup Custom, which are not registered for aquatic uses, must be interpreted appropriately.

While the most conservative maximum environmental concentration that we expect from herbicide overspray at our study site is 0.084 ppm, the lowest sublethal toxic effect concentration to a salmonid species was 0.1 ppm, which was the lowest concentration that caused a significant increase in mobility for rainbow trout larvae exposed to Roundup GT Max formulation for 21 days (Santos et al. 2019). However, this effect was not seen in larvae exposed to higher concentration of glyphosate. The next lowest effect was 1.0 ppm, which was the lowest concentration that caused a significant electrophysiological olfactory response (LOEC) in a study conducted with silver salmon and rainbow trout (Tierney et al. 2006 and 2007). The lowest lethal concentration was 1.3 ppm in rainbow trout, Oncorhynchus mykiss, exposed to glyphosate over four days, as reported in a USDI manual. Notably, this report contained a wide range of lethal concentrations for rainbow trout, up to 240 ppm for this one species, with a median concentration of 8.3 ppm (Mayer et al. 1986). These concentrations are greater than the maximum concentration we expect to see in receiving waters, and the duration of the exposure to the maximum concentration is also expected to be less. In addition, no glyphosate was detected during any Control Study sampling events following treatments.

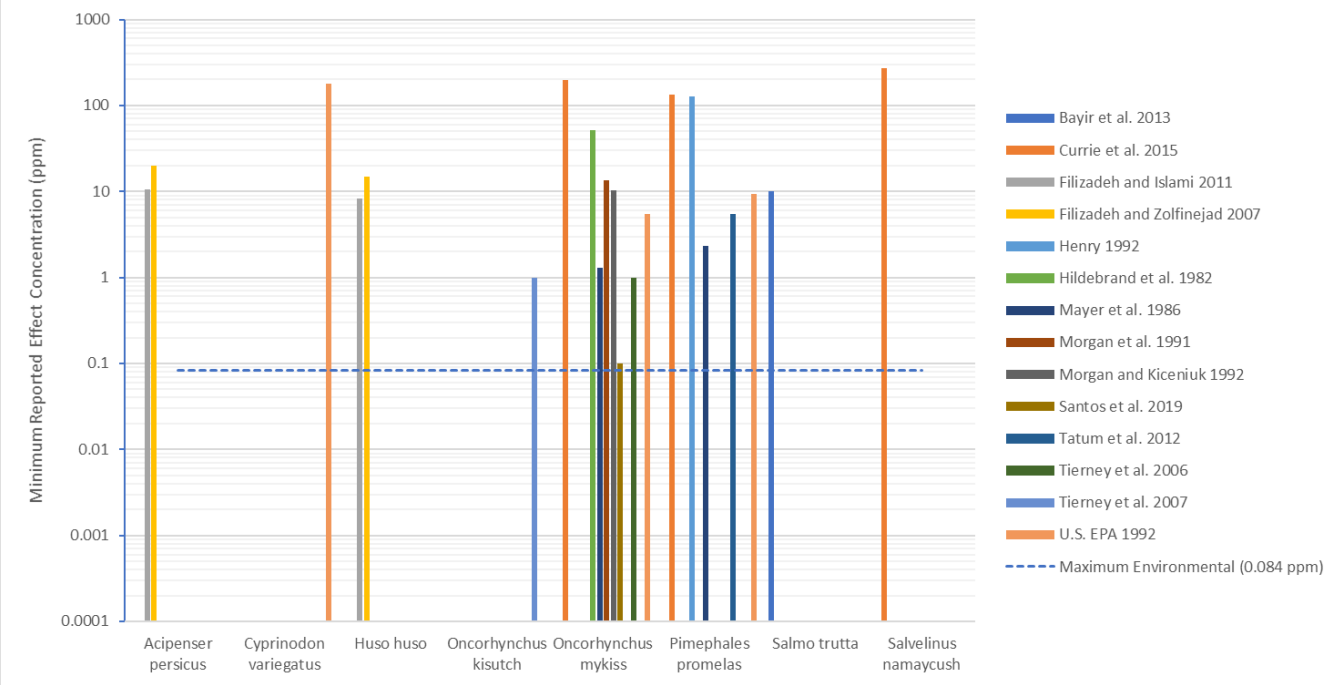


Figure 3-3. Concentrations of glyphosate that cause significant lethal or sub-lethal effects on fish species relevant to the Suisun Marsh.

3.9.2.1.1.3 NORTH AMERICAN GREEN STURGEON

One study investigated the sensitivity of three sturgeon species to glyphosate, and results show a 96-hour LC50 for sturgeon fry of between 19 ppm and 26 ppm, and 168-hour LC50 between 8 ppm and 13 ppm (Filizadeh and Rajabi Islami 2011). The maximum concentrations expected to occur from the proposed actions range between 0.042 and 0.084 ppm, providing a safety factor of over 200, and indicating there will no direct effects on sturgeon.

As previously noted, the calculated maximum instantaneous concentrations of the herbicides (glyphosate and imazapyr) and adjuvants (Agridex, Competitor, Liberate, and LI 700) are far below the toxic range of concentrations to sturgeon. Any potential adverse effects are avoided or minimized by 1) targeting the upper unwetted portion of the Phragmites stand, 2) spraying at low tide and not directly over water, and 3) conforming to wind speed restrictions, in addition to adherence to all Conservation Measures. Due to the expected low exposure concentrations and short half-life of herbicides, along with the proposed conservation measures, any potential adverse effects from herbicide application are discountable and insignificant.

3.9.2.1.1.4 ZOOPLANKTON AND PHYTOPLANKTON TROPHIC SOURCES FOR FISH

Glyphosate is not likely to have an adverse effect on aquatic invertebrates, as studies indicate that invertebrates are less sensitive than fish (Siepmann 1995), and concentrations that are acutely toxic to invertebrates are much higher than their expected or measured concentrations in water. A query of EPA's ECOTOX database, graphically presented in Figure 3-4, shows a minimum effect concentration of 0.44 ppm which was the 48-hour 50% lethal concentration for the water flea Ceriodaphnia dubia in one study using the Panzer Gold formulation (Reno et al. 2018). Other studies on the same species found an LC50 concentration of 21 ppm (Currie et al. 2015), 5.5 ppm (Tatum et al. 2012), 5.7 ppm (Tsui and Chu 2004), and 5 ppm (Tsui et al. 2005). The differences in toxicities across studies may be due to the chemical formulations used, as these can vary substantially in their toxicity, and varying test conditions.

Henry et al. (1992) specifically evaluated the non-target toxicity of Rodeo applications within a wetland to five invertebrate species. In this study field samples were collected after the wetland was treated to determine if field water was toxic to invertebrates tested in the lab. No toxicity occurred. A follow-up laboratory experiment evaluated the lethal concentration of Rodeo, resulting in an LC50 range of 218 – 1216 mg/L across invertebrates species tested; Daphnia magna (daphia), Chironomus spp. (midge), Hyalella azteca (amphipod), Stagnicola elodes (pond snail), and Nephelopsis obscura (leech) (Henry et al. 1994). The California Department of Fish and Wildlife, Aquatic Toxicology Laboratory, conducted seven-day chronic toxicity tests on the water flea neonates, Ceriodaphnia dubia (CDFG 2003). The seven-day LOEC for Rodeo was 104 ppm. Pesticides with effect concentrations of >100 ppm are considered practically nontoxic according to the categories of acute toxicity of pesticides (Mischke and Avey, 2013).

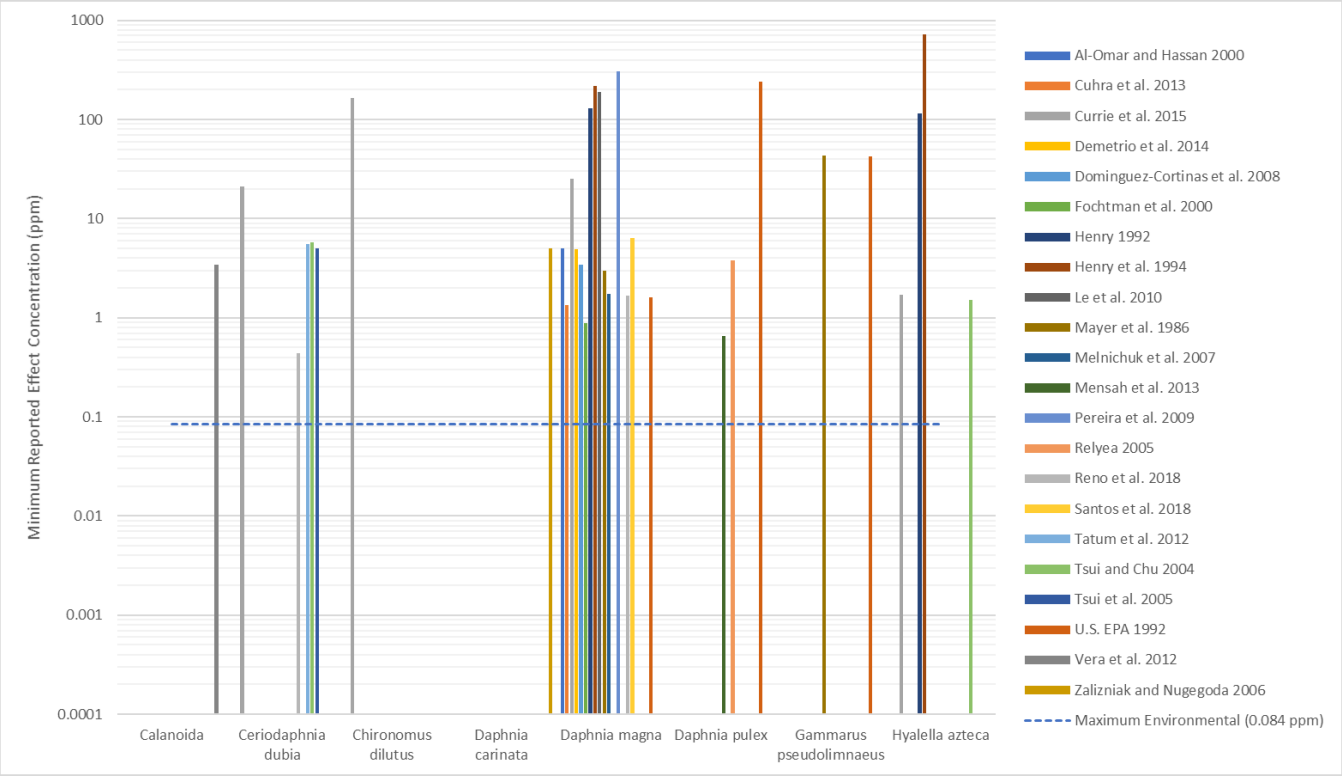


Figure 3-4. Concentrations of glyphosate that cause significant lethal or sub-lethal effects on invertebrate species relevant to the Suisun Marsh.

Glyphosate is not likely to have an adverse effect on phytoplankton, due to the minimal effect it would have on phytoplankton at water concentrations expected to result from study actions (Figure 3-5). The lowest effect concentration reported within EPA ECOTOX database is 0.05 ppm, which was the LOEC reported in a study evaluating the toxicity of eight herbicides across four phytoplankton species. Exposures of 0.05, 0.2, and 0.5 ppm of glyphosate resulted in a significant reduction in the percentage of healthy cells relative to a control in three of the four phytoplankton species. The standard measure of toxicity in phytoplankton is cell density relative to a control, so these results use an alternative and potentially more sensitive measure of phytoplankton response than the standard method.

The next most sensitive result was reported in Vendrell et al. (2009), with a 0.1 ppm reported LOEC. This study evaluated the effects of glyphosate on four microalgae species collected at Albufera Lake in Valencia (Spain). Though the LOEC was quite low, the 72-hour EC50 for the four microalgae (Scendesmus acutus, Scendesmus subspicatus, Chlorella vulgaris, and Chlorella saccharophilia) ranged from 24.5 ppm to 41.7 ppm, and the concentrations resulting in 10 percent growth inhibition ranged from 1.6 ppm to 3.0 ppm. Among the remaining 37 effect concentration values reported in the ECOTOX database, all were above the maximum expected water concentration from study actions of 0.084 ppm.

Lam et al. (2019) evaluated the effects of Roundup Custom on the diatom Thalassiosira pseudonana, an important food source for zooplankton in the San Francisco Estuary. Glyphosate inhibited growth T. pseudonana only at 70 ppm, the highest concentration tested. Interestingly, Roundup Custom significantly enhanced T. pseudonana growth by almost 50% at .7 ppm when compared to the control, and had no effect at 7 ppm.

Results from the Control Study did not indicate any negative water quality impacts near plots treated with glyphosate (Appendix C). Combining water quality data from all three treatment seasons, dissolved oxygen, chlorophyll a, and phycocyanin were not significantly different between glyphosate and control plots at either timepoint following treatments. In addition, no glyphosate was detected during any sampling events.

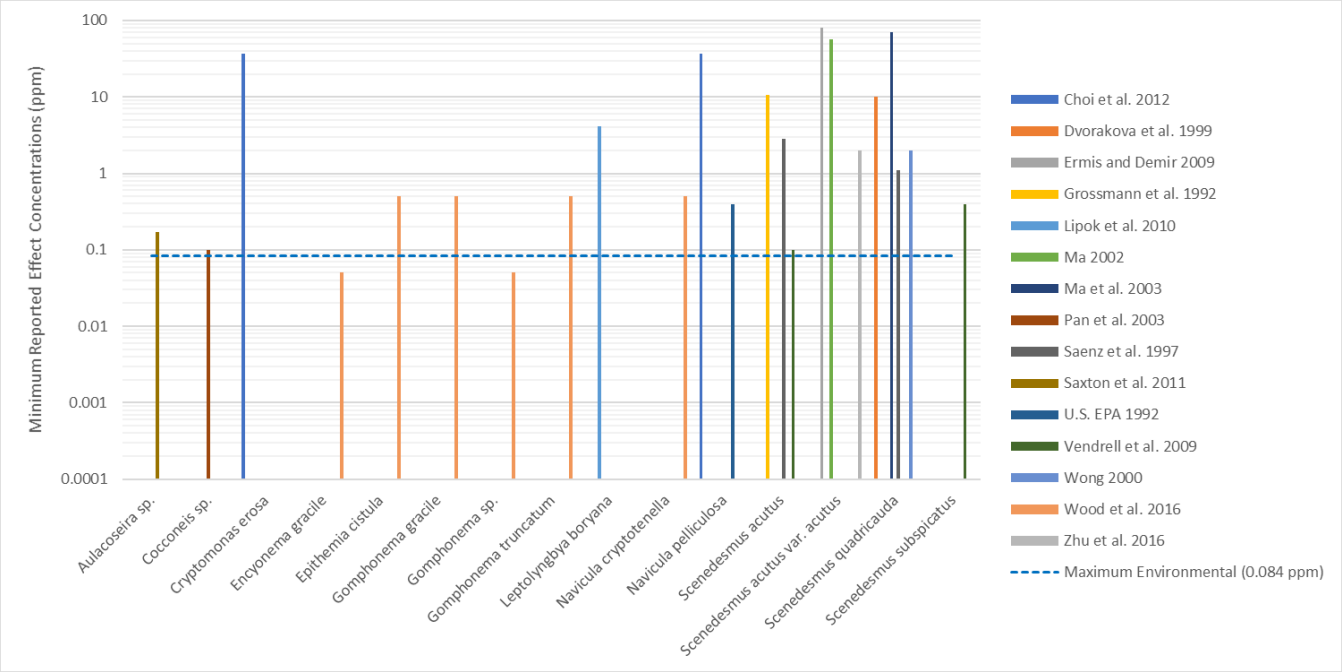


Figure 3-5. Concentrations of glyphosate that cause significant lethal or sub-lethal effects on phytoplankton species relevant to the Suisun Marsh.

3.9.2.1.2 IMAZAPYR

3.9.2.1.2.1 DELTA SMELT

The USEPA has classified imazapyr (tradename Habitat®) as "practically non-toxic" to fish and is approved as a Reduced Risk herbicide. No studies have analysed the effects of imazapyr exposure to Delta smelt. Thus, a surrogate species, Rainbow trout, is utilized in this analysis to predict the potential for adverse effects from exposure based on toxicity data from the EPA classification. Chemicals may be concentrated or partitioned from water into the tissues of fish species, referred to as bioconcentration, and cause acute and chronic adverse effects. The USEPA reviewed the data on imazapyr and confirmed that imazapyr does not bioconcentrate in fish (USEPA 2005).

A conservative and instantaneous estimate of Imazapyr concentrations in water adjacent to treatment sites is 0.017 ppm – 0.034 ppm (equivalent to 17 – 34 ppb). There is no NPDES maximum limitation for Imazapyr; however, 11.2 ppm is the designated NPDES monitoring trigger and the expected levels are far below that threshold. Of the 30 out of 196 samples taken during the 2019-2021 Study at Blacklock that did have positive detections, all were orders of magnitude below the monitoring trigger concentration, with a maximum concentration of 0.03 ppm.

Table 3-9 below, summarizes imazapyr toxicity data available for rainbow trout and Chinook salmon. Several laboratory investigations of imazapyr toxicity to fish conducted for the USEPA registration process found LC50 values of greater than 100 ppm, and in some cases greater than 1,000 ppm (SERA 2004). In an early life-stage

study in rainbow trout, a concentration of 92.4 mg a.e./L resulted in a nearly significant effect hatch and reduced fry survival (Manning 1989, as reported in Pless 2005). The EPA judged that the 92.4 mg a.e./L concentration is the LOAEC (Pless et al. 2005). Cohle and McAllister (1984) found that Rainbow trout had a LC50 at 110 mg/L at 96 hours (reported in Pless 2005). Sublethal effects of imazapyr on Chinook salmon were tested by Patten (2003). The study investigated the effects of imazapyr on osmoregulatory capacity of Chinook salmon smolts, measured as plasma sodium level and gill ATPase, and found no effect by imazapyr at concentrations up to 1.6 ppm (the highest concentration tested).

Table 3-9. Response to Imazapyr from fish. The range of maximum environmental concentrations from proposed activities is 0.017 – 0.034 ppm.

Species	Chemical	Endpoint (ppm)	Time Period	Reference
Rainbow Trout (*Oncorhynchus mykiss*)	Imazapyr	LC_{50}: 110	96 hours	Cohle and McAllister 1984
Rainbow Trout (*Oncorhynchus mykiss*)	Imazapyr	LOAEC: 92.4	62 days	Manning 1989
Chinook salmon	Imazapyr	NOEC: >1.6 ppm	24 hours	Patten 2003

Sunlight rapidly degrades aquatic solutions of imazapyr, however, in soils there is little or no photodegradation (WSSA 1994). The half-life of imazapyr due to photodegradation in aqueous solution is approximately two days (48 hours), and decreases with increasing pH (Mallipudi et al. 1991, Mangels 1991). The potential for reduced prey availability and biomagnification resulting from the proposed imazapyr application is addressed in the Delta smelt Designated Critical Habitat effects section below.

The expected exposure duration, anticipated herbicide concentrations, and the maximum concentration detected during the Study are far below the thresholds indicated to have adverse effects on the species. In addition, all detection of imazapyr during the Control Study were well below the NPDES monitoring trigger (11.2 mg/L). Of the 11 detections adjacent to plots treated with imazapyr, the average was 0.002894 mg/L and the maximum was 0.013 mg/L, both well below toxicological levels of concern for Delta Smelt outlined in this section.

3.9.2.1.2.2 SALMONIDS

The USEPA has classified imazapyr (tradename Habitat®) as "practically non-toxic" to fish and is approved as a Reduced Risk herbicide. Rainbow trout toxicity data are utilized in this analysis to predict the potential for adverse effects on salmonids from exposure based on toxicity data from the EPA classification. Chemicals may be concentrated or partitioned from water into the tissues of fish species, referred to as bioconcentration, and cause acute and chronic adverse effects. The USEPA reviewed the data on imazapyr and confirmed that imazapyr does not bioconcentrate in fish (USEPA 2005).

A conservative and instantaneous estimate of Imazapyr concentrations in water adjacent to treatment sites is 0.017 ppm – 0.034 ppm (equivalent to 17 – 34 ppb). There is no NPDES maximum limitation for Imazapyr; however, 11.2 ppm is the designated NPDES monitoring trigger and the expected levels are far below that threshold.

Several laboratory investigations of imazapyr toxicity to fish conducted for the USEPA registration process found LC_{50} values of greater than 100 ppm, and in some cases greater than 1,000 ppm (SERA 2004). Data queried from EPA's ECOTOX database show a range of lowest effect concentrations between 3.3 ppm and 110 ppm (Figure 3-6). In an early life-stage study in rainbow trout (Manning 1989), a concentration of 92.4 mg a.e./L resulted in a nearly significant effect hatch and reduced fry survival. The EPA judged that the 92.4 mg a.e./L concentration is

the LOAEC (USEPA 2005). Cohle and McAllister (1984) found that Rainbow trout had a LC_{50} at 110 mg/L at 96 hours.

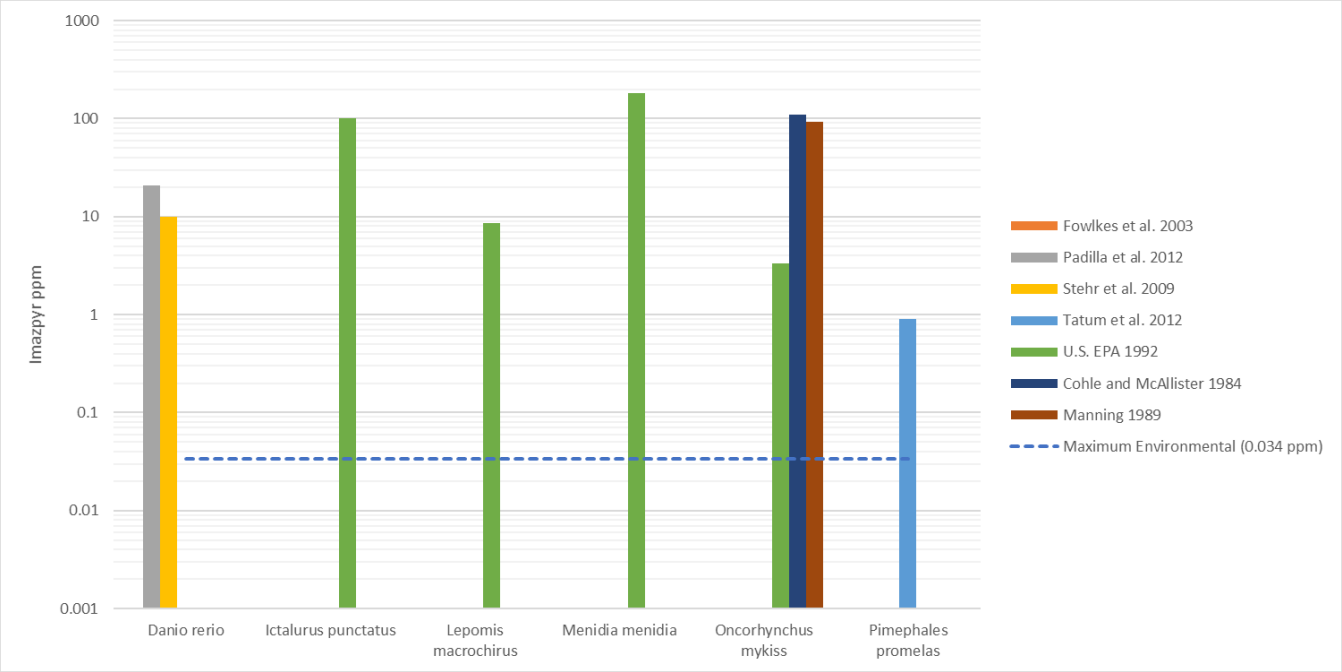


Figure 3-6. Concentrations of imazapyr that cause significant lethal or sub-lethal effects on fish species relevant to the Suisun Marsh.

Sunlight rapidly degrades aquatic solutions of imazapyr, however, in soils there is little or no photodegradation (WSSA 1994). The half-life of imazapyr due to photodegradation in aqueous solution is approximately two days (48 hours), and decreases with increasing pH (Mallipudi et al. 1991, Mangels 1991). The potential for reduced prey availability and biomagnification resulting from the proposed imazapyr application is addressed in the Designated Critical Habitat effects section below.

Both the expected exposure duration and anticipated herbicide concentrations are far below the thresholds indicated to have adverse effects on the species. In addition, all detection of imazapyr during the Control Study were well below the NPDES monitoring trigger (11.2 mg/L). Of the 11 detections adjacent to plots treated with imazapyr, the average was 0.002894 mg/L and the maximum was 0.013 mg/L, both well below toxicological levels of concern for salmonids outlined in this section.

3.9.2.1.2.3 NORTH AMERICAN GREEN STURGEON

Due to their high trophic position in the estuarine food web, sturgeon are particularly susceptible to contaminants that bioaccumulate and biomagnify, such as certain metals like selenium, and long-lasting pesticides or contaminants like PCBs. As previously noted, however, neither glyphosate nor imazapyr bioaccumulate (Siepmann 1995, Franz et al. 1997, EXTONET 1996, WI DNR 2012, WSDOT 2006, Habitat MSDS) therefore, sturgeon should not accumulate concentrations of the herbicides via their food source.

3.9.2.1.2.4 ZOOPLANKTON AND PHYTOPLANKTON TROPHIC SOURCES FOR FISH

Imazapyr is not expected to affect macroinvertebrate communities, as aquatic invertebrates are no more sensitive to imazapyr than fish (SERA 2004). The EPA ECOTOX database cites Fowlkes et al. (2003) with an LOEC concentration of 2.1 ppm on the midge, Procladius sp., however the publication itself reports no statistically significant effect on the macroinvertebrate community, including taxa richness and abundance up to 100 times the expected application rate, equivalent to 18.4 ppm (Fowlkes et al. 2003). The most sensitive result reported in the ECOTOX database (depicted in Figure 3-7) is 0.91 ppm, which was the concentration of imazapyr within a complex mixture, containing Accord Concentrate (glyphosate), Arsenal AC (imazapyr), Chopper (imazapyr), Escort (metsulfuron methyl), Oust XP (sulfometuron methyl), and Velpar L (hexazinone), and resulted in lethal effects on Ceriodaphnia dubia. Because this study only evaluated mixtures, it is difficult to discern what the contributing effect of the imazapyr content had on the daphnia. Tatum et al. (2012) conclude from their findings that:

"neither acute toxicity nor enhanced acute aquatic toxicity due to synergistic mixture effects appears to be a significant concern for applications of the herbicide mixtures most commonly used in forestry."

The remaining lethal concentrations reported in the ECOTOX database range from 6.6 ppm to 750 ppm. These values far exceed the maximum concentration of 0.034 ppm that could occur in 1-meter depth of water, assuming 20% overspray, indicating that there will be no direct effect on aquatic invertebrates.

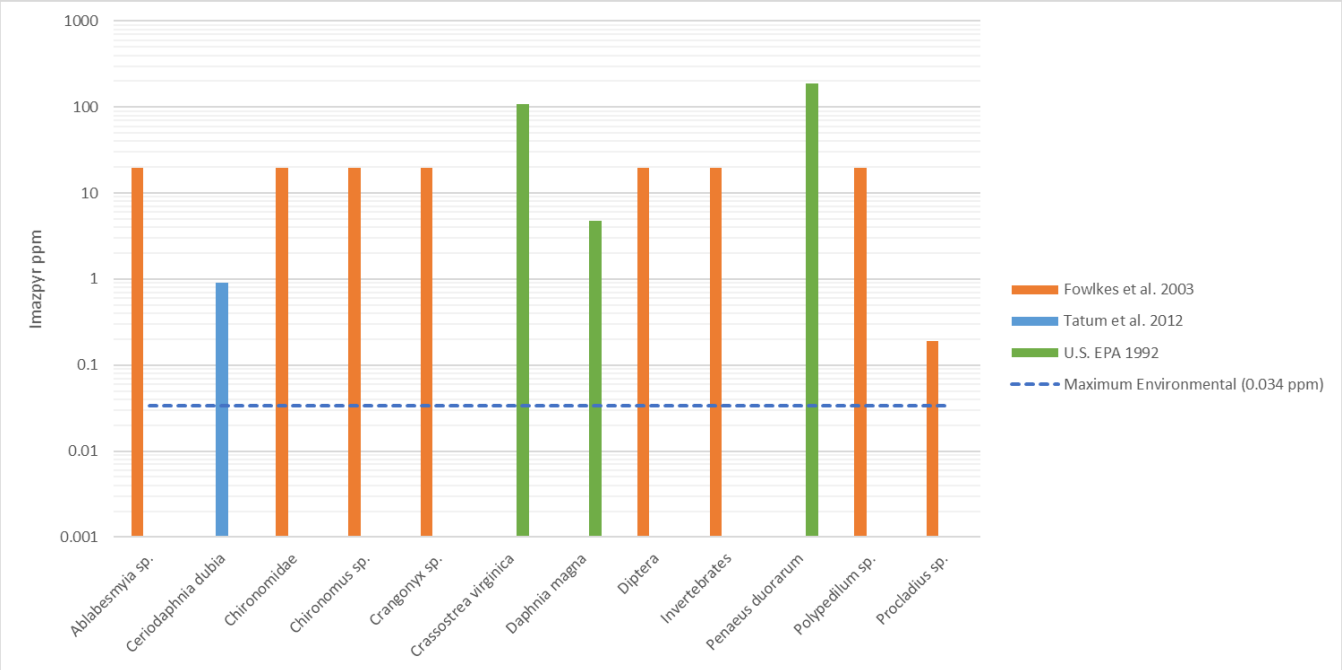


Figure 3-7. Concentrations of imazapyr that cause significant lethal or sub-lethal effects on invertebrate species relevant to the Suisun Marsh.

Imazapyr is not likely to have an adverse effect on phytoplankton, due to the minimal toxicity at water concentrations expected to result from study actions (Figure 3-8). Minimal data is available for the toxicity of imazapyr to phytoplankton species, except as reported by US EPA (1992) and in a dissertation thesis by Doherty et al. (1997), that evaluated the biochemical toxicology of herbicide mixtures on Thalassiosira weisflogii. US EPA (1992) indicates one species, Skeletonema costatum, is sensitive to imazapyr at the maximum predicted

environmental concentration. The remaining four species for which data were available are not sensitive to imazapyr at the predicted environmental concentration of 0.034 ppm (Figure 3-8). Some additional toxicity data is available in the registration data for imazapyr (SERA 2004), indicating the most sensitive species of algae tested was a unicellular green algae (Chlorella emersonii) with an EC50 of about 0.2 ppm for growth. Notably, some algal species are stimulated rather than inhibited by imazapyr concentrations of up to 100 mg/L (Hughes 1987 in SERA 2004). Results from the Control Study did not indicate any negative water quality impacts near plots treated with imazapyr (Appendix II). Combining water quality data from all three treatment seasons, dissolved oxygen, chlorophyll a, and phycocyanin were not significantly different between imazapyr and control plots at either timepoint following treatments. In addition, all detection of imazapyr were well below the NPDES monitoring trigger (11.2 mg/L). Of the 11 detections adjacent to plots treated with imazapyr, the average was 0.002894 mg/L and the maximum was 0.013 mg/L, both below toxicological levels of concern described in this section. Any effect on phytoplankton primary productivity would be temporary in nature, as the concentrations of herbicide would dilute over time with tidal flows, adsorb to sediment, and undergo natural degradation. Any impacts would thus be temporary and narrow in extent among phytoplankton species, and therefore insignificant.

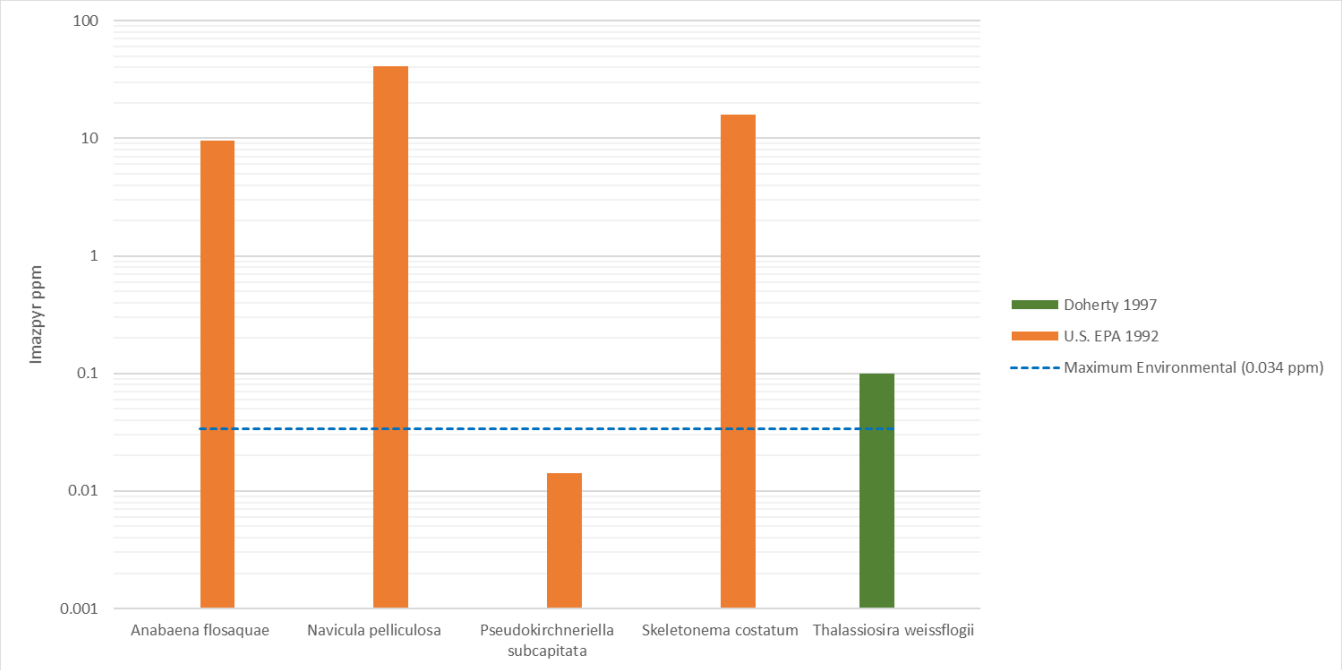


Figure 3-8. Concentrations of imazapyr that cause significant lethal or sub-lethal effects on phytoplankton species relevant to the Suisun Marsh.

3.9.2.1.3 AGRIDEX, COMPETITOR, LI 700, AND LIBERATE

3.9.2.1.3.1 DELTA SMELT

If an individual Delta smelt is exposed to Agridex, Competitor, LI 700, or Liberate, a conservative and instantaneous estimate of concentrations in water adjacent to treatment sites ranges between 0.000125 ppm – 0.001 ppm (equivalent to 0.125 ppb – 1.0 ppb).

For Agridex, Stillway et al. (2017) determined Agridex had no effect on Delta smelt embryo hatching success, though condition factor of hatched larvae from exposed embryos was decreased at an LOEC of 0.113 ppm (Stillway et al. 2017). Agridex caused significant mortality of Delta smelt larvae exposed at 41 ppm, a reduction in larval yolk sac perimeter at 0.113 ppm, and a decrease in larval condition factor at 6.4 ppm (Stillway et al.

2017). Competitor was found to have no significant effects on Delta smelt embryo survival, hatching success, or larval mortality (Stillway et al. 2017). LC50 values for Competitor range from 35.55 ppm for larval Delta smelt. Though significant sublethal effects occur from embryo or larval exposures of Agridex, Delta smelt will be in their sub-adult to adult life stage during the months in which herbicides are applied under the proposed study. There are no toxicity data for exposures to sub-adult or adult Delta smelt, however unpublished data summarized in a report entitled Use of the Registered Aquatic Herbicide Fluridone (SONAR) and the Use of the Registered Aquatic Herbicide Glyphosate (Rodeo and Accord) in the State of New York, prepared by McLaren/Hart for DowElanco and Monsanto (McLaren/Hart 1995) and reported in SERA 1997 report on exposures with Agridex and LI-700 to juvenile Bluegill sunfish and Rainbow trout. Agridex did not cause 50% mortality in either juvenile fish species up to the highest concentration tested of 1000 ppm. The LC50s for LI-700 were 130 ppm and 210 ppm for Rainbow trout and Bluegill sunfish, respectively (Table 3-10). The LC50 for Liberate for Rainbow trout was 17.6 ppm.

Table 3-10. Response of Delta Smelt to Adjuvants. The range of maximum environmental concentrations from proposed activities is 0.000125 – 0.001 ppm.

Species	Chemical	Endpoint (ppm)	Time Period	Reference
Delta Smelt, early life stages	Agridex	Condition factor LOEC: 0.113 – 6.4; Significant mortality at 41	96 hours	Stillway et al. 2017
Delta Smelt, early life stages	Competitor	C_{50} >35.55	96 hours & 8 days	Stillway et al. 2017
Bluegill sunfish	Agridex	C_{50} > 1000	96 hours	SERA 1997
Bluegill sunfish	LI 700	C_{50}: 210	96 hours	SERA 1997
Rainbow trout	Agridex	C_{50} > 1000	96 hours	SERA 1997
Rainbow trout	LI 700	C_{50}: 130	96 hours	SERA 1997
Rainbow trout	Liberate	C_{50}: 17.6	96 hours	MSDS, 2017

3.9.2.1.3.2 SALMONIDS

There has been relatively little research on the toxic effects of adjuvants. Nonylphenol ethoxylate (NPE) surfactants are more toxic to aquatic species than most aquatic pesticides, and may also cause endocrine disruption. As a result, this proposed project does not use NPE adjuvants (such as R-11).

If an individual salmonid is exposed to Agridex, Competitor, LI 700, or Liberate, a conservative and instantaneous estimate of concentrations in water adjacent to treatment sites ranges between 0.000125 ppm – 0.001 ppm (equivalent to 0.125 ppb – 1.0 ppb).

Effect concentrations relevant to salmonids are provided below (Table 3-11). Unpublished data summarized in a report entitled Use of the Registered Aquatic Herbicide Fluridone (SONAR) and the Use of the Registered Aquatic Herbicide Glyphosate (Rodeo and Accord) in the State of New York, prepared by McLaren/Hart for DowElanco and Monsanto (McLaren/Hart 1995) and reported in SERA 1997 report on exposures with Agridex and LI-700 to juvenile Bluegill sunfish and Rainbow trout. Agridex did not cause 50% mortality in either juvenile fish species up to the highest concentration tested of 1000 ppm. The LC50s for LI-700 were 130 ppm and 210

ppm for Rainbow trout and Bluegill sunfish, respectively (SERA 1997). Competitor has a Rainbow trout LC50 of 95 ppm (WSDA 2005).

Table 3-11. Response of salmonids to Adjuvants. The range of maximum environmental concentrations from proposed activities is 0.000125 – 0.001 ppm.

Species	Chemical	Endpoint (ppm)	Time Period	Reference
Bluegill sunfish	Agridex	LC_{50} > 1000	96 hours	SERA 1997
Bluegill sunfish	LI 700	LC_{50}: 210	96 hours	SERA 1997
Rainbow trout	Agridex	LC_{50} > 1000	96 hours	SERA 1997
Rainbow trout	LI 700	LC_{50}: 130	96 hours	SERA 1997
Rainbow trout	Competitor	LC_{50}: 95	96 hours	WSDA 2005
Rainbow trout	Liberate	LC_{50}: 17.6	96 hours	MSDS, 2017

3.9.2.1.3.3 NORTH AMERICAN GREEN STURGEON

As previously noted, the calculated maximum instantaneous concentrations of adjuvants (Agridex, Competitor, Liberate, and LI 700) are far below the toxic range of concentrations to sturgeon. Any potential adverse effects are avoided or minimized by 1) targeting the upper unwetted portion of the Phragmites stand, 2) spraying at low tide and not directly over water, and 3) conforming to wind speed restrictions, in addition to adherence to all Conservation Measures. Due to the expected low exposure concentrations and short half-life of herbicides, along with the proposed conservation measures, any potential adverse effects from herbicide application are discountable and insignificant.

3.9.2.1.3.4 ZOOPLANKTON AND PHYTOPLANKTON TROPHIC SOURCES FOR FISH

A conservative and instantaneous estimate of Agridex, Competitor, LI-700, and Liberate concentrations in water adjacent to treatment sites ranges between 0.000125 ppm and 0.001 ppm (equivalent to 0.125 ppb – 1.0 ppb). As shown in Table 3-12, below, concentrations that are lethal to Daphnia species are above the maximum concentrations tested for Agridex and Competitor, 1000 ppm and 100 ppm, respectively (WSDA 2005). The LC50 for LI-700 and Liberate are 170 ppm and 9.3 ppm, respectively. A 2020 study by Stillway and Teh found that the diatom Thalassiosira pseudonana had a 50% inhibition concentration (IC50) to Agridex at 38.5 ppm, and that the copepod Eurytemora affinis had a 50% effect concentration (EC50) to Agridex at 45.4 ppm.

Table 3-12. Lethal concentrations of Agridex, Competitor, LI-700, and Liberate inducing responses in aquatic invertebrate species. The range of maximum environmental concentrations from proposed activities is 0.000125 – 0.001 ppm.

Species	Chemical	LC_{50}	Time Period	Reference
Daphnia magna	Agridex	>1,000 ppm	48-hr	WSDA 2005
Daphnia magna	Competitor	>100 ppm	48-hr	WSDA 2005
Daphnia spp.	LI-700	170 ppm	48-hr	WSDA 2004
Daphnia magna	LI-700	190 ppm	48-hr	MSDS, 2015
Daphnia magna	Liberate	9.3 ppm	48-hr	MSDS, 2017

Data is scarce on the toxicity of adjuvants to phytoplankton. An analysis by the U.S. Forest Service (2007) found a single study evaluating surfactant effects on algae, by Lewis and Hamm (1987). This study compared the toxicity of various surfactant ingredients that occur in some adjuvant products. Endpoints measured were photosynthesis and growth of freshwater algae. For in situ depression of photosynthesis, the 3-hour EC50 values were 28.7 mg/L for octylphenoxypolyethoxyethanol and 2.1 mg/L for alkylethoxyethanol. The mean 96-hour EC50 values for growth depression in laboratory cultures of green algae (Selenastrum capricornutum), blue-green algae (Microcystis aeruginosa) and diatoms (Naviculla pelliculosa) were 0.21 mg/L for octylphenoxypolyethoxyethanol and 0.09 mg/L for alkylethoxyethanol. Though these specific surfactants are not ingredients within the adjuvants we will use in the proposed action, results provide some evidence that surfactants have low toxicity to freshwater algae. Effect concentrations are orders of magnitude above concentrations expected from proposed activities (between 0.000125 ppm and 0.001 ppm).

3.9.2.2 HANDHELD VEGETATION REMOVAL TOOLS AND AMPHIBIOUS VEHICLE FOR SPRAYING

Phragmites will be removed using handheld vegetation removal tools. The amphibious vehicle will be used to apply herbicide over the top of the plant. The amphibious vehicle will use the shortest route possible traveling between treatment areas in order to minimize disturbance.

The use of the amphibious vehicle and handheld vegetation removal tools is not likely to have adverse effects on fish. As stated in the Conservation Measures, the blades of the handheld vegetation removal tools will only operate once in contact with the emergent vegetation on the mudflat of the site. No handheld vegetation removal tools will be used in-water. If fish are present, they would be expected to move in and out of the restoration site with the tidal cycle. Thus, the species is not expected to be exposed to stressors resulting from the amphibious vehicle.

Increased water turbidity from sediment disturbance will occur within the designated plots where handheld vegetation removal tools will be used; however, because actions will occur at low tide when the mudflat is minimally inundated, there will be little overlying water to be impacted, and sediment is anticipated to be settled again by the time the area is rewetted. In addition, personnel equipped with handheld weed trimmers will be transported by jon boat between treatment areas. If the turbid water increases the turbidity of an adjacent slough, some fish species may benefit, as Delta smelt are also typically associated with turbid conditions (Feyrer et al. 2007, Nobriga et al. 2008).

3.9.2.3 SUMMARY OF THE PROPOSED PROJECT'S EFFECT ON FISH

The SMP EIS/EIR analyzed the short-term and temporary impacts of restoration-related changes on fish communities. This section expands on those discussions to present a more specific analysis of invasive vegetation control methods on listed and special-status fish.

Overall, herbicides and adjuvants are not likely to result in direct acute, chronic, or sub-chronic toxic effects to fish based on treatment application rates, and short temporal and spatial aspects of treatment. Monitoring, via water samples and drone aerial imagery, is not anticipated to affect fish, since the activities will not result in exposure of stressors to the species. In addition, implementation of the proposed action is expected to have long-term beneficial effects, by enhancing tidal marsh habitat for native fish by reducing invasive species. Only herbicides labeled for aquatic use would be applied in tidal areas. In addition, herbicides in tidal areas would be

applied in accordance with the General NPDES Permit for Residual Aquatic Pesticide Discharges for Algae and Aquatic Weed Control Applications (Order No. 2013-0002-DWQ, NPDES No. CAG990005). With implementation of the proposed BMPs, impacts on fish resulting from invasive vegetation management would be less than significant.

Reports indicate that neither glyphosate or imazapyr are likely to bioaccumulate in aquatic species. Water sampling will occur immediately prior to and after herbicides are applied, as well as over time, to determine the actual concentrations of each chemical in water resulting from study actions. Results from this site-wide implementation of Phragmites control will be used to inform invasive species management at other sites, and therefore will have long-lasting benefits to native fish by improving their habitat.

Some sediment disturbance will occur within the designated areas where handheld vegetation removal tools will be used, however because actions will occur at low tide when the mudflat is minimally inundated, there will be little overlying water to be impacted by the disturbance, and sediment will likely be settled again by the time the area is rewetted.

There will be no loss of habitat as a result of study activities, and the proposed project is expected to be an overall benefit to native fish habitat by reducing invasive species. Since stressors resulting from the proposed study would be minor, temporary, intermittent (10 days per year of study activities utilizing the UAV herbicide applicator), and restricted to a single site, any effects to native fish are anticipated to be insignificant and discountable. In addition, implementation of the proposed action is expected to have a long-term positive effect, by enhancing tidal marsh habitat. Therefore, water quality-related effects on fish from restoration enhancement activities on fish survival, growth, movement, or reproduction would be minimal, and may have an overall beneficial effect for special-status fish species. These effects would be within the scope of the impacts identified in the SMP EIS/EIR and therefore would be less than significant. Compliance with water quality standards and implementation of the following project-specific BMPs, as well as the BMPs in Section 3.5 Water Quality, would ensure water quality impacts on fish resulting from proposed activities would be less than significant:

Project-specific BMPs

1. Herbicide concentrations will be monitored prior to herbicide application, within 24-hours before applications occur, as well as during high slack tide within one week following herbicide application, with a goal to quantify overspray or herbicide runoff. If herbicide concentrations fall above the National Pollutant Discharge Elimination System (NPDES) maximum limit of 700 parts per billion (ppb) for glyphosate or the 11.2 parts per million (ppm) monitoring trigger for imazapyr, then the Service will be notified.
2. Water quality parameters will be monitored in concert with water sample collection. Primary productivity in receiving waters will be measured as chlorophyll-a via handheld YSI.
3. Electrical conductivity, temperature, dissolved oxygen, turbidity, and pH have been measured periodically at the site throughout the Control Study. All of these parameters will be measured directly prior to and directly after herbicide application at the site. If any of these parameters measured post-action vary significantly from the range of background measurements (by 50% or greater), the Service will be notified. All water quality monitoring results will be documented and available upon Service request.

3.10 RECREATIONAL RESOURCES

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

Suisun Marsh's proximity to major urban areas makes the Marsh accessible to many recreational enthusiasts. Duck hunting is the major recreational activity in the Marsh occurring from late October until January. Fishing accounts for nearly as much recreational use in the Marsh as duck hunting. In addition, several other forms of recreation such as water sports, upland game hunting, hiking, and wildlife observation are popular in the Marsh. Much of the recreation associated with Suisun Marsh is water-dependent (boating and fishing) or water-enhanced (picnicking, hiking, hunting, and scenic/wildlife viewing). Most of the Marsh is navigable by small boats, and some channels, such as Montezuma and Suisun Sloughs, are navigable by much larger boats. A major navigation channel, the Suisun Bay channel, connects to the Carquinez Strait. Ability to navigate or access smaller channels and outer edges of the bay is influenced by the tides and type of watercraft used.

Currently, the Blacklock restoration site has no public access and cannot be accessed directly by vehicle. Vehicular access to an adjacent site (Arnold Restoration Site) requires driving through private property. DWR has an easement to access the site for scientific or management purposes, but this easement is not for public access. A private boat launch is located along Denverton Slough, north of the restoration site. Little Honker Bay and the adjacent sloughs are used year-around for boating and fishing. However, several "No Trespassing" signs have been installed along the exterior levee to discourage the public from accessing the site by boat.

The Proposed Action is not anticipated to impact recreation activities, since Blacklock is not publicly accessible and overspray or drift to adjacent sloughs is not anticipated. The Proposed Action will not preclude the use of surrounding water ways for recreation. Any disturbance from noise (see Noise section above) produced from the Proposed Action activities is expected to be short in duration and will attenuate to acceptable levels upon reaching publicly accessible areas.

Implementing the following environmental commitments identified in the SMP EIS/EIR (described in Appendix A of this addendum) would ensure no adverse impacts:

- EC-7: Recreation Best Management Practices

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

3.11 VEGETATION AND WETLANDS

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

Proposed activities that could affect vegetation consist primarily of herbicide treatment. The potential effects of the Proposed Project on vegetation and wetland resources would be consistent with the impacts that were evaluated in the SMP EIS/EIR (Table 3-13). Furthermore, the Proposed Project would minimize the impacts on special-status plant species and invasive plant cover while creating habitat for native plants to colonize. These

activities would not introduce any new impacts and would not increase the severity of the previously documented impacts.

Table 3-13 Impacts on Vegetation and Wetland Resources Considered in the SMP EIS/EIR

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

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

- Hispid bird's-beak (*Chloropyron molle* ssp. *hispidum*) (formerly *Cordylanthus mollis* ssp. *hispidus*)
- Suisun thistle (*Cirsium hydrophilium* var. *hydrophilium*)
- Suisun Marsh aster (*Symphyotrichum lentum*)
- Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*)
- Mason's lilaeopsis (*Lilaeopsis masonii*)
- Delta mudwort (*Limosella subulata*) (synonym: *Limosella australis*)

The conclusion in the SMP EIS/EIR was based on information in the California Natural Diversity Database and the USFWS and California Native Plant Society databases, as well as past special-status plant surveys that were conducted in the region; however, no special-status plant surveys were conducted specifically for the SMP EIS/EIR. To assess potential impacts on special-status plant populations from the Proposed Project, special-status plant surveys in the project area were conducted by a team of DWR biologists on May 19 and June 6, 2021. Common plant species growing at the restoration site include the following: tules (Schoenoplectus [Scirpus] acutus, S. californicus), California rose (Rosa californica), cattails (Typha latifolia, T. angustifolia), wild radish (Raphanus sativus), blackberry (Rubus discolor), saltgrass (Distichlis spicata). The surveys documented three special-status plant species in the project area: Mason's lilaeopsis (Lilaeopsis masonii), Delta tule pea (Lathyrus jepsonii var. jepsonii), and dwarf spikerush (Eleocharis parvula) at the restoration site. While native vegetation has expanded, the growth of the invasive plant Phragmites australis is has been exceeding it, at more than double the rate of tule expansion.

Special status plants with the potential to occur within Blacklock are primarily limited to shallow water from 1-foot in depth to perennially moist soils. Drift of herbicides could affect sensitive plant species in nearby habitats, however implementation of relevant BMPs would identify special-status plants prior to disturbance and avoid or

minimize adverse consequences. These include measures to avoid and minimize off target spray, drift and effects to water quality from herbicide application.

In the long-term, controlling the monoculture of invasive Phragmites on Blacklock may indirectly benefit special-status plant species which currently exist in and around surrounding waterways, by freeing-up suitable habitat in the interior of the island.

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

Vegetation sampling at the project site in 2022 observed native plant (tule, cattails, and spikerush) recruitment into several of the Control Study treatment plots, including those treated with imazapyr, tank mix, glyphosate, and mowing (Figure 3-9). Native recruitment indicates that revegetation will likely be successful and that residual herbicide effects do not prevent regrowth and recruitment within treatment areas. Native vegetation was present in all 20 of the treatment plots with varying cover during the 2022 surveys, and was not present in 2019 when the Control Study began, indicating that it recruited into the plot following phragmites treatment.

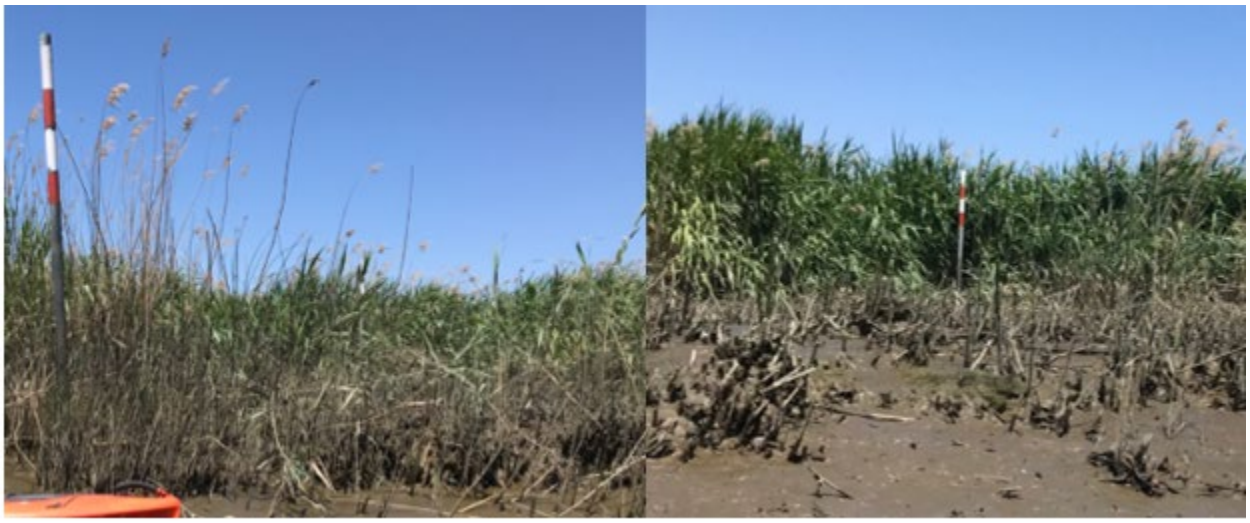
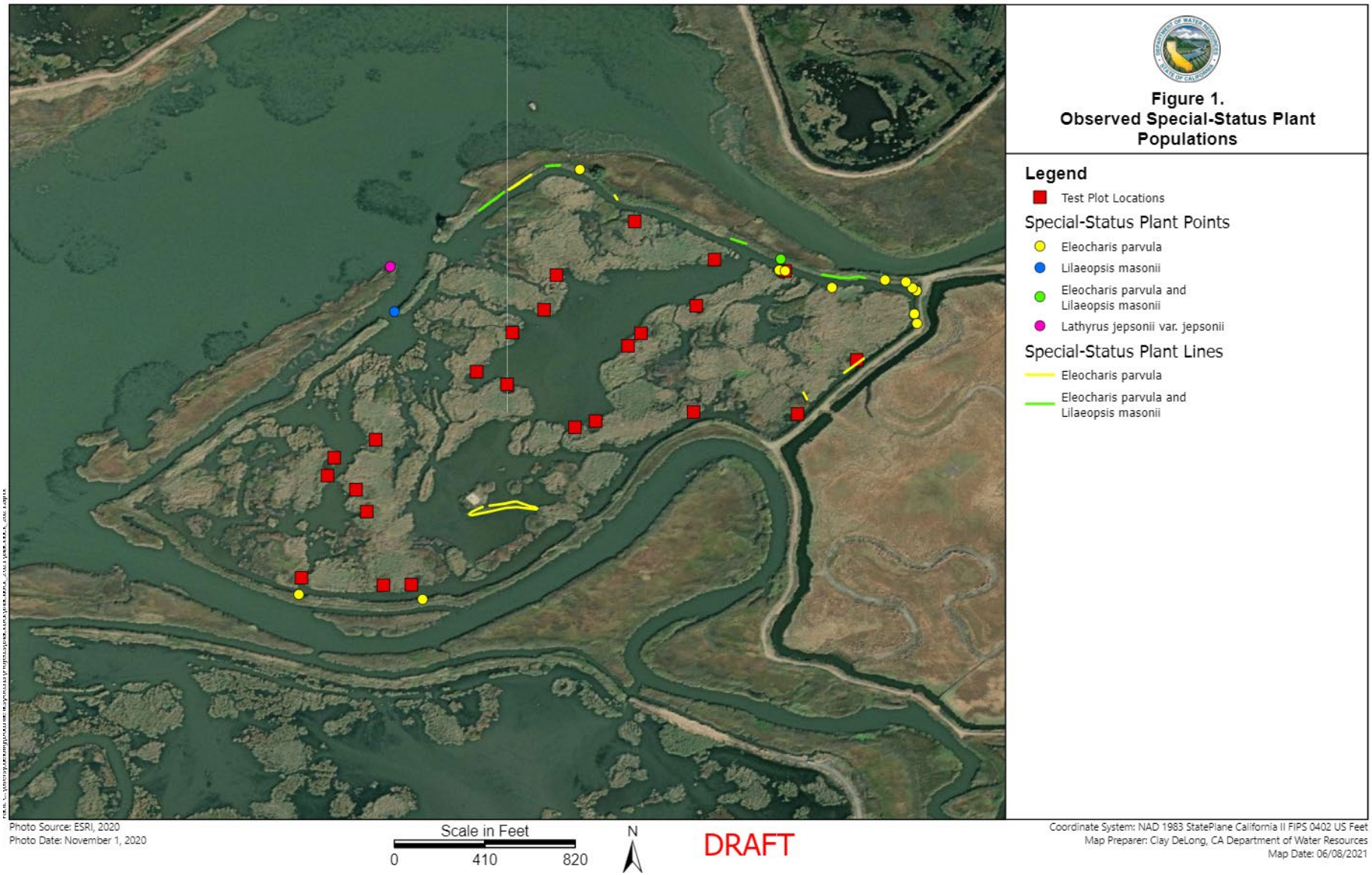


Figure 3-9. Tule (left) and spikerush (right) recruitment in two Control Study treatment plots. Photos taken May 2021.

Implementation of the Proposed Project would not result in the conversion of any wetland habitat to other habitat types and all existing tidal wetlands would remain unchanged. Because no habitat conversion would take place, impact to wetlands by the Proposed Project is less significant that the impact analyzed and presented in the SMP EIS/EIR for vegetation and wetlands (see Table 6.2-1 of the SMP EIS/EIR).

Implementation of the Proposed Project may affect, but is not likely to affect population of Mason's lilaeopsis at the project site due to detecting and buffering around all populations within the treatment area. In addition, phragmites treatment creates habitat for special status plants, as observed by the recruitment of *Eleocharis parvula* into a majority of the treatment plots during the 2022 vegetation surveys following the Control Study. Therefore, impacts on special-status plants resulting from implementation of the Proposed Project would be less than significant.



Source: Compiled by DWR 2020

Figure 3-10. Special-Status Plants Documented in the Project Area

The SMP EIS/EIR developed criteria for determining significant impacts on biological resources by reviewing the State CEQA Guidelines, concluding that the SMP likely would result in a significant impact if any of the following criteria were met:

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

DWR would adhere to the following project-specific BMPs to avoid effects on protected species to the greatest extent feasible:

Project-specific BMPs

1. Herbicide applications will occur by an authorized and certified aquatic pest control applicator with experience in the Bay-Delta.
2. Herbicides will be applied using precision foliar spray methods from a backpack sprayer; a spray rig attached to a truck, boat, or all-terrain vehicle; or a drone-mounted sprayer, depending on patch size and accessibility. Herbicide label recommendations will be followed regarding tank mixture, application rate, and spray nozzle adjustments; to minimize overspray, spray nozzles will be adjusted to the coarsest setting possible while maintaining efficacy.
3. Herbicide treatment will not occur when wind speeds are greater than 10 miles per hour.
4. All herbicide applications will occur during low tide, to maximize plant coverage, and the non-wetted portion of the plant will be targeted to minimize water contamination.
5. A water-safe dye will be added to the pesticide formulations to enhance the precision and evenness of pesticide applications.
6. A special status plant survey will be conducted in June prior to the first year of treatments by DWR botanists. Special status plants will be flagged and pointed out to the contractor and workers for avoidance. Herbicide treatment by UAV will not occur within a 100-foot radius of *Mason's lilaeopsis* detections. Spot treatments using backpack sprayers and handheld vegetation removal tools will be used in areas withing this 100-foot buffer. The next survey will be conducted after project activities are initiated in the spring before the second year of treatments and each subsequent year, during correct blooming season for special status plant species with the potential to occur within Blacklock.
7. Disturbance to vegetated areas will be minimized to the extent feasible with the exception of the sections of *Phragmites* targeted for treatment.

If surveys identify special status plant species to be directly or indirectly affected by the project, the treatment will be adjusted to avoid impacts

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

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

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

3.12 WILDLIFE

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

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

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

- Swainson's hawk (*Buteo swainsoni*)
- tricolored blackbird (*Agelaius tricolor*)
- white-tailed kite (*Elanus leucurus*)

The Proposed Project would involve enhancement of tidal wetlands, environmental commitments, and adaptive management. Invasive *Phragmites australis* cover would be reduced through herbicide application, facilitating restoration of native vegetation by passive recruitment and revegetation. These actions would contribute to the recovery of special-status wildlife species that occur or have the potential to occur on the Blacklock Restoration site.

3.12.1 EFFECTS TO NESTING BIRDS

As described in the SMP EIS/EIR, implementing the Proposed Project could adversely affect wildlife resources. The proposed project could result in disturbance to nesting special-status and migratory birds at the site. Ongoing surveys by CDFW and USGS have not detected California clapper rails or California least tern in close vicinity to Blacklock, therefore, it is not likely these special-status species forage, nest, or reside on site. Still, potential exists for rails or terns to pass over the site during migration or while searching for suitable habitat.

Individual birds are not expected to be killed as a result of project actions, but individuals may be disturbed, and their normal behaviors disrupted by their encounter with equipment used during project implementation. From the time Phragmites is cleared from marsh areas and until vegetation becomes fully reestablished those cleared areas may serve as a predator corridor, potentially increasing predator access to the marsh and potentially a depredation threat to rails, if present. Drones in the air may distract or disturb rails in flight, or otherwise disturb them from their normal flight or foraging behavior

Project activities, including vegetation removal, presence of personnel, and operation of equipment, may injure individual adults or nestlings, reduce the prey base, or cause abandonment of active nests. Herbicides applications will occur outside of the breeding season for rails, between September and December, therefore the project will not affect breeding activity in the unlikely event of rails using the restoration site for breeding or nesting. If herbicide application needs to occur within the breeding season in any year of the project, then rail surveys will be conducted prior to project activities to determine rail locations and territories so that they can be avoided. Project actions will occur during work windows, or nesting bird surveys will occur prior to project activities, in order to avoid nesting birds, therefore chemical exposure would only occur in the form of dietary intake. Herbicides and adjuvants used for this project do not bioaccumulate or persist, therefore dietary consumption is not anticipated. Although the use of herbicides is not addressed in the SMP EIS/EIR, DWR would adhere to the following project-specific BMPs to avoid effects on nesting bird species to the greatest extent feasible:

Project-specific BMPs

1. To avoid or minimize the loss of individual Ridgeway's rails, activities within or adjacent to rail habitat will not occur within 2 hours before or after extreme high tides (6.5 ft or above, as measured at the Golden Gate Bridge), when the marsh plain is inundated, because protective cover for rails is limited and activities could prevent them from reaching available cover.
2. To minimize or avoid the loss of individual Ridgeway's rails, activities within or adjacent to tidal marsh areas will be avoided during the rail breeding season from February 1 through August 31 each year, unless

surveys are conducted to determine rail locations and territories can be avoided. Surveys will be conducted as described in the Service's June 2015 California Clapper Rail Survey Protocol (and/or another Service-approved protocol).

3. If breeding Ridgeway's rails are determined to be present, activities will not occur within 700 ft of an identified calling center. If the intervening distance across a major slough channel or across a substantial barrier between the Ridgeway's rail calling center and any activity area is greater than 200 ft, it may proceed at that location within the breeding season.
4. A USFWS-approved biologist will be on site during study activities occurring in wetlands. The biologist will document compliance with this biological opinion, including conservation measures. The biologist will have the authority to stop proposed action activities to comply with the conservation measures.
5. Only inspection, surveys, and monitoring activities will be performed within 2 hours before or after extreme high tides or during the Ridgeway's rails breeding season in areas within or adjacent to Ridgeway's rail breeding habitat with approval of the Service under the supervision of a qualified biologist.
6. California least tern nests during the California least tern breeding season, April 15 to August 15, will be fully avoided by the proposed action, since there is no suitable nesting substrate is located within the work areas. Surveys will be conducted to confirm the efficacy of this avoidance measure.
7. Western snowy plover nests during the western snowy plover breeding season, March through September, will be fully avoided by the proposed action since there no suitable nesting substrate is located within the work areas. Surveys will be conducted to confirm the efficacy of this avoidance measure.

3.12.2 EFFECTS TO SALT MARSH HARVEST MOUSE

Salt Marsh Harvest Mouse (SMHM) habitat within the Blacklock site is of low quality, however suitable habitat does exist on remnant levees and mice can utilize Phragmites stands; therefore, SMHM may be present within the restoration site. Relevant BMPs will be taken to reduce negative impacts to mice due to project activities. Vehicles will drive at speeds 15 mph or less on ingress and egress routes to access the site and all drivers will be advised to look out for mice that may occur on roadways. It is not possible for ground nesting to occur, because the site is tidally inundated. Vegetation waste (removed clippings) will be removed from all areas (driving roads, action area, or anywhere else that vegetation could be stepped on) following the use of handheld vegetation removal tools. Based on salt marsh harvest mouse (SMHM) expert advice, exclusion fencing would not likely be practical or effective at keeping SMHM out of the work area in a tidal wetland (Laureen Thompson, personal communication, February 2019), therefore will not be used in this project. Rather, all project activities will take place one hour after sunrise to one hour before sunset. This time period is when mice are the least active and thus are unlikely to be moving through the area. Disturbance to wetland vegetation outside of the treatment sections will be avoided to the extent feasible in order to reduce potential impacts on SMHM. A biologist will be present to ensure harm is not done to mice that could occur on site during project activities. Suitable adjacent levee areas will continue to provide habitat for SMHM during the project. DWR would adhere to the following project-specific BMPs to avoid effects on SMHM to the greatest extent feasible:

Project-specific BMPs:

1. All proposed activities will take place one hour after sunrise to one hour before sunset, when mice are least likely to be moving through the work areas.
2. Disturbance to wetland vegetation outside of the treatment areas will be avoided to the extent feasible to reduce potential impacts on salt marsh harvest mice. The biological monitor will be on-site to monitor all wetland vegetation removal and herbicide application activities.

3. Work will be scheduled to avoid extreme high tides when there is potential for salt marsh harvest mouse to move higher in the vegetation. All equipment will be staged on existing roadways away from the study site when not in use.
4. If a suspected salt marsh harvest mouse is discovered, proposed activities will cease in the immediate vicinity of the individual until the individual has been allowed to leave the area where work is occurring.
5. A USFWS-approved biologist will be onsite during proposed action activities occurring in wetlands. The biologist will document compliance with this biological opinion, including conservation measures. The biologist will have the authority to stop all activities to comply with the conservation measures.

3.12.3 SUMMARY OF WILDLIFE EFFECTS

A reduction on phragmites cover would increase habitat availability and suitability for special-status and other native wildlife species that depend on tidal wetland habitat and resources. This would result in an overall benefit to wildlife and meet the restoration goals of the SMP. Herbicide application would be conducted in consultation with a certified chemical applicator, in accordance with State requirements, manufacturer's instructions, standard BMPs recommended by SRCD, and the RWQCB's General NPDES Permit for Residual Aquatic Pesticide Discharges for Algae and Aquatic Weed Control Applications (Order No. 2013-0002-DWQ, NPDES No. CAG990005).

The Proposed Project would result in temporary impacts on wildlife resources. Wildlife could be affected by the application of herbicides, however project-specific BMPs will be implemented to reduce the likelihood of effects on species to insignificant. Water quality monitoring will confirm that impacts have not occurred. In the long term, it is expected that the conversion of habitat to native emergent vegetation species will be beneficial to native species. In addition to implementation of project-specific BMPs, implementing the following environmental commitments identified for wildlife in the SMP EIS/EIR (described in Appendix A of this addendum) would reduce potential adverse impacts to a less-than-significant level:

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

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

Consistent with the findings in the SMP EIS/EIR, impacts of the Proposed Project on wildlife resources would be less than significant. None of the conditions described in Section 15162 of the State CEQA Guidelines would

occur relative to wildlife. The analysis of potential wildlife impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.13 CULTURAL RESOURCES

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

The *Restoration Plan for the Blacklock Restoration Project* report was completed before the implementation of the SMP (DWR and Reclamation, et al. 2007). The restoration project proposed to breach existing levees on a 72-acre parcel in the Suisun Marsh that is boarded by Honker Bay, Arnold Slough, and Denverton Slough. DWR conducted a cultural resources record search at the Northwest Information Center of the California Historical Resources Information System at Sonoma State University as part of the phase I environmental site assessment in January 2003. A search of the records maintained did not identify any previously recorded cultural resources in the project area or vicinity, nor have any cultural resources studies previously been conducted in the project area. Contact with the Native American Heritage Commission and local Native American representatives failed to identify the presence of any traditional cultural properties or sacred sites within the proposed project acreage. A cultural resources site inspection was conducted by Janis Offerman of DWR on January 4, 2005. Ms. Offerman concluded that the proposed project area does not appear sensitive for cultural resources. Since no known artifacts and historic properties are known to be located on the Blacklock restoration site, it is unlikely that implementation of the proposed project would result in impacts to cultural resources. If artifacts are found during construction of the levee breaches, all work would cease until the objects were evaluated by qualified personnel.

The cultural resources findings for that project determined that the levees on Blacklock Ranch were not eligible for the NRHP and the State Historic Preservation Officer (SHPO) concurred with those findings (SHPO to Reclamation 2006).

A cultural resources evaluation of the project area was also conducted in March 2018 as part of the Bradmoor Island and Arnold Slough Tidal Habitat Restoration (Appendix D, “Cultural Resources Report”), and included background research and field inventories. This evaluation determined that no historic-age built-environment resources or archaeological sites are within the project area. The evaluation did find seven built-environment resources, but none of these were within the Blacklock Restoration Site. These groups of classes of these seven architectural features (i.e., engineering structures, duck clubs, dams, and levees) previously were determined not to be eligible for listing in the National Register of Historic Places (NRHP) or California Register of Historical Resources (CRHR) (SHPO 2014). The resources belonging to these classes of architectural features were recorded and evaluated and also have been found ineligible for the NRHP or CRHR. The adjacent Arnold Slough Restoration Site was also determined to be ineligible for listing in the NRHP or CRHR.

In addition, the SMP EIS/EIR determined that only approximately 10 percent of the area of potential effect delineated for the Proposed Project is archeologically sensitive. These areas are located in current marsh environments on the northern end of the Project Site. Because no ground-disturbing work will take place, Proposed Project actions will have no effect no effect on archaeological resources present in these areas.

The discovery of cultural resources in low-sensitivity areas is highly unlikely because no ground-disturbing activities would take place under the Proposed project. In the unlikely event that unidentified cultural resources

are observed, and if they are determined to be historic properties and Proposed project activities would result in adverse effects, DWR as the lead State agency would resolve the effects in accordance with Section 106 of the National Historic Preservation Act (NHPA) or CEQA, as applicable, consistent with the environmental commitment "Cultural Resources" (Chapter 2 of the SMP EIS/EIR). In cases where the Proposed Project would affect small portions of the resources, implementing the environmental commitment "EC-12: Inadvertent Discovery of Cultural Resources" (Chapter 2 of the SMP EIS/EIR) would reduce the impact to less than significant. Due to the nature of Proposed Project actions, major damage or destruction of any significant cultural resources is not expected.

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

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

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

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

3.14 PUBLIC HEALTH AND ENVIRONMENTAL HAZARDS

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

A hazardous material is defined as "a substance or material… capable of posing an unreasonable risk to health, safety, and property when transported in commerce" (49 CFR 171.8). California Health and Safety Code Section 25501 defines a hazardous material as "any material that… poses a significant present or potential hazard to human health and safety or to the environment if released." Hazardous materials may include fuel, lubricants, and hydraulic fluid. A discussion of water quality and potential hazards to water quality associated with the project is presented in Section 3.5 Water Quality. If improper handling of hazardous material occurs, workers and the environment could be exposed to hazardous materials. Project staff would be required by law to implement and comply with existing hazardous material regulations. Construction contractors would be required to comply with

the California Environmental Protection Agency's Unified Program; regulated activities would be managed by the Solano County Environmental Health Department, the designated certified unified program agency for Solano County, in accordance with the regulations included in the Unified Program. Each of these regulations is specifically designed to protect public health through improved procedures for the handling of hazardous materials, better technology in the equipment used to transport these materials, and a more coordinated, quicker response to emergencies.

DWR expects that adherence to BMPs that dictate the use, containment, and cleanup of contaminants would minimize the risk of introducing such products to the waterway because the prevention and contingency measures would require frequent equipment checks to prevent leaks, would keep stockpiled materials away from the water, and would require that absorbent booms are kept on-site to prevent petroleum products from entering the river in the event of a spill or leak.

The Proposed Action would not be located at a site on the Hazardous Waste And Substances Site List, known as the Cortese List, pursuant to Government Code Section 65962.5 (DTSC 2015). No site listed in the Proposed Action is within one-quarter mile of an existing or proposed school. Prior to implementation of the adjacent Bradmoor Island and Arnold Slough tidal restoration projects, a search was conducted of SWRCB's GeoTracker and the California Department of Toxic Substances Control's EnviroStor websites to identify toxic releases, hazardous waste, or other violations on or in the vicinity of Blacklock (SWRCB 2018; DTSC 2018). In addition, a search was conducted of EPA's Envirofacts database to identify hazardous waste sites and National Priorities List sites being assessed under the Superfund program (EPA 2018). The records search did not find documentation of known contaminated municipal groundwater wells, leaking underground or aboveground storage tanks, or active or inactive landfills located on, adjacent to, or within one-quarter mile of Bradmoor or Arnold. No confirmed State or federal Superfund sites were identified within 1 mile of the project area.

In addition, DWR would develop and implement Spill Prevention and Control Plan (SCPC) to minimize effects of spills of hazardous, toxic, or petroleum substances during project activities. The SPCP will be kept on site during Phragmites control and monitoring activities and will be made available upon request (See Appendix B). Mixing of herbicides and adjuvants will occur at the Grizzly Island Wildlife Area complex maintenance area in a 50-100 gallon chemical tank and brought to the launch area on the boat. The drone will be filled with herbicide by pumping directly from the tank with a hose which prevents spillage on the levee. DWR would adhere to the following project-specific BMP to avoid public health and environmental hazard effects to the greatest extent feasible:

Project-specific BMP

1. DWR has developed and will implement a Spill Prevention and Control Plan (SPCP) to minimize effects of spills of hazardous, toxic, or petroleum substances during proposed action activities (Appendix B). The SPCP will be kept on site during *Phragmites* control and monitoring activities and will be made available upon request.

All activities would follow the relevant environmental commitments identified in the SMP EIS/EIR (described further in Appendix A of this addendum) that are related to staging areas, spill prevention and control, and hazardous materials management. In addition, no infrastructure removal or waste material will be removed from the site, and all drones used would be battery-operated. As a result, implementing environmental commitments

would reduce the potential adverse impact from exposure of construction workers and the environment to hazardous materials to a less-than-significant level.

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

- EC-1: Standard Design Features and Construction Practices
- EC-2: Access Points/Staging Areas
- EC-9: Hazardous Materials Management Plan

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

3.15 OTHER RESOURCES

Environmental resources topics that were analyzed in the SMP EIS/EIR, but were outside the scope of the effects of the Proposed Project, and thus were not analyzed in detail in this chapter include the following:

- Water Supply, Hydrology, and Delta Water Management
- Geology and Groundwater
- Flood Control and Levee Stability
- Sediment Transport
- Land Use and Delta Plan Policies
- Utilities and Public Services
- Visual/Aesthetic Resources
- Growth-Inducing Impacts, including Population and Housing

3.15.1 WATER SUPPLY, HYDROLOGY, AND DELTA WATER MANAGEMENT

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

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

The SMP EIS/EIR states that a change in average channel velocity to less than 2 feet per second (ft/s) or an increase of more than 1 ft/s in an existing channel would be considered a substantial change in tidal velocities and may result in local sediment scour and deposition. In addition, the document states that changes in tidal elevation (stage) could affect the timing of water available to managed wetlands. Because no ground-moving activities would take place under the Proposed Project, no changes in average channel velocity, tidal prism, and tidal

elevation are expected within the project site and surrounding areas. Therefore, there will be no impact on hydrological conditions.

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

3.15.2 GEOLOGY AND GROUNDWATER

Geology and groundwater resources that could be affected by the Proposed Project and the type and severity of potential impacts on these resources are less significant than those evaluated in the SMP EIS/EIR. Potential impacts on several environmental resources were examined and found to be nonexistent. These resources include: Groundwater, Geology and Soils. Based on the environmental commitments in the SMP EIS/EIR (provided in Appendix A) and the expected construction practices and outcomes of restoration activities, the SMP EIS/EIR determined that restoration would have a less-than-significant impact related to geology, seismicity, soils, minerals, and groundwater. Because no ground-moving activities would take place under the Proposed Project, no changes to geology and groundwater are expected within the project site and surrounding areas. Therefore, no impact on geology and groundwater is expected as a result of the Proposed Project.

3.15.3 FLOOD CONTROL AND LEVEE STABILITY

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

The Proposed Project will not create any new exterior levees, and thus no levee improvements would be necessary. The amphibious vehicle would not be driven on the levees during project implementation, thus existing levees would not be subject to ground-shaking and increased ground pressures. No other heavy equipment would be used on-site, and site access for drone applications and monitoring would be by boat.

Consistent with the findings in the SMP EIS/EIR, there would be no impact on flood control and levee stability as a result of the Proposed Project. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to flood control and levee stability. The analysis of potential flood control and levee stability impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.15.4 SEDIMENT TRANSPORT

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

Ground-disturbing activities, such as earthwork and demolition of existing structures, would not occur under the Proposed project. An increase in average channel velocity resulting in a velocity more than 2 ft/s or an increase of more than 1 ft/s in an existing channel would result in a significant impact on channel scouring because such

increased tidal velocities may result in local sediment scour of fine silt, clay, or sand or cause vegetation disruption. No changes in channel velocities are expected as a result of the Proposed Project. Therefore, associated channel velocities would remain below the significance threshold, and no impact would occur. No new or more severe water quality impact would occur, beyond that identified in the SMP EIS/EIR.

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

3.15.5 Land Use and Delta Plan Policies

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

The land use designation for the entire Blacklock site is designated as marsh. The Proposed Project will have no impact on land use within Blacklock because the entire site will remain as marsh. Blacklock has a resource conservation overlay. The marsh designation provides protection to marsh and wetland areas and permits aquatic and wildlife habitat, marsh-oriented recreational uses, agricultural activities compatible with the marsh environment and marsh habitat, and restoration of historical tidal wetlands (Solano County 2008:Table LU-5). The resource conservation overlay identifies and protects areas of the county with special resource management needs; this designation recognizes the presence of certain important natural resources while maintaining the validity of underlying land use designations (Solano County 2008:Table LU-5).

The Proposed Project's tidal restoration-enhancement activities would be consistent with the agriculture and marsh land use designations and the resource conservation overlay. Consistent with the SMP EIS/EIR, there will be no impact of the Proposed Project on land use.

3.15.5.1 Delta Stewardship Council's Delta Plan Policies

The Delta Plan became effective with legally enforceable regulations on September 1, 2013 (Delta Stewardship Council 2013). The Proposed Project would not meet the criteria of a "covered action," as defined by the Delta Plan and Section 21056 of the Public Resources Code, and therefore would not be subject to the policies of the Delta Plan.

3.15.6 Utilities and Public Services

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

No active/operational natural gas wells or powerlines are in the project area. The Proposed Project would not require construction of new water, wastewater, stormwater drainage facilities, or landfills, and therefore would not affect any public services. As described in the SMP EIS/EIR, no wastewater infrastructure is in unincorporated

Solano County. All solid waste generated by the Proposed Project would be disposed of in accordance with federal, State, and local statutes and regulations.

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

Consistent with the findings in the SMP EIS/EIR, the project would have no impact on utilities and public resources. None of the conditions described in Section 15162 of the State CEQA Guidelines would occur relative to utilities and public services. The analysis of potential utilities and public services impacts in the SMP EIS/EIR, supplemented by the information in this addendum, is sufficient to meet CEQA requirements and support the approval of the Proposed Project.

3.15.7 VISUAL/AESTHETIC RESOURCES

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

Surrounding properties are used for cattle grazing and waterfowl hunting. The project site is adjacent to the Arnold Slough Restoration Site and is not within view of a State Scenic Highway. Vegetation treatment activities for the Proposed Project would occur during daytime working hours from Monday through Friday (7 a.m. to 6 p.m.). The timing of activities would depend on the type of activity, presence or absence of sensitive resources, and tides.

Activities for the Proposed Project would create minimal temporary visual impacts. Such activities would include invasive vegetation removal using herbicide application by drone and handheld equipment. Vegetation treatment would be limited to a period of 10 days a year. Native plants are expected to colonize the bare ground following vegetation removal.

All activities would be performed in accordance with the BMPs described further in Appendix A of this addendum. As stated in the SMP EIS/EIR, project activities would be temporary and environmental commitments would be implemented; thus, the impact of temporary changes in views during work would be negligible. Because the visual effects would be temporary and minimal in scope, project activities would have no impact. Visual effects are expected to be less significant than those described in the SMP EIS/EIR because no construction activities will take place under the Proposed Project.

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

3.15.8 GROWTH-INDUCING IMPACTS, INCLUDING POPULATION AND HOUSING

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

The SMP EIS/EIR did not evaluate population and housing impacts because activities under the SMP would not involve constructing new homes or businesses, extending roadways or other infrastructure, or displacing people. Similarly, the Proposed Project would consist of invasive vegetation control actions on Blacklock and would not involve constructing new homes or businesses or extending roadways or other infrastructure.

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

3.16 CUMULATIVE IMPACTS

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

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

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

3.16.1 SMP EIS/EIR

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

- other tidal restoration projects in the San Francisco Bay Area that could result in impacts and benefits similar to those of the SMP;

- related projects, including CALFED, Bay Delta Conservation Plan (BDCP)/California WaterFix, Delta Vision, Delta Regional Ecosystem Restoration Implementation Plan, San Francisco Bay Long-Term Management Strategy, Delta Risk Management Strategy, San Francisco Bay Ecosystems Goals, the Delta Plan, and the various USFWS recovery plans for species that use Suisun Marsh;

- City and County development projects (e.g., new or expanded residential, commercial, or industrial development projects); and

- regional and local agency infrastructure projects (e.g., water and wastewater facility construction and/or improvements and flood protection projects).

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

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

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

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

- SMP restoration activities would be restricted to areas within the Marsh; many of the other projects that could result in cumulatively considerable impacts on resources (such as air quality, biological resources, cultural resources, noise, traffic, water quality, and utilities) would occur well outside the Marsh;

- SMP restoration activities would occur on a different temporal and geographic scale than some of the restoration and development/infrastructure projects;

- SMP restoration modeled scenarios' contribution to changes in water quality (i.e., salinity) would not be considerable, and restoration would be subject to the various regulations in place to control salinity in the Marsh and throughout the Delta;

- SMP restoration activities would include design criteria and environmental commitments to reduce substantial changes related to water supply, water quality, terrestrial and aquatic biological resources, sediment and geology, and transportation and navigation;
- SMP restoration activities would be small, sporadic, and short term in magnitude over the entire Marsh, through plan implementation;
- SMP restoration activities would result in an increase in quality and quantity for sensitive terrestrial and aquatic biological resources;
- SMP restoration activities would implement, as appropriate, mitigation measures related to air quality, cultural resources, and utilities and public services, as described in the SMP EIS/EIR; and
- SMP restoration activities would not result in impacts on some resource, such as aesthetics, recreation, flood control and levee stability, noise, and land use.

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

3.16.2 PROPOSED PROJECT

Table 3-14 shows wetland and tidal restoration and enhancement projects (the status and projects updated since the time of certification of the SMP EIS/EIR). Several tidal restoration projects have been completed, are under way, or are proposed throughout the San Francisco Bay Area. Each of these restoration projects is expected to increase natural habitats for species that historically have occupied these areas. Because all of them would require a shift in habitat types, they all would have some level of habitat loss associated with conversion. In addition, managed wetland activities have been proposed through the North American Waterfowl Conservation Act and the San Francisco Bay Joint Venture. Associated activities are expected to improve management capabilities and habitat functions and values. Table 3-15 shows other projects that were identified in the SMP EIS/EIR that could result in cumulative impacts.

Table 3-14. Updated Wetland Restoration and Enhancement Cumulative Project List

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

Sources: EcoAtlas 2018; EcoRestore 2019

Table 3-15. Updated Other Projects Cumulative Project List

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

As demonstrated in the analysis in Sections 3. 1 through 3.16 of this addendum, the Proposed Project would not result in impacts not previously disclosed in the SMP EIS/EIR. In addition, the Proposed Project would not result in new significant and unavoidable impacts on any resources, would not require mitigation measures identified in the SMP EIS/EIR, would not result in any new significant and unavoidable impacts not previously disclosed in the SMP EIS/EIR, and would not result in impacts on any resources not previously disclosed in the SMP EIS/EIR. Furthermore, impacts on cultural resources would be less than significant under the Proposed Project because of the baseline conditions, project location, and the nature of project activities, and thus would be reduced when compared to the impact determination disclosed for those resources in the SMP EIS/EIR (i.e., significant and unavoidable).

The past, present, and reasonably foreseeable future projects shown in Table 3-14 may result in cumulatively considerable impacts on certain resources. However, for the reasons described in the following list, the Proposed Project is not expected to include activities that would result in a new cumulatively considerable incremental contribution to any significant cumulative impacts or change the cumulative impact analysis and the conclusions in the SMP EIS/EIR. Thus, the Proposed Project:

- would be restricted to areas within the Marsh; many of the other projects that could result in potentially cumulatively considerable impacts related to resources (such as noise, traffic, utilities and public services, and cultural resources) would occur outside the Marsh;
- would be a restoration enhancement projects that would not involve any ground-moving, structure removal, or construction activities that are typically common under restoration projects in the Marsh;
- would occur on a different temporal and geographic scale than some of the restoration and development/infrastructure projects shown in Tables 3-14 and 3-15;
- would include environmental commitments and project-specific monitoring and adaptive management protocols, as intended by the SMP to reduce substantial changes related to water quality, fish and wildlife species, and vegetation and wetlands;
- would be relatively small and short-term in magnitude during implementation over the entire Marsh, and thus would have very limited, localized, or temporary effects related to air quality, water quality, fish and wildlife species, vegetation and wetlands, and hazards and hazardous materials during construction, and would have no impact on sediment and geology;
- would benefit listed fish species, including Delta Smelt and Longfin Smelt, and would benefit special-status and native plant wildlife species; and
- would not need to implement mitigation measures related to any environmental resource analyzed in the document.

3.17 MANDATORY FINDINGS OF SIGNIFICANCE

The analysis in this document concluded that the Proposed Project would not have a significant impact on the environment with implementation of the environmental commitments provided in Appendix A, “Environmental Commitments,” of the SMP EIS/EIR. As evaluated in Section 3.13, “Fish,” Section 3.15, “Vegetation and

Wetlands," and Section 3.16, "Wildlife," of this addendum, with implementation of all environmental commitments, the Proposed Project would not substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or reduce the number or restrict the range of an endangered, rare, or threatened species.

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

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

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

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