South Bay Salt Pond Restoration Project, Phase 2 404 Individual Permit Application Supplemental Information

Prepared for the U.S. Fish and Wildlife Service, Don Edwards San Francisco Bay National Wildlife Refuge, and California State Coastal Conservancy; for submission to the U.S. Army Corps of Engineers, San Francisco District.

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List of Acronyms and Abbreviations

AAC	All-American Canal
APN	Assessor's Parcel Number
Bay	San Francisco Bay
BCDC	San Francisco Bay Conservation and Development Commission
Cargill	Cargill Incorporated
CDFG	California Department of Fish Game
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
DRERIP	Delta Regional Ecosystem Restoration Implementation Plan
EIS/R	Final 2007 Environmental Impact Statement/Report
HDPE	High density polyethylene
ISP	Initial Stewardship Plan
MHHW	Mean Higher High Water
NASA	National Aeronautics and Space Administration
NAVD88	North American Vertical Datum of 1988
NMFS	National Marine Fisheries Service
NOD	CDFW Notice of Determination
QAPP	Quality Assurance Program Plan
Refuge	Don Edwards Regional National Wildlife Refuge
ROD	USFWS Record of Decision
RWQCB	Regional Water Quality Control Board
SBSP	Phase 2 South Bay Salt Pond
SCC	California State Coastal Conservancy
SCVWD	Santa Clara Valley Water District
South Bay	South San Francisco Bay
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1 BOXES 12-16 (LOCATION OF PROJECT)

1.1 Boxes 12-14

1.1.1 Box 12 Project Title

South Bay Salt Pond Restoration Project, Phase 2

1.1.2 Box 13 Names of Affected Waterbodies

Proposed project activities may affect the following waterbodies:

- South San Francisco Bay
- Phase 2 ponds and adjacent water bodies:
  - Ponds A19, A20, A21 at the Alviso pond complex (Alviso-Island Ponds)
    - Coyote Creek
    - Mud Slough
  - Ponds A8, A8S at the Alviso pond complex (Alviso-A8 Ponds)
    - Guadalupe Slough
    - Guadalupe River/Alviso Slough
  - Ponds A1, A2W at the Alviso pond complex (Alviso-Mountain View Ponds)
    - Charleston Slough
    - Stevens Creek/Whisman Slough
    - Permanente Creek/Mountain View Slough
    - Coast Casey Forebay
  - Ponds R3, R4, R5 and S5 at the Ravenswood pond complex (Ravenswood Ponds)
    - Ravenswood Slough
    - Flood Slough
    - West Point Slough

1.1.3 Box 14 Project Street Address

There is no street address associated with the Phase 2 project areas. The mailing address for the landowner (the U.S. Fish and Wildlife Service's Don Edwards San Francisco Bay National Wildlife Refuge) is 1 Marshlands Road, Fremont, CA, 94555.

1.1.4 Box 15 Project Location

The SBSP Restoration Project is in South San Francisco Bay (South Bay) in Northern California (Figure 1). Phase 2 of the SBSP Restoration Project includes parts of two complexes of salt ponds and adjacent habitats in the South Bay that the USFWS acquired from Cargill in 2003 (Figure 2). The salt pond complexes consist of the 8,000-acre Alviso pond complex and the 1,600-acre Ravenswood pond complex, both of which are owned and managed by USFWS as part of the Don Edwards Regional National Wildlife Refuge (Refuge). Within these two pond complexes, there are four groups of ponds (or "pond clusters") that are included in the proposed Phase 2 actions; these are illustrated in Figure 3 through Figure 6. They are as follows:

- Alviso–Island Ponds (Island Ponds) shown in Figure 3 in the Alviso pond complex
- Alviso–A8 Ponds (A8 Ponds) shown in Figure 4 in the Alviso pond complex
- Alviso–Mountain View Ponds (Mountain View Ponds) shown in Figure 5 in the Alviso pond complex
- Ravenswood Ponds, shown in Figure 6 in the Ravenswood pond complex

The Alviso pond complex consists of 25 ponds on the shores of the South Bay in the cities of Fremont, San Jose, Sunnyvale, and Mountain View, within Santa Clara and Alameda Counties. The pond complex is bordered on the west by the Palo Alto Baylands Park and Nature Preserve and the City of Mountain View's Charleston Slough; on the south by commercial and industrial land uses, Mountain View's Shoreline Park, the National Aeronautics and Space Administration (NASA) Ames Research Center, and Sunnyvale Baylands Park; and on the east by Coyote Creek in San Jose and Cushing Parkway in Fremont. The Phase 2 project actions in the Alviso pond complex focus on three clusters of ponds. The first cluster, the Island Ponds, containing Ponds A19, A20, and A21 is between Coyote Creek and Mud Slough near the eastern end of the Alviso pond complex. The Island Ponds were breached in 2006 as part of tidal marsh restoration actions covered by the Initial Stewardship Plan (ISP) (USFWS and CDFG 2003).

The second cluster, the A8 Ponds, containing Ponds A8, and A8S is in the southern and central portion of the Alviso pond complex. The A8 Ponds are west of the town of Alviso, north of Sunnyvale and State Route (SR) 237, and east of other parts of the Alviso pond complex. Ponds A8 and A8S were also included in the Phase 1 work; they were made reversibly tidal through the installation of a variable-size and reversible "notched" gate that opened in July 2010. Ponds A5 and A7 were also connected to Pond A8 and Pond A8S as part of Phase 1 actions. There would be no Phase 2 actions at that end of this group of ponds.

The third cluster, the Mountain View Ponds, containing Ponds A1 and A2W is on the western edge of the Alviso pond complex. The City of Mountain View lies immediately to the south, and Charleston Slough and the Palo Alto Flood Control Basin lie to the west.

The Ravenswood pond complex consists of seven ponds on the Bay side of the Peninsula, both north and south of SR 84, west of the Dumbarton Bridge, and on the Bay side of the developed areas of the City of Menlo Park in San Mateo County. Bayfront Park in Menlo Park is directly west of the Ravenswood pond complex, and a portion of SR 84 and the Dumbarton rail corridor are along its southern border. The Phase 2 project actions in the Ravenswood pond complex are focused on the western half of the pond complex, which contains Ponds R3, R4, R5, and S5, here referred to as the Ravenswood Ponds.

Table 1 lists each pond, the cluster it is part of, and its area, centroid, and latitude and longitude coordinates in decimal degrees. Pond areas in the following table are sourced from the 2007 SBSP EIS/R and provide general estimates for each pond. Areas calculated for Phase 2 operations have been updated and may slightly differ from those estimated in the programmatic portion of the 2007 EIS/R.

Table 1. SBSP Phase 2 Approximate Pond Areas and Locations

POND CLUSTER	POND	AREA* (ACRES)	LATITUDE	LONGITUDE
Alviso-Island Ponds	A19	265	37.467092	-121.957692
	A20	65	37.464876	-121.970986
	A21	150	37.465142	-121.979427
Alviso - A8 Ponds	A8	410	37.428778	-121.991558
	A8S	160	37.420860	-121.989553
Alviso - Mountain View Ponds	A1	275	37.442525	-122.086577
	A2W	435	37.441989	-122.074607
Ravenswood Ponds	R3	270	37.486675	-122.155291
	R4	295	37.493048	-122.161933
	R5	30	37.488054	-122.170371
	S5	30	37.485913	-122.170712

Note: This table presents standard pond areas excerpted from the 2007 SBSP FEIR/S. The measured areas of the ponds may vary seasonally, tidally, and by method of measurement.

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1.2 Box 16 (Other Location Descriptions)

1.2.1 Municipal Jurisdictions, Counties, and Cities

The Phase 2 South Bay Salt Pond (SBSP) Restoration Project areas are located within Alameda, Santa Clara, and San Mateo Counties, as shown Table 2.

Table 2. Phase 2 Project Area Jurisdictions

POND COMPLEX	POND CLUSTER	JURISDICTION	
		CITY	COUNTY
Alviso	Island Ponds (A19, A20, and A21)	Fremont	Alameda
	Mountain View Ponds (A1 and A2W)	Mountain View	Santa Clara
	A8 Ponds (A8 and A8S)	San Jose	Santa Clara
Ravenswood	Ravenswood Ponds (R3, R4, R5, and S5)	Menlo Park	San Mateo

1.2.2 Federal, State, and Regional Regulatory Regions

U.S. Army Corps of Engineers (USACE) Regulatory: South Pacific Division, San Francisco District

Regional Water Quality Control Board (RWQCB): Region 2 – San Francisco Bay Region

U.S. Fish and Wildlife Service (USFWS): Region 8 – Pacific Southwest Division

National Marine Fisheries Service (NMFS): West Coast Region

California Department of Fish and Wildlife (CDFW): Region 3 – Bay Delta Region

San Francisco Bay Conservation and Development Commission (BCDC): CZMA – San Francisco Bay Region, SF Bay Plan – Map 7

1.2.3 State Tax Parcel ID Numbers

State Tax Parcel ID (APN) numbers are presented in Table 3.

Table 3. State Tax Parcel (APN) ID Numbers by Pond Cluster

POND CLUSTER	APN
Alviso Mt. View	00805005
	01536012
	01536017
	01536022
	01536024
	01536025
	01536026
	01536028
	01536037
	01536039
	01536043
	01536044
	11603015
	11619002
Alviso A8	01533022
	01533055
	01535005
	01535038
	01535047
	01535048
	01545011
	01545031
	01535005
	01533011
	01535014
	01501025
Ravenswood	055400570

POND CLUSTER	APN
Alviso Island	519-760-10
	519-760-11
	519-760-12
	519-760-13
	519-760-4
	519-760-5
	519-760-6
	519-760-7
	519-760-8
	519-760-9
	519-770-1
	519-770-10
	519-770-11
	519-770-12
	519-770-13
	519-770-14
	519-770-15
	519-770-16-2
	519-770-17
	519-770-2
	519-770-3
	519-770-4
	519-770-5
	519-770-6
	519-770-7
	519-770-8
	519-770-9
	519-780-1
	519-800-1-17
	519-800-1-20
	519-800-1-21
	519-800-1-32
	519-800-4
	519-800-4
	519-800-4
	537-801-6

2 BOX 17 (DIRECTIONS TO SITES)

SBSP Restoration Project Phase 2 area consists of four pond complexes: Alviso-Island Ponds, Alviso-A8 Ponds, Alviso-Mountain View Ponds and the Ravenswood Ponds. Additionally, the project is managed by USFWS from the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge) offices located in Fremont, California. Project regional vicinity and Project location are shown in Figures 1 and 2. Directions to the sites are as follows.

2.1 Alviso Island Pond Cluster

Ponds A19, A20 and A21 are not accessible by public roadways, and in some areas are not accessible by land. To access these ponds please coordinate with USFWS. Directions to the USFWS Refuge offices where project representatives are located are provided here. From CA-84 take the Paseo Padre Parkway/Thornton Avenue Exit. Turn south onto Thornton Avenue. Continue on Thornton Avenue to Marshlands Road. Turn onto Marshlands Road heading west. The Refuge offices are located at 1 Marshlands Road, Fremont, CA 94555.

For the Bay Trail adjacent to the Alviso-Island Pond clusters: from Highway 101, exit at Amphitheatre Parkway in Mountain View. Turn north on Shoreline Boulevard toward the Shoreline Park entrance. Parking is available at Mountain View Shoreline Park and Shoreline Amphitheatre overflow lots.

2.2 Alviso A-8 Pond Cluster

Take Highway 237 to the Gold Street exit. Head north on Gold St. The gate entrance is on the west side of the street located between two World Financial Group buildings at 2099 Gold St. and before the overpass over Alviso Slough. Gate access is available by contacting the USFWS at Don Edwards San Francisco Bay National Wildlife Refuge.

2.3 Alviso Mountain View Pond Cluster

Pond A1: Take Highway 101 to the N Shoreline Blvd exit. Turn onto N Shoreline Blvd. Continue straight to stay on N Shoreline Blvd. Parking is available at the Shoreline Park at Mountain View Sailing Lake. From the parking lot, Ponds A1 and A2W access is available along their southern perimeters via the Bay trail. Gate access to service roads is available by contacting the USFWS at Don Edwards San Francisco Bay National Wildlife Refuge.

Pond A2W: Take Highway 101 to the N Shoreline Blvd exit. Turn onto N Shoreline Blvd. Continue straight to stay on N Shoreline Blvd. Approximately 650 feet after crossing Bill Graham Parkway, there is a public parking area called Kite Lot available. From Kite Lot, walk on foot approximately 2,200 feet east to access the Bay trail. Walk north on the Bay trail to access the southern perimeter of Pond A2W. Gate access to service roads is available by contacting the USFWS at Don Edwards San Francisco Bay National Wildlife Refuge.

2.4 Ravenswood Pond Cluster

Take Highway 101 to CA 84E/ Marsh Road. Head north on Marsh Road and continue straight to enter Bedwell Bayfront Park. Parking is available in Bedwell Bayfront Park. Ponds S5, R5 and the eastern and part of the northern limits of Pond R4 are publicly accessible. Gate access to service roads is available by contacting the USFWS at Don Edwards San Francisco Bay National Wildlife Refuge.

3 BOX 18 (NATURE OF ACTIVITY, PROJECT DESCRIPTION)

3.1 Project Overview and Background

The South Bay Salt (SBSP) Restoration Project is a multi-agency effort to restore tidal marsh habitat, reconfigure managed pond habitat, maintain or improve flood protection, and provide recreation opportunities and public access in 15,100 acres of former salt-evaporation ponds purchased from and donated by Cargill Incorporated (Cargill) in 2003. The former salt-production areas are no longer used for that purpose, and, in many cases, they are no more saline than San Francisco Bay (Bay) itself. Immediately after the March 2003 acquisition and subsequent transfer of those ponds from Cargill, the landowners, the U.S. Fish and Wildlife Service (USWFS) and California Department of Fish and Wildlife (CDFW), began implementation of the Initial Stewardship Plan (ISP) (USFWS and CDFG 2003), which was designed to maintain open water and unvegetated pond habitats with enough water circulation to preclude salt production and maintain habitat values and conditions until the long-term restoration actions of the SBSP Restoration Project could be implemented.

The longer-term planning effort involves a 50-year programmatic-level plan for restoration, flood risk management, and public access. This effort has already seen the implementation of Phase 1 projects, which are described in the SBSP Restoration Project's 2007 EIS/R. That longer-term planning was facilitated by the California State Coastal Conservancy (SCC) working with the two landowner agencies listed above and was completed in January 2009. The planning phase of the SBSP Restoration Project was completed in January 2009 with the publication of the Final 2007 Environmental Impact Statement/Report (EIS/R).

Phase 2 of the SBSP Restoration Project is a collaborative effort among federal, state, and local agencies working with scientists and the public to develop and implement project-level plans and designs for habitat restoration, flood management, and wildlife-oriented public access. The former salt ponds are part of the USFWS-owned and managed Refuge, and cover approximately 9,600 acres in the South Bay. The Refuge ponds in Phase 2 are collectively nearly 2,400 acres in size.

The ponds that were neither part of Phase 1 nor part of Phase 2 will continue to be actively managed according to the goals set forth in the ISP until further implementation planning and the appropriate adaptive management studies are completed. They may be included in future project phases as well.

3.1.1 Project History

The SBSP Restoration Project is intended to tier from the analysis conducted for the 2007 EIS/R by advancing additional restoration activities within the SBSP project area. The 2007 EIS/R assessed the environmental consequences associated with two long-term restoration alternatives. In consideration of the environmental consequences discussed in the 2007 EIS/R, the USFWS Record of Decision (ROD) and the CDFW Notice of Determination (NOD) state that the USFWS and CDFW will implement Programmatic Alternative C, which would eventually convert up to 90 percent of the former salt ponds to tidal marsh, while at least 10 percent would remain as enhanced managed ponds. Phase 2, as the second project component of this long term restoration project, would incrementally advance the project toward achieving the 90/10 goal.

The 2007 EIS/R was not just a planning document but also included project-level analysis of several restoration, enhancement, recreation, and flood protection projects that would help fulfill the SBSP

Restoration Project's goals and objectives. The selection of the Phase 1 projects considered a variety of factors. The criteria, as listed in the 2007 EIS/R, were available funding, likelihood of success, ease of implementation, visibility and accessibility, opportunities for adaptive management and applied studies, value in building support for the project, and certainty of investment.

Phase 1's restoration actions were successfully completed in December 2010; the last of the public access and recreation features were completed in April 2016. At the end of Phase 1, 1,600 acres of tidal habitats and 1,440 acres of muted tidal habitats were opened to tidal inundation. The tidal areas already show signs of estuarine sedimentation and natural vegetative colonization. These tidal habitats will contribute to the recovery of endangered, threatened, and other special-status species; tidal-marsh-dependent species; and the recovery of South Bay fisheries. Also, 710 acres of managed ponds were constructed at a range of water depths to create a variety of depth, hydrology, and salinity regimes through the use of flow control structures, grading, and other means. In addition, approximately 7 miles of new trail were built, providing new recreational opportunities. Small habitat transition zones were constructed in Eden Landing Pond E14 and vegetated with native upland species by volunteers. Islands were constructed in Ponds SF2, A16, and E12 and E13.

Phase 2 of the SBSP Restoration Project is a direct outgrowth of the acquisition of the Alviso and Ravenswood pond complexes (either in fee ownership or the salt-making rights) from Cargill in 2003 and the continued implementation of the larger SBSP Restoration Project laid out in the 2007 EIS/R. In 2010, the Phase 2 planning was initiated. The initial project elements included restoration, public access, and flood protection[1] actions in all three pond complexes: Alviso, Ravenswood, and Eden Landing. In April 2016 the Final EIS/R for Phase 2 at the Refuge (i.e., Alviso and Ravenswood) was completed. Phase 2 at the State-owned Eden Landing pond complex is proceeding separately.

A delineation of jurisdictional wetlands in the Phase 2 project area was performed in 2013, and a report was submitted to the U.S. Army Corps of Engineers in August of 2016. Following direction from Frances Malamud-Roam at the USACE, that delineation was revised and resubmitted in 2016. The revised delineation is provided as Appendix A to this application. Representative site photos taken as part of that delineation are presented as Appendix B.

The preliminary designs used for the environmental impact analysis in the 2016 Phase 2 EIS/R were extended and more detailed for the Preferred Alternative identified in that Final EIS/R. In 2016, a more detailed set of engineering designs were developed and used as a basis for the permitting phase of the project. Those permitting-level designs are presented as Appendix C to this permit application.

3.2 Site Descriptions

3.2.1 Alviso-Island Pond Cluster

As shown in Figure 3, the Island Ponds consists of Ponds A19, A20, and A21, the levees surrounding each pond, and some of the fringe marsh outside of these levees, including the narrow marsh between Ponds A19 and A20. Ponds A19, A20, and A21 are in the eastern portion of the Alviso pond complex. These ponds are oriented east to west between Mud Slough to the north and west and Coyote Creek to the south. Mud Slough and Coyote Creek converge at the western edge of this pond cluster. The community of Alviso and the city of Milpitas are to the south and to the east of this cluster, respectively. The ponds

[1] The terminology used by the SBSP Restoration Project to describe its goals has since changed from "flood protection" to "flood risk management". This document generally uses the latter term for forward-looking documents.

are geographically isolated from urbanized and built-out areas by other waterbodies, other salt ponds, and a landfill. The former community of Drawbridge is on a strip of land between Pond A21 and Pond A20. That strip of land also holds an active Union Pacific Railroad (UPRR) track.

All three of these ponds were breached on their southern sides in 2006 as part of the SBSP Restoration Project's ISP, which preceded the 2007 Programmatic EIS/R for the project and the subsequent Phase 1 actions. Two breaches were made into Pond A19, the easternmost of the three, and into Pond A21, the westernmost. Pond A20 is smaller and was only breached once. These breaches connected these ponds with Coyote Creek and began their transition to tidal marsh.

Breaches allowed sediment to accrete and vegetation to establish in Pond A21 and, to a somewhat lesser extent, in Pond A20. However, Pond A19 has been slower in its transition, and most of its accretion and vegetation has been limited in its spatial distribution to the areas nearest to the breaches.

3.2.2 Alviso-A8 Pond Cluster

As shown in Figure 4, the A8 Ponds include Ponds A8 and A8S and the levees surrounding them. This pond cluster is in the south-central portion of the Alviso pond complex, between the Guadalupe Slough and Alviso Ponds A5 and A7 to the west; Sunnyvale Baylands County Park, Guadalupe Slough, Calabazas Creek, and San Tomas Aquino Creek to the south; Alviso Slough to the east and northeast; and San Francisco Bay to the north. The cities of Sunnyvale and Santa Clara are inland of the pond cluster to the south; a capped landfill lies to the southeast.

The SBSP Restoration Project set the initial goals for this pond cluster to be reversibly tidal habitat to address mercury concerns and later to possibly become fully tidal habitat, maintain or improve current levels of flood risk management, and improve recreation and public access. Ponds A8 and A8S were physically connected in the Phase 1 actions and were made "reversibly muted tidal habitat" by removing parts of the levees (and associated vehicle access) between them and between Pond A8 and the adjacent Ponds A5/A7 to the west. A reversible, armored notch (smaller than a full breach that can be closed seasonally) was made in the eastern levee of Pond A8 to allow some muted tidal exchange and to allow the USFWS to vary the size of the notched opening.

Ponds A8 and A8S are configured and managed such that they can also be used as flood storage basins during high-rainfall events. Pond A8 contains an overflow weir. During flood events greater than a 10-year flood in the lower Guadalupe River and Alviso Slough, water can overflow into Pond A8 for initial flood storage. Recreation and public access features at these ponds themselves are limited to a hunter check-in station and a small boat launch area along the western side.

3.2.3 Alviso-Mountain View Pond Cluster

The Mountain View Ponds are in the western portion of the Alviso pond complex, between Charleston Slough and the Palo Alto Flood Basin to the west; City of Mountain View's Shoreline Park, Mountain View Mitigation Marsh, and Stevens Creek Mitigation Marsh to the south; Stevens Creek and Whisman Slough to the east; and the open Bay to the north. Permanente Creek, which flows into Mountain View Slough, is between Ponds A1 and A2W. The cities of Mountain View and Palo Alto are immediately inland of the pond cluster to the south and west, respectively. As shown in Figure 5, for the purposes of this document, the Mountain View Ponds consists of Pond A1, Pond A2W, the levees surrounding each pond, some of the fringe marsh outside of the pond and slough levees, Permanente Creek, and Mountain View Slough. Charleston Slough, which is owned by the City of Mountain View is not part of the Refuge, is not included in the proposed project itself, but one of the levees around it – the Coast Casey Forebay levee – is included because it also borders Pond A1. The improvements proposed for the Coast Casey Forebay levee extend beyond the border of Pond A1 and would provide a greater level of increased flood risk management than the improvements to other levees. These differences are discussed in more detail below.

Unlike the Island Ponds or the A8 Ponds, the Mountain View Ponds have not been subject to previous restoration actions under the SBSP Restoration Project. The ponds themselves are somewhat subsided and have water depths of approximately 2 to 4 feet above pond bottom elevations that are at approximately 0-1 feet elevation North American Vertical Datum of 1988 (NAVD88). The ponds have limited hydrologic exchange with the Bay, as there is one small culverted inlet into Pond A1, a siphon to connect it to Pond A2W, and an outflow connection from Pond A2W back to the Bay.

3.2.4 Ravenswood Pond Cluster

As shown in Figure 6, the Phase 2 Ravenswood pond cluster consists of Ponds R3, R4, R5, and S5; the levees surrounding each pond; some of the fringe marsh outside of these levees; and the All-American Canal (AAC). The pond cluster is bordered by Menlo Park's Bedwell Bayfront Park to the west, SR 84 and the city of Menlo Park to the south, Ravenswood Slough to the east, and Greco Island and open Bay water to the north. A small triangular pond is to the immediate west of Pond S5. This pond is unnamed and is labeled or described in various documents in three different ways: part of Pond S5, a separate but unnamed pond, or as the forebay of Pond S5. This document refers to it as the Pond S5 forebay.

There are a number of complicated easements as well as several different landowners in the area where Flood Slough, the Pond S5 forebay, SR 84, Marsh Road, Bedwell Bayfront Park, and the driveway into the park, all come together. This area includes various parcels and their owners, as well as easements for utilities or access. Cargill holds fee title on much of Flood Slough and has a 10-foot wide pipeline strip of property along the entire southern border of Ponds S5 and R3. Cargill's coordination and approval would be required for any proposed activities that would take place on, cross, or otherwise affect lands or properties it owns or to which it holds fee title. This includes proposed additions of fencing, building a trail that would cross Cargill's pipeline easement, and connecting Flood Slough to the S5 forebay. Similar statements would apply to the City of Menlo Park and the West Bay Sanitary District, which are also landowners, and to the California Department of Transportation and other holders of utility easements.

3.3 Proposed Action

The SBSP Restoration Project's proposed actions for Phase 2 provide a variety of habitat enhancements at all four pond clusters and include maintained or increased flood risk management, and additional public access and recreation features at two of the pond clusters. Figures 3 through Figure 6 illustrate the proposed construction as it would be implemented at each of the Phase 2 pond clusters. The pond-cluster specific operations are discussed in detail in the following sections. In those sections and in the tables that are presented there, the term "cut" is used to describe all excavation and levee breaching, lowering, and removal activities. Not all of those activities take place in USACE jurisdiction, however, because many of them are on levees above the high-tide line (HTL) or adjacent wetlands. Only the channel excavation and the lower toes of levee modifications that would take place in wetlands and/or below the HTL (for Section 404) or the mean high water (MHW) elevation (for Section 10) are in USACE jurisdiction. Thus, in this project description section, the term "dredge" is not used in the tables or accompanying text. The impacts sections later in this document will use “dredge” when referring to USACE jurisdictional impacts.

3.3.1 Alviso-Island Pond Cluster

The proposed project would increase habitat connectivity, enhance tidal flows, and expedite the transition of these ponds to tidal marsh. Proposed project activities at the Island Ponds include the following actions, all of which are illustrated in Figure 3. Table 4 presents the areas and volumes of these features that involve cut activities. Table 5 presents the areas and volumes of fill activities. These areas and volumes are presented at various elevations that are relevant to the USACE’s jurisdictions under Section 404 and Section 10. These impacts are discussed more fully in subsequent sections of this document.

3.3.1.1 Lower Portions of Pond A19 Northern Levee

Lower much of Pond A19’s northern levee to MHHW elevation (approximately 7.5 feet NAVD88), but leave portions of that levee at existing elevations to provide more high-tide refugia and roosting or nesting areas. The levee lowering would further increase habitat complexity and connectivity, while unchanged sections of this levee would become island-like high-tide refugia.

3.3.1.2 Widen the Westernmost of the Two Existing Breaches on the Southern Levee of Pond A19

Widening the existing western breach along Pond A19’s southern levee would improve the circulation and flow of sediment into the pond, speed the breakdown of the remaining levee, and increase the rate of transition to marsh habitat. Following the widening, the breach would have a bottom width of approximately 150 feet, an invert elevation near 3.5 feet NAVD88 and 3:1 (h:v) side slopes. The length of the cut would be approximately 90 feet.

3.3.1.3 Remove Most of the Western Levee of Pond A19 and the Eastern Levee of Pond A20

Removing most of the levees between Ponds A19 and A20 would add more habitat connectivity by connecting the two former ponds. Removal of these levees would be to the elevation of the strip of existing marsh between the two ponds, to an approximate elevation of 6.6 to 7 feet NAVD88. Sections of these two levees would be left at their existing elevations to provide high-tide refugia for birds and other wildlife species. Their removal would create a larger area of connected marsh and aquatic habitat.

3.3.1.4 Construct Two Breaches on the North Side Levee of Pond A19 to Connect the Pond with Mud Slough

By adding north side breaches, the habitat connectivity at the Island Ponds would increase, and the distribution of sediment and vegetation would improve. This action would include excavating a channel through the adjacent fringing tidal marsh. Both breaches would be roughly 50 feet wide at the bottom with an invert elevation of 3.5 feet NAVD88 with 3:1 (horizontal to vertical [h:v]) side slopes. The length of channels cut to connect Pond A19 with Mud Slough through the levees would be approximately 150 feet at the Pond A19 northwest breach and approximately 90 feet at the Pond A19 northeast breach.

3.3.1.5 Install Ditch Blocks and Fill Existing Borrow Ditches

Placement of material from levee breaching and other modifications would be used to establish ditch blocks or sidecast into the ponds' borrow ditches. Placing fill into borrow ditches and constructing ditch blocks would speed the transition to tidal marsh. Phase 2 would build 6 ditch blocks in Pond A19. Ditch blocks would be established in the existing borrow ditches to direct tidal flows into the interior of the ponds. The material for the ditch blocks would be sourced on-site from levee lowering or breaches; there would be no imported fill at the Island Ponds. All fill for ditch blocks and sidecast material would be placed in USACE jurisdiction; the top of that fill would remain below MHW, however, and would not create a net loss of waters. The fill volumes for ditch blocks and sidecast material are provided in Table 5.

Table 4. Island Ponds - Estimated Cut (Dredge)Volumes and Areas by Purpose

CUT / DREDGE LOCATION	PURPOSE	TOTAL VOLUME (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	TOTAL AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
Pond A19	Northwest Levee Lowering	5,000	0	0	1.4	0.4	0.00
Pond A19	North Levee Lowering (Middle)	1,800	0	0	0.5	0.1	0.00
Pond A19	Northeast Levee Lowering	2,600	0	0	0.6	0.2	0.00
Pond A19	Southwest Levee Lowering	1,400	0	0	0.5	0.2	0.00
Pond A19	Southeast Levee Lowering	1,900	0	0	0.5	0.2	0.00
Subtotal	**Levee Lowering**	**12,700**	**0**	**0**	**3.3**	**1.0**	**0.00**
Pond A19	Southwest Levee Removal	1,400	0	0	0.4	0.2	0.00
Pond A19	Northwest Levee Removal	3,200	0	0	0.8	0.2	0.00
Pond A20	Northeast Levee Removal	1,400	0	0	0.4	0.2	0.00
Pond A20	Southeast Levee Removal	2,900	0	0	0.9	0.4	0.00
Subtotal	**Levee Removal**	**8,900**	**0**	**0**	**2.5**	**1.0**	**0.00**
Pond A19	Northwest Breach and Channel	1,400	800	750	0.2	0.2	<0.1
Pond A19	Northeast Breach and Channel	1,000	230	220	0.1	0.1	<0.1
Pond A19	South Breach Widening	1,500	560	530	0.2	0.2	<0.1
Subtotal	**Levee Breaches**	**3,900**	**1,590**	**1,500**	**0.6**	**0.4**	**0.1**
Totals	**Total Cut**	**25,500**	**1,590**	**1,500**	**6.6**	**2.4**	**0.1**

Note: For small values, the individual values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.

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Table 5. Island Ponds - Estimated Fill Volumes and Areas by Purpose

FILL LOCATION AND PURPOSE	TOTAL VOLUME (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	TOTAL AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
Pond A19 - Northwest Breach – Ditch block 1	1,800	1,800	1,800	0.3	0.3	0.3
Pond A19 - Northwest Breach – Ditch block 2	1,900	1,900	1,900	0.3	0.3	0.3
Pond A19 - Northeast Breach – Ditch block 1	1,500	1,500	1,500	0.3	0.3	0.3
Pond A19 - Northeast Breach – Ditch block 2	1,400	1,400	1,400	0.3	0.3	0.3
Pond A19 - South Breach Widening – Ditch block 1	2,200	2,200	2,200	0.3	0.3	0.3
Pond A19 - South Breach Widening – Ditch block 2	2,200	2,200	2,200	0.4	0.4	0.4
Other Sidecast Levee Material	14,500	14,500	14,500	4.7	4.7	4.7
Total Fill	**25,500**	**25,500**	**25,500**	**6.6**	**6.6**	**6.6**

Notes: "Other sidecast levee material" is assumed to be placed in piles 2-feet thick; acreage is then back-calculated.
For small values, the individual values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.

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3.3.2 Alviso-A8 Pond Cluster

Proposed project activities at the A8 Ponds, illustrated in Figure 4, would include building habitat transition zones at the southwest and southeast corners of Pond A8S to provide a range of benefits. The benefits of this operation include establishment of habitat complexity and diversity, erosion protection for the landfill and levees behind them, and preparation for long-term sea-level rise adaptation. These benefits would provide critical components to the potential long-term restoration plan for the A8 Ponds – to restore them to full tidal action. The operations would include building the tops of the proposed habitat transition zones to approximately 9 feet elevation NAVD88. The lengths of the transition zones along the MHHW line at the southwest and southeast corners would be approximately 2,075 feet each.

Establishing these habitat transition zones would require import and placement of submerged fill in USACE jurisdiction as shown in Table 6. Table 6 presents the areas and volumes of these fill features at various elevations that are relevant to the USACE's jurisdictions under Section 404 and Section 10. These impacts are discussed more fully in subsequent sections of this document. The habitat transition zones would be constructed of fill material from upland construction projects and would extend into the center of the pond at a typical slope of 30:1 (h:v).

Table 6. A8 Ponds - Estimated Fill Volumes and Areas by Purpose

FILL PURPOSE	TOTAL VOLUME (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	TOTAL AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
Western habitat transition zone	94,100	91,500	89,480	12.1	11.7	11.7
Eastern habitat transition zone	84,900	82,500	80,380	12.5	12.2	12.2
Total	**179,000**	**174,000**	**169,860**	**24.6**	**23.9**	**23.9**

Note: For small values, the individual values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.

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3.3.3 Alviso-Mountain View Pond Cluster

The restoration goals for the Mountain View Ponds are to restore them to tidal marsh by connecting them to the Bay, adjacent streams, and sloughs through proposed breaches. After breaching, the ponds would accrete sediment until they reached marsh plain elevation and then begin to develop marsh vegetation. The proposed project includes those breaches as well as a number of other habitat enhancements, flood risk management components, and additional public access and recreation features.

Proposed project activities at the Mountain View Ponds include the following, all of which are illustrated in Figure 5. Table 7 presents the areas and volumes of these features that involve fill activities. Table 8 presents the areas and volumes of cut activities. These areas and volumes are presented at various elevations that are relevant to the USACE's jurisdictions under Section 404 and Section 10. These impacts are discussed more fully in subsequent sections of this document.

3.3.3.1 Raise and Improve the Western Levee of Pond A1

Most of the western levee of Pond A1 would be raised to provide flood risk management to inland areas west and south of the Mountain View pond cluster. The levee breaches in Pond A1 would remove some of the de facto flood protection currently provided by the outboard levees of Pond A1, but raising the western levee of Pond A1 would offset that loss and maintain the current levels of flood risk management in the communities and infrastructure to the southwest of Pond A1. Much of the material for raising the levee would come from off-site, upland sources, though some would come from on-site breaching. The length of levee that would be raised is approximately 4,400 feet. The improved levee would have a 12-foot wide crest north of the proposed viewing platform where no trail would be present and a 14-foot wide crest from the viewing platform southward where a trail would be added. Levee side slopes would be 3.5:1 (h:v). The crest of the levee north of the proposed viewing platform would be constructed to an elevation of 11 feet NAVD88 along its length north of the viewing platform. The crest of the Pond A1 western levee at the viewing platform and southward would be raised to an elevation of approximately 14.7 NAVD88 to match that of the raised Coast Casey Forebay levee (described in the next bullet) that it connects to on its southern terminus.

3.3.3.2 Raise and Improve the Coast Casey Forebay Levee and Associated Structures

Improvements to the Coast Casey Forebay are shown in Figure 5. To offset the loss of de facto protection provided by Pond A1, the Coast Casey Forebay levee that is along the western end of the southern border of Pond A1 would be improved between the Palo Alto Flood Control Basin levee and the high ground in Shoreline Park. In accordance with that necessity, the City of Mountain View, which owns that levee, seeks to the entire length of that levee even beyond its intersection with the Pond A1 levee. To incorporate the highest sea-level rise prediction from the City of Mountain View's Sea Level Rise Study, Feasibility Report, and Capital Improvement Program (ESA PWA 2012), this levee improvement would build a levee base and foundation support sufficient to support a 16-foot NAVD88 cross section but to a crest elevation of 14.7 feet NAVD88. This design levee height satisfies the FEMA design criteria for 100-year flood level plus 3 feet and gives the City of Mountain View the option of future improvements to address sea-level rise. Further, the Santa Clara Valley Water District (SCVWD), which is the flood protection agency in Santa Clara County, has recommended that a levee-top elevation of 14.7 feet NAVD88 be used for long-term sea-level rise planning. This design levee height would also improve flood risk management along the southern end of Charleston Slough and the communities and infrastructure behind it. The length of the levee improvements would be approximately 1,440 feet. The top width of the improved levee would be approximately 24 feet. In and around this levee are a pump station, a valve vault, and several utility access ports, and all would remain as existing. An existing pump station control building to the southwest would remain in place and the raised levee would be built around it. surrounded with a Finally, the existing wooden platform and viewing station that extend into the slough from the trail near the water intake would remain in place, and an ADA-compliant sloped path would be installed to connect it to the raised Coast Casey Forebay levee. A similar path would connect the top of the Coast Casey Forebay levee to the existing trail from the parking area to the south.

Finally, an excavation is required to place the shear key that is necessary to complete the improvements on the Coast Casey Forebay levee. A shear key would be installed to increase the stability and resistance to sliding for the improved levee. The volume and area for this ground excavation-and-replacement activity are included as part of the Coast Casey Forebay improvement estimates in Table 7. The cut volume and area for this portion of work are shown in Table 8. All cut and fill work for the shear key excavation would occur in USACE jurisdiction, though the forebay itself is not tidally connected. The shear key excavation would remove and replace an equal volume of fill over the same area and would improve material and stability to existing conditions.

3.3.3.3 PG&E Infrastructure Improvement

Sixteen (16) transmission towers are within Pond A2W. Conversion of this pond to tidal marsh habitat would require PG&E to upgrade the tower foundations to account for the introduced tidal flux and to raise the maintenance/service boardwalks that run under the power lines and provide PG&E access to the towers. The concrete pedestals on which the towers sit would be reinforced with additional concrete placed higher on the tower legs to protect the metal portions of the towers from the corrosive action of saltwater from the highest tides.

The tidal marsh restoration would also require elevating the existing PG&E access boardwalks in Pond A2W and constructing a new section of boardwalk outside of Pond A1 to connect Pond A2W's outboard levee with the existing boardwalk outside of the Palo Alto Flood Control Basin. All existing boardwalks would be raised a maximum of 4 feet, utilizing the existing boardwalk pillars. The existing boardwalks in Pond A2W are made of wooden planks on a wooden frame that rests on concrete foundations set into the pond bottom. The decking is intermittently used by PG&E for pedestrian access to the towers. This boardwalk would be removed and replaced with a higher one to retain PG&E access to the towers. In addition to raising the boardwalk within the pond, a new section of boardwalk would be added to connect the end of the Pond A2W boardwalk with the end of an existing one that lies northwest of Pond A1. The access points to the boardwalks would be gated to protect against unauthorized human entry and would be designed to exclude terrestrial predators of marsh wildlife species that may use them.

The combined areas and volumes of these improvements are small and are presented in the summary tables in the following subsection.

3.3.3.4 Construct habitat transition zones in Ponds A1 and A2W

Habitat transition zones would be constructed in Ponds A1 and A2W inside the southern edges of Ponds A1 and A2W to create transitional habitat between the lower elevation of the pond bottoms and the uplands and levees behind them. Once vegetated, the habitat transition zones would provide habitat for salt marsh harvest mouse (*Reithrodontomys raviventris*) and other terrestrial species. They would also provide a gentle slope for dissipation of wave energy and reduction of erosion potential, thereby protecting the closed landfill below Shoreline Park. The transition zone in Pond A1 would extend all the way across the southern border of the pond. In Pond A2W the transition zone would only cross the central portion of the pond's southern border, so that potential future connections with the existing mitigation marshes to the south (the Mountain View mitigation marsh and the Stevens Creek mitigation marsh) would not be precluded. The habitat transition zones would be constructed primarily of upland fill material from off-site projects. Roughly 3,700 linear feet and 3,200 linear feet of transition zone would be established along the inside slope of Ponds A1 and A2W, respectively. The habitat transition zones would have a top elevation of approximately 9 feet NAVD88. The slope of these features in Pond A1 would be varied to provide a range of different slopes including slopes at 10:1, 20:1, 30:1 and 40:1 (h:v). The intent of this variation is to execute a pilot project that would provide observational data about the habitat values, erosion protection, and sea-level rise adaptation that would result from these varying slopes. This approach is proposed as part of the SBSP Restoration Project's commitment to developing and sharing scientific insights to inform not only future phases of this project, but also to develop insights and test hypotheses that have broader application to other projects. In Pond A2W, the slope would be 30:1 (h:v).

3.3.3.5 Construct habitat islands in Ponds A1 and A2W for birds

Nesting and roosting habitat for shorebirds, terns, and dabbling birds would be created through the construction of islands in Ponds A1 and A2W. This would include building up to ten islands, each with a top area of roughly 10,100 square feet. There would be 3 to 5 islands per pond. The islands would be constructed largely of upland fill material from off-site projects. Each island would have a top elevation of 12.5 feet NAVD88 (roughly 3 feet above MHHW) and side slopes would be approximately 3:1 (h:v). As the ponds transition to marsh, the island habitat would eventually become marsh mounds, which have various ecological benefits as high-tide refugia and as focal points for further sediment aggregation and vegetation formation.

3.3.3.6 Breach Pond A1 at Two Locations and Pond A2W at Four Locations

These breaches and the associated channels that would be excavated to connect them to the surrounding sloughs would allow tidal flows to enter, sediment to accrete, and vegetation to become established. The two Pond A1 breaches would be at the northwest corner of the pond on the western levee and along the eastern levee into Permanente Creek/Mountain View Slough. Two of the four Pond A2W breaches would be on the western levee into Permanente Creek/Mountain View Slough. The other two breaches would be on the eastern levee into Stevens Creek/Whisman Slough. The specific locations of these breaches would be determined during advanced construction design, but their locations would generally follow the locations of historical slough traces and are also being chosen to minimize the amount of existing fringing marsh through which the channel to connect the breaches to the sloughs must be excavated. The breaches would all have an invert elevation of approximately 2 feet NAVD88 and have approximately 2:1 (h:v) side slopes. The bottom widths would be approximately 60 feet. The length of the channel cut connecting Pond A1 to adjacent Mountain View Slough would be approximately 110 feet. At Pond A2W's western levee, the channel cut through the south breach connecting Pond A2W to Whisman Slough would be approximately 230 feet and through the north breach the channel cut would be approximately 200 feet. On Pond A2W's east levee, the channel cut through the south breach would be approximately 210 feet long and through the north breach it would be approximately 200 feet long. The two breaches on the eastern levee would be designed such that the top width would be wide enough to span access bridges (described below). Both of the breaches on the eastern side of Pond A2W would be armored on both sides to protect the bridge abutments from future erosion or scour.

3.3.3.7 Armor the Two Eastern Breaches of Pond A2W and Add Bridges over the Two Breaches

Two single-span precast/prestressed I-girder bridges would be installed to extend over the armored breaches on the eastern levee of Pond A2W and would provide access to existing PG&E utilities. To accommodate the load of maintenance vehicles, bridges would be designed to accommodate a vehicle load of 4,000 pounds. The bridges would consist of pile supported abutments and wing walls at each end that would provide a foundation for the superstructure and would also serve to armor the breaches and prevent further scour and widening. Foundations and wing walls would be cast in place concrete footings supported on top of piles driven into the existing levee and its edges, where it meets the fringing marsh and the pond interior. Each foundation's abutment is estimated to require 8 supporting piles. The total pile count for both bridges is estimated to be 32 piles. The superstructure would be cast-in-place concrete bridge deck on precast/prestressed 2.5 feet deep I-girders. Concrete barriers (Type 732 or similar) would be placed on each side of the bridge. Each bridge would be approximately 60 feet long and 19 feet wide. This length would allow for a minimum of 40 feet channel bottom width through the bridge opening. The bridge deck elevation would be 12.25 feet NAVD88 and the soffit would be at 9 feet NAVD 88 elevation. The dimensions of the fill for abutments and piles are presented in Table 9. A trail approximately 15 feet wide with 2-foot wide shoulders on each side with would traverse the top of the bridges.

Table 7. Mountain View Ponds - Estimated Fill Volumes and Areas by Purpose

FILL PURPOSE	TOTAL VOLUME (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	TOTAL FOOTPRINT AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
Coast Casey Forebay Levee Improvement*	27,400	12,050	11,370	2.3	1.5	1.3
Pond A1 West Levee Improvement	89,100	40,320	35,780	10.3	8.3	8.2
10 Habitat Islands	53,500	40,600	38,280	5.1	5.1	5.1
Bridge piles, abutments	540	100	60	0.1	<0.001	<0.001
Pond A1 Habitat Transition Zone	77,100	73,480	70,460	16.9	15.9	15.9
Pond A2W Habitat Transition Zone	80,000	77,120	74,420	15.7	15.7	15.3
Totals	**327,640**	**243,670**	**230,370**	**52.8**	**46.4**	**45.8**

Note: For small values, the individual values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.
*Includes the excavation and fill associated with the Coast Casey Forebay shear key.
Additional fill volumes and areas from work associated with PG&E infrastructure improvements would be 124 cubic yards/0.18 acres in USACE jurisdiction in addition to that provided above. The distribution of these volumes and areas of fill would be 12.4 cubic yards/0.018 acres in wetlands and 111.6 cubic yards/0.162 acres in other waters.
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Table 8. Mountain View Ponds - Estimated Cut (Dredge) Volumes and Areas by Purpose

CUT / DREDGE LOCATION	PURPOSE	TOTAL VOLUME (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	AREA (ACRES)	§404 AREA (ACRES)	§10 AREA BELOW MHW (ACRES)
Pond A1	Northwest Breach	1,700	990	900	0.2	0.1	0.1
Pond A1	Southeast Breach	1,700	660	600	0.2	0.1	0.1
Pond A2W	Northwest Breach	2,400	660	600	0.3	0.1	0.1
Pond A2W	Southwest Breach	3,000	880	800	0.4	0.1	0.1
Pond A2W	Northeast Breach	1,100	330	300	0.1	<0.1	<0.1
Pond A2W	Southeast Breach	2,200	1650	1,500	0.3	0.2	0.2
Subtotal	***Mountain View Pond Breaches***	***12,100***	***5,170***	***4,700***	***1.5***	***0.7***	***0.6***
Pond A1 (Coast Casey Forebay)	Shear Key Excavation	3,100	3,100	3,100	0.7	0.7	0.7
Total		**15,200**	**8,270**	**7,800**	**2.2**	**1.3**	**1.3**

Notes: For small values, the individual values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.
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Table 9. Mountain View Ponds - A2W Bridge Details

LOCATION	BRIDGE SUPERSTRUCTURE FOOTPRINT (SQUARE FEET)	PILE QUANTITY	PILE LENGTH (FEET)	PILE DIAMETER (INCHES)
Pond A2W Northeast Breach	1,131	16	45	14
Pond A2W Southeast Breach	1,131	16	45	14
Total	**2,262**	**32**	**n/a**	**n/a**

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3.3.4 Ravenswood Pond Cluster

The restoration goals for the Ravenswood Ponds are to restore Pond R4 tidal marsh by connecting it to the Bay through a breach into Ravenswood Slough, to improve Pond R3 as an enhanced managed pond for small shorebirds, including western snowy plover (*Charadrius alexandrines*), and to convert Ponds R5 and S5 to enhanced managed ponds for dabbling ducks and other bird guilds. The proposed project includes the breach, four water control structures, a number of other habitat enhancements and flood risk management components, and additional public access and recreation features.

Proposed project activities at the Ravenswood Ponds include the following, all of which are illustrated in Figure 6. Table 10 presents the areas and volumes of these features that involve cut activities. Table 11 presents the areas and volumes of fill activities. These areas and volumes are presented at various elevations that are relevant to the USACE's jurisdictions under Section 404 and Section 10. These impacts are discussed more fully in subsequent sections of this document.

3.3.4.1 Convert Ponds R3, R5 and S5 to Enhanced Managed Ponds and Install Water Control Structures

There would be four water control structures installed within and between these ponds to allow them to be managed to achieve different habitat goals. First, a water control structure would be installed into the eastern levee of Pond R3 where the historical slough trace intersects with Ravenswood Slough. This water control structure would allow direct control and management of the water levels in the pond to provide for better water quality management, better control over water levels, and improvement of the existing western snowy plover forage habitat in Pond R3. There would also be a channel excavated through the external fringing marsh to connect the water control structure with Ravenswood Slough.

Ponds R5 and S5, which are currently seasonal ponds, would be converted into a single enhanced managed pond through removal or modification of levees within and between the ponds. There would be four water control structures (pipe culverts through levees) installed. One would be installed at the levee between Ponds R4 and R5. Another would be installed between Pond S5 and Flood Slough. A third would be installed between Ponds S5 and R3. The fourth would be installed between Pond R3 and Ravenswood Slough. By providing the means for year-round control of water levels and some control of the salinities and other aspects of water quality in the ponds, these structures would allow for separate control of different types of managed pond habitat for birds with different bottom depths and elevations.

The water control structures would be circular high density polyethylene (HDPE) pipes (culverts). The number of pipes, pipe size, and invert elevations of the water control structures that would be installed at proposed locations around the project site, are listed in Table 12. The water control structures would be gated at both ends to allow two-way control over flows in or out of each pond.

To support loads from the control structure gates and access to gate controls by Refuge personnel, bridges would be constructed above each pipe culvert from the proposed or existing levee grade to the end of each pipe. The bridge decks would be pre-cast/pre-stressed concrete voided slab decks on pile caps supported by driven concrete piles. Bridge decks would include cable railing on each side of the deck.

3.3.4.2 Improve Levees and Fill in the All-American Canal

Approximately 4,700 feet of improved levee would be constructed on existing levees and would fill in the AAC. The berm-like levees along both sides of the AAC would be raised and strengthened, and the AAC would be filled in, creating a single levee. Constructing this improved levee would replace the protection currently provided by the outboard levees on Pond R4. Improvements at the western end of the AAC would extend north along the Ponds R4/R5 border and south along the R3/S5 border to isolate Ponds R5 and S5 from the others so that they can be managed separately. Most of the material for the improvements would come from off-site sources, though some may be from local cut activities. The improved levee would consist of a 60-foot-wide crest with side slopes at approximately 3.5:1 (h:v) on the north side and 4.5:1 (h:v) on the south side. The crest of the levee would be at elevation 11 feet NAVD88. The improved levee would become wider as it transitions to meet the sections of improved levee that would form the eastern borders of Ponds R5 and S5 and would also be the basis of a public access trail and viewing platform.

3.3.4.3 Construct Two Habitat Transition Zones in Pond R4

Construct one habitat transition zones in the western side of Pond R4, up against the Bedwell Bayfront Park (a closed landfill) border as shown in Figure 6. This habitat transition zones would be approximately 2,500 feet long. Construct the second habitat transition zones to extend northward into Pond R4 from the improved AAC levees. This second habitat transition zones would be approximately 5,100 linear feet long. The habitat transition zones would be at an elevation of 9 feet NAVD88 along the levees or the high ground of the park and have side slopes of 30:1 (h:v) with varying steeper slopes at end transitions. The transition zones would be constructed primarily of upland fill material brought in from off-site locations.

3.3.4.4 Remove Internal Levees in Ponds R5 and S5

As part of converting Ponds R5 and S5 to managed ponds, four water control structures (discussed below) would be installed within and between these ponds. To further enhance the habitat, most of the levee between Ponds R5 and S5 would be removed, and the levee within Pond S5 (i.e., between the forebay and the main part of Pond S5) would be removed to an elevation of 4.5 feet NAVD88 to match the surrounding pond bottoms. This would increase the area available for aquatic habitat within the ponds. As discussed below, a portion of the existing internal levee between Ponds R5 and S5 would be left in place and resurfaced to improve its suitability for use as a habitat island for bird roosting.

3.3.4.5 Establish a Habitat Island between Ponds R5 and S5

A habitat island would be created between Ponds R5 and S5 from the remnants of the internal levee currently between those ponds. The island would be modified to optimize its usefulness as upland wildlife habitat. The habitat island surface would be approximately 1.77 acres with a relatively flat top at elevation 9 feet NAVD88 (above the MHHW elevation) with side slopes of 2:1 (h:v) down to the adjacent pond bottom. Sand, shell, or other suitable topping would be added to the island to enhance its usefulness for the birds that would use it and to help control invasive vegetation.

3.3.4.6 Excavate a Pilot Channel in Pond R4

Portions of the bottom of Pond R4 would be modified to direct the new tidal flows (introduced by the levee breach) into the interior of the pond by creating and extending pilot channels from portions of former slough traces. The proposed pilot channels would together be roughly 2,890 feet long and would be excavated through the existing pond bed. The invert elevation would be at 2 feet NAVD88 to roughly match the invert elevation of the existing channels within Pond R4. The bottom width of the channel cut would be roughly 50 feet wide with side slopes of 2:1 (h:v). The moved material would be used to enhance levees, and construct habitat transition zones and ditch blocks.

3.3.4.7 Build Ditch Blocks in Pond R4

Build ditch blocks in the existing borrow ditches west of the R4 breach to direct tidal flows into the interior of the ponds. The material for the ditch blocks would be from a combination of imported fill material and local material from levee lowering or breaches.

3.3.4.8 Lower the levee in the northwest corner of Pond R4

Approximately 960 linear feet of the northwestern levee on the edge of Pond R4 would be lowered to MHHW. This modification would improve habitat connectivity between Pond R4 and Greco Island/West Point Slough, and it would also provide high-tide refugia for salt marsh harvest mouse and other species. The new top elevation would be at approximately 8 feet NAVD88 and side slopes would be approximately 2:1 (h:v). Material from the lowered levee would be used to raise levees or construct habitat transition zones.

3.3.4.9 Breach Pond R4

Breach the northeastern corner of Pond R4 to open the pond to tidal flows from Ravenswood Slough. Material from the breached levee would be used to build ditch blocks to direct flows through the borrow ditch to the historic slough trace and into the pond’s center; material could also be used to improve levees or construct habitat transition zones. The bottom width of this breach would be approximately 200 feet, with an invert elevation of 2 feet NAVD88 and with side slopes of 3:1 (h:v). The length of the excavated channel to connect the breach to Ravenswood Slough would be approximately 470 feet.

Table 10. Ravenswood Ponds - Estimated Cut (Dredge) Volumes and Areas by Purpose

CUT / DREDGE LOCATION	PURPOSE	TOTAL VOLUME (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	TOTAL AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
Pond S5	Internal Levee Removal	2,500	1,000	920	0.5	0.2	0.2
Ponds R5/S5	North internal levee removal	4,100	3,900	3,720	1.5	0.9	0.8
Ponds R5/S5	South Internal Levee Removal	4,100	2,800	2,540	1.2	0.6	0.6

Table 10. Ravenswood Ponds - Estimated Cut (Dredge) Volumes and Areas by Purpose

CUT / DREDGE LOCATION	PURPOSE	TOTAL VOLUME (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	TOTAL AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
Subtotal	***Levee Removal***	***10,700***	***7,700***	***7,180***	***3.2***	***1.7***	***1.9***
Pond R4	Northwest Levee lowering	2,100	0	0	0.9	0.3	0
Pond R4	Northeast Breach	13,300	10,600	6,650	2.1	2.0	1.8
Pond R4	Pilot Channel	16,000	16,000	16,000	4.1	4.1	4.1
Pond R3	Water Control Structure Channel	1,000	1,000	1,000	0.2	0.2	0.2
Totals		**43,100**	**35,300**	**34,780**	**10.4**	**8.2**	**7.9**

Note: For small values, the individual values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.
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Table 11. Ravenswood Ponds - Estimated Fill Volumes and Areas by Purpose

FILL PURPOSE	TOTAL VOLUME (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	TOTAL FOOTPRINT AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
All American Canal and R5/S5 levee improvement	182,400	46,090	35,980	17.5	7.0	7.0
All-American Canal habitat transition zone	76,300	69,460	63,750	14.9	12.0	12.0
Bedwell Bayfront Park habitat transition zone	50,200	47,240	44,740	9.1	8.3	8.3
Ditch Block west of R4 Breach	1,000	1,000	1,000	0.3	0.3	0.3
Water Control Structures	400	400	400	0.2	0.2	0.2
Total	**310,300**	**164,190**	**145,870**	**41.9**	**27.8**	**27.7**

Note: For small values, the individual values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.

*The Ravenswood habitat island will be formed from remnant of existing levee between Pond R5 and Pond S5. New topping will be added to existing surface above USACE jurisdiction.
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Table 12. Ravenswood Ponds - Water Control Structures

LOCATION	PIPE QUANTITY	INSIDE DIAMETER (INCHES)	PIPE LENGTH (FEET)	INVERT ELEVATION NAVD88 (FEET)	PILE QUANTITY*	TOTAL AREA** (SQUARE FEET)
Pond R5/S5 to Flood Slough	2	48	179	2	8	3,790
Pond R5 to Pond R4	2	48	70	3.5	8	1,650
Pond R5 to Pond R3	1	48	54	4.5	8	690
Pond R3 to Ravenswood Slough	1	48	56	2	8	640
Total	**6**	**N/A**	**359**	**N/A**	**32**	**6,770**

Notes:

*All piles are 16-inch diameter and approximately 20 feet long.

**Total Area includes pipe-culvert, gates and pipe bridges at each control structure

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3.3.5 South Bay Salt Pond Restoration Project Phase 2 Summary Tables

Tables 13 to 16 summarize the areas and volumes of the proposed actions for the SBSP Phase 2 project. For ease of reference, the cut estimates (which is “dredge” only when in Section 404 or Section 10 jurisdiction) and fill estimates are provided by location (i.e., pond cluster) in one set of tables and by purpose in another set of tables. The cut information in Table 13 and Table 14 represent the same volumes and areas presented two different ways, likewise for the fill volumes and areas summarized in Tables 15 and 16. Additionally, each of these tables contains the total areas and volumes at each location, or for each purpose, and then parses those areas or volumes into the quantities in Section 404 or Section 10 jurisdiction.

The areas and volumes of fill for the PG&E infrastructure (totals and the portion in USACE jurisdiction) are presented in Table 17. These are preliminary estimates based on PG&E’s common practices; the actual design work for PG&E’s infrastructure is still underway and will be provided to the USACE when complete. The total areas and volumes presented in Tables 13 through 16 do not include these PG&E totals. They have been kept separate for the purposes of the project description. However, the impact sections below present the grand totals, including the PG&E work

Table 13. SBSP Phase 2 - Estimated Cut (Dredge) Volumes and Areas by Location

LOCATION	TOTAL CUT (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
Island Ponds	25,500	1,590	1,500	6.6	2.4	0.1
A8 Ponds	NA	NA	NA	NA	NA	NA
Mountain View Ponds	15,200	8,270	7,800	2.2	1.3	1.3
Ravenswood Ponds	43,100	35,300	34,780	10.4	8.2	7.9
Total	**83,800**	**45,160**	**44,080**	**19.2**	**12.0**	**9.4**

Notes: Some individually listed values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.
Additional fill volumes and areas from work associated with PG&E infrastructure improvements would be 124 cubic yards/0.18 acres in USACE jurisdiction in addition to that provided above. The distribution of these volumes and areas of fill would be 12.4 cubic yards/0.018 acres in wetlands and 111.6 cubic yards/0.162 acres in other waters.
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Table 14. SBSP Phase 2 - Estimated Cut (Dredge) Volumes and Areas by Purpose

PURPOSE	TOTAL VOLUME (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	TOTAL AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
Levee Removal	19,600	7,700	7,180	5.7	2.7	1.9
Levee Lowering	14,800	0	0	4.3	1.3	0
Levee Breaches and Excavations and Pilot Channels	49,400	37,460	36,900	9.1	8.0	7.4
Total	**83,800**	**45,160**	**44,080**	**19.2**	**12.0**	**9.4**

Notes: Some individually listed values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.
Additional fill volumes and areas from work associated with PG&E infrastructure improvements would be 124 cubic yards/0.18 acres in USACE jurisdiction in addition to that provided above. The distribution of these volumes and areas of fill would be 12.4 cubic yards/0.018 acres in wetlands and 111.6 cubic yards/0.162 acres in other waters.
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Table 15. SBSP Phase 2 - Estimated Fill Volumes and Areas by Location

LOCATION	TOTAL VOLUME (CUBIC YARDS)	§404 VOLUME (CUBIC YARDS)	§10 VOLUME (CUBIC YARDS)	TOTAL AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
Island Ponds	25,500	25,500	25,500	6.6	6.6	6.6

A8 Ponds	179,000	174,000	169,860	24.6	23.9	23.9
Mountain View Ponds	327,100	243,670	230,370	52.8	46.4	45.8
Ravenswood Ponds	310,300	164,190	145,770	41.9	27.8	27.7
Totals	**842,440**	**607,360**	**571,500**	**125.9**	**104.8**	**104.0**

Notes: Some individually listed values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.
Additional fill volumes and areas from work associated with PG&E infrastructure improvements would be 124 cubic yards/0.18 acres in USACE jurisdiction in addition to that provided above. The distribution of these volumes and areas of fill would be 12.4 cubic yards/0.018 acres in wetlands and 111.6 cubic yards/0.162 acres in other waters.
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Table 16. SBSP Phase 2 - Estimated Fill Volumes and Areas by Purpose

PURPOSE	VOLUME (CUBIC YARDS)	§404 VOLUME (ACRES)	§10 VOLUME (CUBIC YARDS)	TOTAL AREA (ACRES)	§404 AREA (ACRES)	§10 AREA (ACRES)
Levee Improvement	298,900	98,460	83,130	32.5	16.8	16.5
Habitat Island	53,500	40,600	38,280	5.1	5.1	5.1
Habitat Transition Zone	462,600	441,300	423,230	81.7	75.9	75.4
Ditch Blocks & Sidecast	26,500	26,500	26,500	6.9	6.9	6.9
Structures (Water Control and Bridges)	940	500	460	0.2	0.2	<0.1
Totals	**842,440**	**607,360**	**571,600**	**125.9**	**104.8**	**104.0**

Notes: Some individually listed values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.
Additional fill volumes and areas from work associated with PG&E infrastructure improvements would be 124 cubic yards/0.18 acres in USACE jurisdiction in addition to that provided above. The distribution of these volumes and areas of fill would be 12.4 cubic yards/0.018 acres in wetlands and 111.6 cubic yards/0.162 acres in other waters.
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Table 17. Areas and Volumes of PG&E Infrastructure Actions

ITEM	TOTAL AREA (ACRES)	TOTAL VOLUME (CUBIC YARDS)	404 AREA (ACRES)	404 VOLUME (CUBIC YARDS)
Replace boardwalks in Pond A2W	0.3	187	0.09	37
Add new boardwalk outside of Pond A1	0.16	93	0.08	47
Enlarge concrete tower footings	0.02	80	0.01	40
Total	**0.48**	**360**	**0.18**	**124**

Note: Areas and volumes within USACE jurisdiction are assumed to be half of the total fill impact. PG&E designs are pending.

4 BOX 19 (PROJECT PURPOSE)

The overall SBSP Restoration Project purpose is to:

1. Restore and enhance a mix of wetland habitats.
2. Provide wildlife-oriented public access and recreation.
3. Provide for flood management in the South Bay.

The purpose of Phase 2 of the SBSP Restoration Project is to meet the needs described above through implementing the proposed work to restore tidal marsh habitat, reconfigure managed pond habitat, maintain current levels of flood protection, and provide recreation opportunities and public access.

Phase 2 addresses multiple needs that include:

- Historic losses of tidal marsh ecosystems and habitats in San Francisco Bay and concomitant declines in populations of endangered species (e.g., California Ridgway's rail [*Rallus obsoletus obsoletus*], and salt marsh harvest mouse [*Reithrodontomys raviventris*]);
- Increasing salinity and declining ecological value in several of the ponds within the project area;
- Long-term deterioration of non-certifiable levees (for Federal Emergency Management Agency [FEMA] purposes) within the project area, which could lead to levee breaches and flooding;
- Long-term tidal flood risk management; and
- Limited opportunities in South San Francisco Bay for wildlife-oriented recreation.

Phase 2 objectives are:

- Create, restore, or enhance habitats of sufficient size, function, and appropriate structure to:
  - Promote restoration of native special-status plants and animals that depend on South San Francisco Bay habitat for all or part of their life cycles.
  - Maintain current migratory bird species that utilize existing salt ponds and associated structures such as levees.
  - Support increased abundance and diversity of native species in various South San Francisco Bay aquatic and terrestrial ecosystem components, including plants, invertebrates, fish, mammals, birds, reptiles, and amphibians.
- Maintain or improve existing levels of flood risk management in the South Bay.
- Provide public access and recreational opportunities compatible with wildlife and habitat goals.
- Protect or improve existing levels of water and sediment quality in the South Bay and take into account ecological risks caused by restoration.
- Implement design and management measures to maintain or improve current levels of vector management, control predation on special-status species, and manage the spread of non-native invasive species.

- Protect the services provided by existing infrastructure (e.g., power lines, railroads).

5 BOX 20 (REASON FOR DISCHARGE)

Fill and discharge of fill into Waters of the US will be required in order to meet the purpose of the project: 1) restore and enhance a mix of wetland habitats; 2) provide wildlife-oriented public access and recreation; and 3) provide for flood management in the South Bay.

5.1 General Site Restoration Components

The Phase 2 sites include several common restoration features and operations that are proposed to meet project objectives. Detailed information for operations at each site is provided in subsequent sections. A general summary of these operations and features follows.

5.1.1 Habitat Transition Zones:

As an adaptation to future sea level rise, the project is proposing the creation of habitat transition zones as part of Phase 2 actions. Habitat transition zones involve the beneficial reuse of material to create transitional habitats from the pond or marsh bottom to the adjacent upland habitat along portions of the upland edge. These habitat transition zones, are sometimes referred to elsewhere as “upland transition zones,” “transition zone habitats,” “ecotones,” or “horizontal levees”; this document uses the term “habitat transition zones” for these constructed features. Habitat transition zones are specifically called out in documents such as the U.S. Fish and Wildlife Service’s Tidal Marsh Recovery Plan and the recent Science Update to the Baylands Ecosystem Habitat Goals Project Report. A gradual transition from submerged Baylands, ponds, or open waters to uplands is largely missing in the current landscape of the South Bay, where there is often an abrupt boundary between the bay or ponds and the built environment. The SBSP Restoration Project’s intention in including habitat transition zones in the Phase 2 alternatives is to restore this missing habitat feature. Doing so would:

- Establish areas in which terrestrial marsh species can take refuge during high tides and storm events, thereby reducing their vulnerability.
- Expand habitat for a variety of special status plant species that occupy this specific elevation zone.
- Provide space for marshes to migrate upslope over time as sea-level rise occurs.

Before proposing these features, the SBSP Restoration Project examined the landscape to see if there were any areas adjacent to the project site where this could occur naturally. In general, the best locations for building these features would be located adjacent to open space or park land where the project can provide an even greater extent of transition into upland habitats. However, at the edge of the Bay, these open space areas are largely former (now closed and capped) landfills which present a variety of challenges for creating the missing upland habitat. First, the existing elevation gradient between the restored marsh and the edge of the landfill is usually too steep to provide a gradual transition. Secondly, these landfills would otherwise pose a water quality risk from erosion if tidal action were introduced immediately adjacent to the protective clay liner or un-engineered rip rap slopes. In these instances, it is necessary that the project place material inside the former salt ponds to create the desired slope (generally 15:1 to 30:1 but potentially larger). At other locations, the actual elevations landward of the project sites are too low to create an uphill slope with the desired habitat functions. Therefore, once new levees are built to protect that area from tidal flooding, the only area remaining to build the transition zones is in the former salt ponds. Finally, most of the adjacent property is not within the SBSP Restoration Project's ability to acquire, whether or not it has the desired elevation profile, because it is currently developed. In addition to being very expensive to acquire these areas, it would be infeasible to relocate all of the residences and businesses that have been built adjacent to the salt ponds.

For these reasons, the project plans to construct the habitat transition zones inside the former salt ponds. The transition zones would improve the habitat quality of the restored marsh, particularly for endangered and threatened species, and improve resiliency of the shoreline over time as sea levels rise.

5.1.2 Ditch Blocks

To create the existing salt production evaporation ponds, earth was piled in a mound around each pond's perimeter to establish levee that separated the pond from communicating with the waters of the Bay. The material for these levees was sourced from digging ditches around the perimeter of the pond, leaving a borrow ditch around the raised levees. Operations and maintenance of the levee maintained this process during salt production. Phase 2 propose the use of ditch blocks as a means of enhancing tidal flow as select ponds are restored to tidal marshes.

Ditch blocks would be built by placing fill material inside of the historic borrow ditches to direct tidal flows into the center of the ponds instead of allowing them to flow around the interior perimeter. Fill material would be sourced from levee lowering, removal and breaching operations at each pond as well as from off-site sources.

5.1.3 Levee Modifications

Modifications to existing pond levees are proposed at multiple locations to establish hydraulic connection with adjacent sloughs and the Bay, establish a mosaic of wildlife habitat to meet restoration goals, and provide the necessary flood risk management. Modifications proposed for Phase 2 include breaching levees, lowering levees, removing levees and improving levees. A brief summary of these proposed restoration operations follow.

5.1.3.1 Levee Breaching

Levee breaches are proposed at specific pond locations to open the ponds to full tidal flows and/or to establish hydraulic connections between ponds. Levees would be breached after all internal pond activities are completed. Levees would be breached mechanically using earth moving equipment. Most breaches would not be reinforced and would be allowed to scour and widen naturally. Select locations would have armored breaches to support bridges where access by levee roads would be maintained. Material from breaches would be used for levee enhancements, sidecast into the ponds and used to create ditch blocks or pond bottom to speed the return to marsh plain elevation.

5.1.3.2 Levee Lowering

At select locations, levees would be lowered by scraping their tops down to the local mean higher high water (MHHW) elevation. Levee lowering would enhance habitat connectivity and provide transition of some locations to tidal marsh. Levee material would be used for levee enhancements, sidecast into the ponds and used to create ditch blocks or pond bottom to speed the return to marsh plain elevation.

5.1.3.3 Levee Removal

Levee removal is proposed at specific ponds to restore managed ponds to tidal wetland and to enhance hydraulic connections between ponds. Levee removal would bring certain sections of levees down to the elevation of the adjoining marsh plain and would thereby help connect aquatic habitat at high tides and speed the overall restoration of tidal marsh. Levee material would be used for levee enhancement, sidecast into the ponds and used to create ditch blocks or pond bottom to speed the return to marsh plain elevation.

5.1.3.4 Levee Enhancement

Levee enhancements are proposed at some locations to maintain or improve flood control, improve levee conditions for public access features and promote the establishment of wildlife habitat and native plant composition. These activities involve raising, widening, compacting, and otherwise improving existing levees where it is necessary to do.

5.1.4 Habitat Islands

Within specific ponds habitat islands would be constructed from fill and existing levees to provide isolated nesting areas for birds. These islands would increase the quality, complexity, and availability of bird habitat in the Phase 2 areas and in the Refuge in general.

5.1.5 Water Control Structures

Within the Ravenswood Ponds at four locations, water control structures would be installed. Water control structures are proposed to allow management of water levels and quality in managed ponds. They would give Refuge staff more ability to avoid water quality problems, algal blooms, or other adverse impacts. The water control structures would be pipe culverts with gates at each end to provide directional control.

5.1.6 Initial Overbuild

To achieve final design goals, many fill operations would require that construction elevations are built at a higher elevation than the final design. This planned overbuild is to allow for compaction, address wind and water erosion, and compensate for settling that will occur after fill is placed. Constructions elevations for levee improvements, habitat transition zones, and habitat islands would typically be constructed 2 to 4 feet above design goals

Additional activities for each pond cluster are discussed in Proposed Actions, Box 18, Section 3 of this document.

5.2 Discharge Means, Methods, and Equipment

This section discusses the construction approach at each of the Phase 2 locations. It describes the means and methods of how each component listed above would be implemented, and lists the equipment that would be used to do so. Subsequent sections address details of construction schedules and of the planned operations and maintenance.

A San Francisco Regional Water Quality Control Board (RWQCB) accepted Storm Water Pollution Prevention Plan for the project would be implemented for all project-related activities; appropriate Best Management Practices (BMPs) would be used for all activities with potential impact on water quality. Water quality monitoring would be undertaken in compliance with a SBSP Restoration Project 401 Certification and Waste Discharge Requirements, once issued by the RWQCB, and the San Francisco Bay RWQCB Basin Plan.

Prior to performing construction activities, areas to be disturbed by construction equipment would be cleared of existing vegetation and disposed off-site.

5.2.1 Alviso-Island Pond Cluster

At the Island Ponds, the construction approach would include the following details.

5.2.1.1 Construction Access

Primary land access to the Island Ponds would be from the adjacent levees at Ponds A22 and A23. Vehicle and heavy equipment access to these ponds is available from levee roads. An amphibious excavator would be offloaded and floated across Mud Slough. Daily access for crews would be from the Fremont Boulevard exit off of Interstate 880, onto Landing Road, and then onto an unnamed levee road that connects to the northeast corner of Pond A19 via small footbridge. Construction crews would typically consist of fewer than a dozen people.

5.2.1.2 Construction Staging Areas

No staging areas are necessary for work at the Island Ponds. Equipment used for construction would stay within the project footprint, and no material would be brought into the Island Ponds.

5.2.1.3 Levee Breach and Channel Excavation

All levee modifications – including adding new breaches, widening existing breaches, and lowering and removing levees – would be accomplished by using amphibious excavators, and other conventional construction equipment. Movement of the excavator between the perimeter levees of Ponds A19 and A20 would occur at low tide utilizing mats. The excavators would work from the existing levees.

5.2.1.4 Ditch Blocks

Ditch blocks would be formed by placing material from other onsite activities into the existing internal borrow ditches and compacting it. Excavators would be used for placement, and a vibratory hand tamper or a roller would be used for compaction.

5.2.1.5 Construction Equipment

Construction equipment would include excavators (amphibious and/or terrestrial, fitted with long-reach attachments), a barge (for fueling and possibly for access to the project site), low-bed truck, other common construction equipment, skiff, and pickup vehicles for transportation in and out of the project site.

5.2.2 Alviso-A8 Pond Cluster

At the A8 Ponds, the construction approach would include the following details.

5.2.2.1 Construction Access

Access to the A8 Ponds would be from Gold Street or America Center Road near the southeast corner of Pond A8S and the levee crests along the perimeter levees. The ponds would be accessed by haul trucks using existing roadways and levee roads. No work would occur on the internal pond levees. Construction crews would typically consist of fewer than a dozen people. The existing levees are known to be capable of handling heavy construction equipment and trucks carrying dirt because the SCVWD uses these access roads to import material dredged from creek channels in Santa Clara County.

5.2.2.2 Construction Staging Areas

A staging area would be established for equipment and material stockpiling. The location would be within the hard-pack access and turnaround areas that exist within the landfill access areas or within the construction area along the southern border of Pond A8S.

5.2.2.3 Habitat Transition Zones

The habitat transition zones would be constructed by placing fill material along the slopes and into the pond bottom. The work would proceed from the existing levee roads outward into the pond. Material would be placed and compacted to approximately 70 percent density to enable vegetation establishment. Slope protection would be maintained by establishment of native vegetation. Hydroseeding or other seeding method with a native plant mix, development of a planting scheme, and invasive plant control would aid in establishing desirable vegetative habitat.

5.2.2.4 Construction Equipment

Construction equipment would include haul trucks, bulldozers, water trucks, compaction rollers, other construction equipment, and vehicles for transportation in and out of the project site.

5.2.3 Alviso-Mountain View Pond Cluster

At the Mountain View Ponds, the construction approach would include the following details.

5.2.3.1 Construction Staging Areas

Construction staging areas will be established within Mountain View Shoreline Park at locations to be determined in coordination with City of Mountain View. The staging areas will be adjacent to the southern borders of Ponds A1 and A2W in upland areas alongside existing roads and trails.

5.2.3.2 Levee Improvement

Levee improvements along the western side of Pond A1, the eastern side of Pond A2W, and the Coast Casey Forebay levee would require clearing of vegetation, debris, and grooving. Fill would be placed in 8-inch-thick lifts and compacted either through a vibratory hand tamper or a roller to achieve approximately 90 or 95 percent compaction. Some material would be largely sourced from off-site excavation projects. On-site sources would include excavated material from levee lowering, channel excavation, and breaching activities.

Levee crests destined for trail access would be finished with a 4-inch-thick layer of crushed gravel to provide all weather access and to be compliant with the Architectural Barriers Act (ABA) on federal lands and the Americans with Disabilities Act (ADA) where the trails are part of the Bay Trail system or where project partners (e.g., city, county, or state agency) have compliance obligations.

5.2.3.3 PG&E Boardwalk and Tower Footing Improvements and Additions

The new boardwalks would be placed within the existing PG&E right-of-way (ROW), adjacent to the towers. All new sections of boardwalk would be built approximately 4 feet above the height of the existing boardwalk. The boardwalk spans would be 3-foot-wide sections and would include a double handrail. The boardwalk spans would be built in 20-foot-long sections supported by 4-inch by 4-inch vertical plastic lumber posts, known as support footings, which would be spaced 10 feet apart along the boardwalk spans. The boardwalks would parallel the transmission line towers and would include additional lateral boardwalks, which would be used to access each tower from the main boardwalk. Boardwalk work would be completed first for worker safety and to more efficiently transport materials and tools to the towers. Following the completion of boardwalk replacement and construction, work would be performed on the footings of the towers in Pond A2W. Multiple towers will be worked at the same time from each side of the boardwalks. All structures would require adding additional concrete to existing concrete foundations to a greater height of up to 4 feet above existing structure footing. Construction details for this work are provided in Appendix A.

5.2.3.4 Habitat Islands

The material for the habitat islands would be placed by long-reach excavators working from the existing levees. Material would be delivered by haul trucks to the working locations. A water truck would be used for dust control of delivered material. An excavator would place material in the pond. The material would be piled in layers and compacted by a vibratory tamper or a roller. The top surface of the proposed habitat islands would be treated with a combination of rock, shell, and sand; current designs include a 12-inch-thick sand layer underlain by 6-inch-thick crushed rock to cover any surficial cracks and prevent weed establishment. The sand layer would be covered with a 4-inch-thick layer of oyster shells, if available, to provide a barren land sight that is typically preferred by some nesting birds.

5.2.3.5 Habitat Transition Zones

Pond A1's habitat transition zone would be constructed by placing fill material along the existing levee side slopes and into the pond bottoms at a range of different side slopes including 10:1, 20:1, 30:1 and 40:1 (h:v). Pond A2W habitat transition zone would be constructed with 30:1 (h:v) a side slope. The work would proceed from the existing levee roads outward into the pond. These features would be compacted to approximately 70 percent dry density to enable vegetation establishment. Slope protection would be maintained by establishment of native vegetation.

Hydroseeding or other seeding method with a native plant mix, development of a planting scheme, and invasive plant control would aid in establishing desirable vegetative habitat.

5.2.3.6 Levee Breach and Channel Excavation

Breaching would be accomplished from the levee crests using excavators and hauling material to locations receiving fill for levee improvement or habitat transition zone construction. The breach at the northwest corner of Pond A1 would be at the location of the current water intake gate, which would be removed as part of this breach activity.

5.2.3.7 Levee Bridges

The two breaches in the east levee of Pond A2W would be bridged to provide continued PG&E maintenance access and to support a public access trail. Existing levees at connection points would be raised from approximately 10 feet NAVD88 to 12.5 feet NAVD88. These bridges would include prefabricated I-girder superstructure with a cast in place concrete bridge deck on precast 2.5 feet deep concrete I-girders set on seat-type abutments with wing walls that would be cast on top of driven concrete piles. Installation of the abutment foundations would require vibratory and impact driving to install concrete piles, installing and dewatering cofferdams at each abutment location, setting foundation forms, and pouring concrete. .. Support piles at each abutment would be 14 inch pre-cast concrete piles approximately 45 feet in length. 8 piles at each of four abutment footings would be driven. The total count for piles driven to support both bridges would be 32. Piles would be driven using an impact hammer.

5.2.3.8 Dewatering

Armoring and bridging of breaches on the east levee of Pond A2W would require dry conditions. Therefore, installation of cofferdams at the breach and bridge locations would facilitate the construction of concrete abutments and wing walls. During cofferdam dewatering, pumped water would be managed in accordance with the 2007 SBSP Program FEIS/R and 2016 SBSP Phase 2 Mitigation Measure 3.4-5a. The language from this Mitigation Measure follows.

SBSP Mitigation Measure 3.4-5a: Stormwater Pollution Prevention Plan.

This mitigates potential impacts due to construction related-activities and maintenance activities. The Project sponsors will obtain authorization from the RWQCB prior to beginning construction. As part of this application, the Project sponsors will prepare a Stormwater Pollution Prevention Plan (SWPPP) and require all construction contractors to implement BMPs identified in the SWPPP for controlling soil erosion and discharges of other construction-related contaminants. Routine monitoring and inspection of BMPs will be conducted to ensure that the quality of stormwater discharges is in compliance with the permit.

BMPs that will appear in the SWPPP include:

- Soil stabilization measures, such as preservation of existing vegetation and use of mulch or temporary plantings to minimize soil disturbance;
- Sediment control measures to prevent disturbed soils from entering waterways;

- Tracking control measures to reduce sediments that leave the construction site on vehicle or equipment tires;
- Non-stormwater discharge control measures, such as monitoring water quality of dewatering operations and hazardous material delivery, storage, and emergency spill response requirements, and measures by the Project sponsors to ensure that soil-excavation and movement activities are conducted in accordance with standard BMPs regarding excavation and dredging of bay muds as outlined in San Francisco Bay Conservation and Development Commission's bay dredge guidance documents. These include excavating channels during low tide; using dredge equipment, such as sealing clamshell buckets, designed to minimize escape of the fine grained materials; and testing dredge materials for contaminants.

The contractor will select specific BMPs from each area, with Project sponsor approval, on a site-specific basis. The construction general contractor will ensure that the BMPs are implemented as appropriate throughout the duration of construction and will be responsible for subcontractor compliance with the SWPPP requirements.

Other impacts due to construction-related and maintenance activities can be mitigated by appropriate additions to stormwater pollution prevention plans, including a plan for safe refueling of vehicles and spill containment plans. An appropriate hazardous materials management plan will be developed for any activity that involves handling, transport or removal of hazardous materials.

5.2.3.9 Trails, Viewing Platforms, Signs, and Benches

All rebuilt trails on existing levees that would be raised or modified as part of this project would be resurfaced to match the existing conditions.

A new trail would be built on a portion of the raised and improved Pond A1 west levee. A new trail would also be built on the eastern levee of Pond A2W, which would not be raised but which would be graded and filled in places as needed to make the levee top suitable for a trail. Eroded or uneven surfaces on these levees would be regraded for ADA and ABA compliance. Surfacing materials would be decomposed granite with timber or concrete edging. These materials would be placed with dump trucks and bulldozers.

The new viewing platforms would not be elevated above the levees or existing land on which they would be placed, though some would involve local levee widening to accommodate the added space required. The viewing platforms would be graded and surfaced to meet ABD and ADA standards and would have a visual appearance matching nearby conditions. The main features at the platforms would be benches and signs or panels that provide site information to the public. These features would be constructed of wood and placed on cast-in-place concrete abutments. The footings would be dug with an auger attachment on a bobcat. Concrete would be imported by concrete truck and the footings would be cast-in-place. The signage at the platforms would be mounted on pedestals, and one or more benches would be located near each sign or panel.

5.2.3.10 Construction Equipment

Construction would be accomplished using conventional construction equipment including excavators, bulldozers, dump trucks, compaction rollers, water tankers, refueling tanks, pile-driving equipment, pumps, sheet piles, cranes, barges, skiffs, paving equipment, and pickup vehicles for transportation in and out of the project site. Helicopters may be needed in areas where new PG&E boardwalks are constructed. Temporary fill would also be used at staging locations if required. Fill material would be transported to the project area by haul trucks.

5.2.4 Ravenswood Pond Cluster

At the Ravenswood Ponds, the construction approach would include the following details.

5.2.4.1 Construction Access

Ravenswood Ponds would be primarily accessed from the Marsh Road exit on U.S. 101 via the entrance to the City of Menlo Park's Bedwell Bayfront Park. The USFWS has an access easement with the city for this purpose. Alternate access to the southern edge of Pond R3 is possible from the paved bicycle path/hiking trail just north of SR 84. The details of this access would be developed in coordination with the City of Menlo Park.

The construction areas in and around the ponds themselves would be accessed via existing trails in Bedwell Bayfront Park and on the Refuge levee crests. The USFWS Refuge staff drive on the levees for maintenance, cleanup, and other management purposes, and it is assumed that the existing levees are capable of handling heavy construction equipment. Ponds R4, R5, and S5 can be accessed via existing trails on the edge of Bayfront Park and the outboard perimeter levee in Ponds R3 and R4. The crests of the berms on either side of the AAC or the levee around the perimeter of Pond R4 would be used to access various construction areas in Ponds R3 and R4.

If conditions warrant, levee improvements, including the widening of the crest to provide adequate pathway for construction equipment, would be undertaken. Heavy vehicles would avoid crossing structures in the levees if the vehicle exceeds the weight-bearing capacity of a structure. If this is not possible, engineer-approved precautions would be taken to avoid damaging the structure.

5.2.4.2 Construction Staging Areas

Staging areas would be established for equipment and material storage within the Refuge boundaries. These areas may be on existing levees or in areas that would be filled as part of the Phase 2 actions later in the project. Material staging areas would not be located within the City of Menlo Park's Bedwell Bayfront Park.

5.2.4.3 Dewatering

Construction could occur in the wet or the dry. If the contractor decides to perform construction in the dry, some localized dewatering would be required. Dewatering of pond bottom would be accomplished by evaporating the pond beds to provide access to excavate pilot channels. Limited, local dewatering using portable, generator-powered pumps would likely take place during the installation of water control structures. Pumped water would be discharged per the 2007 SBSP Program FEIS/R and 2016 SBSP Phase 2 FEIS/R Mitigation Measure 3.4-5a.

5.2.4.4 Demolition of Existing Water Control Structures

An existing water control structure at Pond R5 consists of a 72-inch-diameter corrugated metal pipe through the levee between Ponds R4 and R5. This, a remnant feature of the former salt production infrastructure, and similar features elsewhere at these ponds would be removed. During construction, this culvert and all associated support structures would be demolished and disposed off-site or recycled as appropriate.

5.2.4.5 Water Control Structures

The four water control structures would be placed into trenches cut by excavators and/or backhoes. To reduce the corrosion concerns typically expected in brackish water and to allow for management of pond habitat, solid-wall HDPE pipes would be used. Pipe bridges would be built over both ends of each structure to allow maintenance and operations access. The pipe bridges would be built pre-cast/pre-stressed concrete voided slab decks on pile caps, supported on concrete driven piles. Piles would be driven using vibratory and impact methods.

The water control structure connection Flood Slough to the Pond S5 forebay would be the most involved installment because a portion of the existing roadway entrance into Bedwell Bayfront Park would have to be removed to allow access to the ground below it.

5.2.4.6 Habitat Transition Zones

The habitat transition zones would be constructed by placing fill material along the existing levee side slopes and into the pond bottoms. The work would proceed from the existing levees outward into the pond. These features would be compacted to 70–80 percent density to enable vegetation establishment. Slope protection would be maintained by establishment of native vegetation. Hydroseeding or other seeding method with a native plant mix, development of a planting scheme, and invasive plant control would aid in establishing desirable vegetative habitat.

5.2.4.7 Levee Improvements

Levee improvements at the AAC would consist of preparing the subgrade to receive additional fill material by clearing vegetation, debris, and grooving. Fill would be placed in 8 inch-thick lifts and compacted either through a vibratory hand tamper or a roller to achieve 95 percent compaction. Borrow material would be sourced on-site from levee lowering at Pond R4, internal levee removal at Ponds R5 and S5, and pilot channel excavation, but most would be from off-site upland excavation projects.

5.2.4.8 Levee Removal

An excavator would be used to remove most of the levees within and between Ponds R5 and S5. Removed material would be used on site to fill borrow ditches, construct ditch blocks, or to construct habitat transition zones.

5.2.4.9 Pilot Channel Excavation

Existing soil conditions at the R4 pond bottom are likely to be too soft to support vehicles or heavy equipment. Temporary mats with gravel cover would be deployed at the pond bottom to create a firm surface that can handle heavy equipment such as an excavator, loader, or mini-dozer to access locations where pilot channels are to be established. Alternatively, amphibious equipment such as an aquatic excavator would be used to excavate in the wet to designed depths. It is likely that removed material would be unsuitable to be used as levee fill material and would instead be used to fill borrow ditches within Pond R4 or as fill for habitat transition zones.

5.2.4.10 Ditch Blocks

Ditch blocks would be formed by placing material from other onsite activities into the existing internal borrow ditches and compacting it. Excavators would be used for placement, and a vibratory hand tamper or a roller would be used for compaction.

5.2.4.11 Levee Lowering or Removal

Levee lowering at the northwest corner of Pond R4 would be accomplished by using an excavator and loader and hauling the removed material to fill borrow ditches in Pond R4 or to construct habitat transition zones. Levee lowering at Pond R4 would remain at elevations above the MHHW until construction activities within the pond that need to be performed in the dry are complete. After construction operations within the ponds are complete, these levees would be lowered to approximately 8 feet NAVD88. This would cause levee overtopping, levee erosion and allow for improved hydraulic and habitat connectivity.

Portions of the internal levees between and within Ponds R5 and S5, with lengths ranging from 2,500 feet to 4,100 feet would be removed (i.e., lowered to match the existing pond bottom elevation of about 4.5 feet NAVD88). This activity would also use an excavator and loader. Removed material would be used to fill borrow ditches in Pond R4 or to construct habitat transition zones.

5.2.4.12 Habitat Island

The expected treatment for the top surface of the island is a 12-inch-thick sand layer underlain by a 6-inch-thick crushed rock to minimize weed establishment. The sand layer would be mixed with Bay mud to prevent formation of cracks. The sand layer would be covered with 4-inch-thick layer of oyster shells, if available, to provide a barren land site that is typically preferred by nesting birds. Other combinations of rock, sand, dirt, or other materials may be used as available. These materials would be brought in and placed prior to removal of the portions of the levee to be breached.

5.2.4.13 Trail, Viewing Platform, Signs, and Benches

The 2,750-foot trail on the eastern border of Ponds R5 and S5 would be at least 10 feet wide with 2-foot shoulders on each side and would be built on the improved levees described above. Erosion or uneven surfaces on existing levees would be regraded for compliance with the ABA on federal lands and the ADA elsewhere. Levees would be graded and compacted. Geotextile fabric would be laid out and gravel imported and compacted in place. Quarry fines would then be compacted over the gravel with a smooth drum compactor to create an accessible surface.

The new viewing platform would not be elevated above the levee or existing land on which it would be placed. There would be local levee widening to accommodate the added space required. The viewing platforms would be graded and surfaced to meet ABD and ADA standards and would have a visual appearance matching nearby conditions. The main features at the platforms would be benches and signs or panels that provide site information to the public. These features would be constructed of wood and placed on cast-in-place concrete abutments. The footings would be dug with an auger attachment on a bobcat. Concrete would be imported by concrete truck and the footings would be cast-in-place. The signage at the platforms would be mounted on pedestals, and one or more benches would be located near each sign or panel.

5.2.4.14 Levee Breach and Channel Excavation

The levee breaching and associated excavation of a channel to connect to Ravenswood Slough would be accomplished from levee crests using long-reach excavators and hauling material using trucks to on-site locations receiving fill for levee improvement or habitat transition zones.

5.2.4.15 Construction Equipment

Excavators, bulldozers, amphibious equipment (e.g., an aquatic excavator), dump trucks, compaction rollers or vibratory plates, a water tanker, pumps, sheet piles, refueling tanks, and pickup vehicles for transportation in and out of the project site would be used during construction. Depending on the soil conditions within the ponds, temporary heavy equipment mats or wooden mats with gravel cover would be employed to provide access and establish working conditions to excavate pilot channels at the pond bottom. Temporary fill would also be used at staging locations if required. Upland fill material would be transported to the project area by trucks.

6 BOX 21 (TYPES AND AMOUNTS BEING DISCHARGED)

Total soil fill volume is: 604,040 cubic yards.

Total water control structure/bridge abutment/bridge piles fill volume is: 500 cubic yards

Volumes of discharged fill are summarized by location and by purpose in Tables 15 and 16. Fill locations are indicated on Figure 7. Fill material will consist of dredged soils from the ponds and existing levee soil from levee breaching, levee lowering, levee removal, and levee modifications, as discussed in Section 5.1. Any additional fill required will be upland soil fill sourced from off-site projects. Methods of fill placement are discussed in Section 5.2.

Table 18. Project Impacts to Wetlands and Other Waters of the U.S., Volume of Fill

Phase 2 Activities	Wetlands (cubic yards)[1]		Other Waters of the U.S. (cubic yards)[2]	
	fill	dredge	fill	dredge
Island Ponds (A19 and A20)				
Install ditch blocks	600	0	6,000	0
Levee lowering/removal	0	5,037	0	560
Breaching levees	0	900	0	130
Widen breaches of southern levee	4,000	500	400	60
Other sidecast material	7,250	-	7,250	-
A8 Ponds (A8 and A8S)				
Construct habitat transition zones	10,000	-	164,000	-
Mountain View Ponds (A1 and A2W)				
Construct habitat transition zones	30,120	-	120,480	-
Build eight to ten habitat islands	0	-	38,280	-
Raise and improve levees	17,457	3,100	34,913	-
Bridge piles/abutments	100	0	0	0
Breaching levees	0	4,136	0	1,034
Ravenswood Ponds (R3, R4, R5, S5)				
Excavate pilot channels	0	1,000	0	15,000
Levee improvement	7,682	3,850	38,408	3,850
Build ditch blocks	100	0	900	0
Construct habitat transition zones	11,670	0	105,030	0
Install water control structures	200	500	200	500
Breaching levees	0	3,533	0	7,067
TOTALS	**89,179**	**22,556**	**515,861**	**28,201**

Notes:

[1] "Wetlands" include tidal salt marsh, brackish marsh, and freshwater marsh habitats.

[2] "Other waters" include open water and subtidal habitat, former salt production ponds, and mudflat habitat. Other Waters includes both 404 and Section 10 waters.

Notes: Some individually listed values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.

Additional fill volumes from work associated with PG&E infrastructure improvements would be 124 cubic yards in USACE jurisdiction in addition to that provided above. The distribution of these volumes of fill would be 12.4 cubic yards in wetlands and 111.6 cubic yards in other waters.

7 BOX 22 (SURFACE AREA OF WETLAND AND/OR OTHER WATERS FILLED)

Surface areas of fill and Project impacts to wetlands and other waters of the U.S. are shown in Figure 7. Project impacts to wetlands and other waters of the U.S. are presented in Table 18.

As discussed in the response to Box 20, fill and discharge of fill into Waters of the US will be required in order to meet the purpose of the project: 1) restore and enhance a mix of wetland habitats; 2) provide wildlife-oriented public access and recreation; and 3) provide for flood management in the South Bay. The proposed Project activities are aimed at restoring higher-ecological value wetlands or enhanced managed ponds (using ecological functions and values such as those used in CRAM or similar function) on what are now marginal non-wetland waters of the U.S. Specifically:

1) The already tidal opened Island Ponds will be sped toward their tidal marsh destiny and have more aquatic habitat connectivity and diversity.
2) The deep water managed ponds A8 and A8S will be enhanced a bit by having the habitat transition zone added.
3) The relatively barren salt pannes at Ravenswood would be made to a mix of tidal marsh and enhanced managed ponds.
4) The deep and relatively stagnant open water MV Ponds (A1 and A2W) would be opened to tidal marsh flows and eventually become tidal marsh.

7.1 Project Impacts to Wetlands and Other Waters

Table 19. Project Impacts to Wetlands and Other Waters of the U.S., Area of Fill

PHASE 2 ACTIVITIES	WETLANDS (ACRES)[1]		OTHER WATERS OF THE U.S. (ACRES)[2]	
	FILL	CUT	FILL	CUT
Island Ponds (A19 and A20)				
Install ditch blocks	0.22	-	1.00	-
Levee lowering/removal	-	2.00	-	0.40
Breaching levees	-	0.24	-	0.02
Widen breaches of southern levee	0.60	0.15	0.10	0.05
Other sidecast material	2.35	-	2.35	-
A8 Ponds (A8 and A8S)				
Construct habitat transition zones	0.91	0	23	0
Mountain View Ponds (A1 and A2W)				
Construct habitat transition zones	6.43	-	25.57	-
Build eight to ten habitat islands	0.00	-	5.10	-
Raise and improve levees	3.25	0.65	6.51	-
Bridge piles/abutments	0.00	-	0.00	-
Breaching levees	-	0.55	-	0.14

PHASE 2 ACTIVITIES	WETLANDS (ACRES)[1]		OTHER WATERS OF THE U.S. (ACRES)[2]	
	FILL	CUT	FILL	CUT
Ravenswood Ponds (R3, R4, R5, S5)				
Excavate pilot channels	-	0.10	-	4.00
Levee improvement	0.47	0.89	6.55	1.10
Build ditch blocks	0.01	-	0.28	-
Construct habitat transition zones	1.32	0.00	19.03	0.00
Install water control structures	0.10	0.08	0.10	0.08
Breaching levees	-	0.65	-	1.27
TOTALS	**15.72**	**5.31**	**89.59**	**7.06**

Notes:

[1] "Wetlands" include tidal salt marsh, brackish marsh, and freshwater marsh habitats.

[2] "Other waters" include open water and subtidal habitat, former salt production ponds, and mudflat habitat. Other Wates includes both 404 and Section 10 waters.
Some individually listed values may not sum to the listed total because of rounding. Totals presented are sums of unrounded values, which are then rounded.
Additional fill areas from work associated with PG&E infrastructure improvements would be 0.18 acres USACE jurisdiction in addition to that provided above. The distribution of these areas of fill would be 0.018 acres in wetlands and 0.162 acres in other waters.

7.2 Project Benefits to Wetlands and Other Waters of the U.S.

The main objective of the SBSP project is converting industrial salt ponds into tidal marsh wetlands and enhanced managed pond habitat. Large swaths of the industrial salt ponds meet USACE criteria for waters of the U.S., as they are unvegetated salt flats, yet they lack many of the functions and values that a well-functioning tidal system provides (such as tidal recharge, water quality improvements, habitat for wildlife, carbon storage, flood protection, sea level rise modifications). In order to achieve the SBSP project objectives of habitat restoration, some of the jurisdictional features need to be impacted. However, the result of restoration activities will be the conversion of the current 128 acres of wetlands and 1,600 acres of open waters to 1,250 acres of tidal marsh wetlands (929 acres of new tidal marsh habitat and 321 acres of enhanced tidal marsh habitat) and 900 acres of enhanced open water habitat (Table 20). Regarding USACE jurisdiction, the conversion of significant areas of open water salt ponds to new and enhanced marsh habitat is a conversion of waters of the U.S. to wetlands, which USACE identifies as special aquatic sites. This conversion is a major habitat gain. The increase in high quality tidal marsh wetlands (special aquatic sites) and enhanced managed pond habitat, from the conversion of former industrial salt ponds, will be used by this project as mitigation for the restoration impacts. As a result, this project should be considered self-mitigating. No further off-site mitigation will be needed to account for temporary and permanent project impacts.

Table 20.Project Impacts Versus Project Benefits: Wetlands and Other Waters of the U.S. Created by Project Activities

Pond Cluster	Pond	Nominal Pond Area (acres)[1]	Current Status	Existing Wetlands (acres)	Impacts in USACE Jurisdiction		Restoration Outcome(s)			Rationale	Net Restoration (acres)[2]	Net Restoration Ratio (x:1)	Net Gain of Wetlands (acres)
					Fill (acres)	Dredge (acres)	New Tidal Marsh Restoration (acres)	Enhanced Tidal Marsh Restoration (acres)	Enhanced Managed Pond Habitat (acres)				
Island Ponds	A19 and A20[3]	330	Open to tidal flows; transitioning to tidal marsh	115.5	7	2	0	321	0	Modification of a previous restoration effort to improve connectivity and complexity of marsh and aquatic habitat and to speed marsh formation.	312	36	206
A8 Ponds	A8 and A8S	570	Muted Tidal Managed Ponds	0	24	0	0	0	570	Modification of a previous restoration effort to enhance habitat complexity, protect against levee and landfill erosion, and prepare for future tidal marsh restoration.	546	24	0
Mountain View Ponds	A1 and A2W	710	Muted Tidal Ponds	12.2	46	1	662	0	0	Full tidal marsh restoration minus area of habitat islands and transition zones and levee improvements. Transition zones and islands have ecological benefits as well.	615	14	650
Ravenswood Ponds	R3	270	Seasonal Pond / Salt Panne	0.26	10	0	0	0	270	Retained as seasonal pond/salt panne habitat but enhanced control over water levels and circulation for western snowy plover.	260	26	0
	R4	295			22	6	267	0	0	Full tidal marsh restoration minus area of habitat transition zones and levee improvements. The habitat transition zones have ecological benefits as well.	238	9	267
	R5 and S5	60			10	2	0	0	60	Managed ponds enhanced by 3 new water control structures to provide year-round control over water depths and quality for duck and shorebird habitat.	48	5	0
Totals		**2235**	**n/a**	**128.0**	**119**	**12**	**929**	**321**	**900**		**2019**	**16**	**1122**

[1] This table presents standard pond areas excerpted from the 2007 SBSP Final EIR/S. The measured areas of the ponds may vary seasonally, tidally, and by method of measurement.

[2] Net restoration is calculated as the sum of the various restoration enhancements minus the sum of the impacts from fill and dredge.

[3] The net gain of wetlands is calculated as the total area of wetlands newly restored or enhanced toward restoration minus the area of existing wetlands.

[4] Pond A21 is technically part of the Island Ponds, but it would not be directly impacted or benefitted by the proposed Phase 2 actions.

Additional fill volumes and areas from work associated with PG&E infrastructure improvements would be 124 cubic yards/0.18 acres in USACE jurisdiction in addition to that provided above. The distribution of these volumes and areas of fill would be 12.4 cubic yards/0.018 acres in wetlands and 111.6 cubic yards/0.162 acres in other waters.

8 BOX 23 (DESCRIPTION OF AVOIDANCE, MINIMIZATION, AND COMPENSATION)

The following conservation measures and other best management practices are included in the proposed Phase 2 operations to directly or indirectly minimize or avoid potential adverse effects to environmental resources during SBSP Restoration Project-related activities:

- A water truck would be used for dust control on the site if needed.
- If land-based equipment is used, light, low-pressure construction equipment and/or equipment on mats would be employed.
- Vehicles driving on levees to access the Bay, tidal sloughs, or channels for construction or monitoring activities would travel at speeds slow enough to minimize noise and dust disturbance.
- Vehicle staging, cleaning, maintenance, refueling, and fuel storage would be 150 feet or more from any stream, water body, or wetland.
- A hazardous spill plan would be developed prior to construction, and would state what actions would be taken in the event of a spill. This plan would also incorporate preventative measures to be implemented, such as the placement of refueling facilities, storage and handling of hazardous materials, etc.
- No more than 4,000 gallons of fuel would be transported at any one time.
- Staging areas would be established in upland (rather than wetland) areas that do not provide habitat for ESA-listed species; such staging areas would typically be located on bare ground, paved or graveled areas, ruderal habitat, or non-native grassland.
- Contaminants would be stored within bermed containment areas lined with an impermeable membrane and designed to hold 125 percent of total fuel capacity. Containment areas would be located as far from live water as possible within the staging area. Contaminant absorbent materials would be stored within each containment area. Water collected within containment areas would be disposed of according to federal, state, and local regulations.
- Equipment would be refueled only in the staging area. Fuel absorbent mats would be used when refueling equipment.
- All equipment would be maintained free of petroleum leaks. No equipment would enter live water except for aquatic equipment (e.g., the “Mallard”) or amphibious equipment designed specifically for aquatic or amphibious use.
- Absorbent materials would be maintained at each worksite in sufficient quantity to effectively immobilize the volume of petroleum-based fluids contained in the largest tank present at the site. Acceptable absorbent materials are those that are manufactured specifically for the containment and clean-up of hazardous materials. Sands or soil are not approved absorbent materials.
- In the event of a contaminant spill, work at the site would immediately cease while the absorbent materials are deployed to contain, control, and mitigate the spill. The contractor would

immediately prevent further contamination notify appropriate authorities, and mitigate damage as appropriate.

- Site work would resume when the spill kit is resupplied with a sufficient quantity of material capable of effectively immobilizing the volume of petroleum-based fluids contained in the largest tank present at the site.

- Containers for storage, transportation, and disposal of contaminated absorbent materials would be provided on the Phase 2 Actions site. Petroleum products and contaminated soil would be disposed of according to federal, state, and local regulations.

- Any machinery that would be left on the temporary platform or parked within 150 feet of a water body including portable water pumps would be placed in a full containment cell.

- All vehicles operated within 150 feet of any water body would be inspected daily for leaks and, if necessary, repaired before leaving the staging area. Inspections would be documented in a record that is available for review on request from USFWS or NMFS.

- Machinery and implements that are used during the Phase 2 Actions would be in good repair, free of excessive leaks and steam cleaned off-site prior to entering the work area. Fluid leaks would either be repaired or contained within a suitable waste collection device (e.g., drip pads, drip pans). When changing hydraulic lines, care would be taken to keep hydraulic fluid from entering a water body or soils.

- There would be no debris introduction into the channels, wetlands, or environmentally sensitive areas from Phase 2 Action work.

- All disturbed areas would be stabilized within 12 hours of any break in work unless construction would resume work within 7 days. Earthwork would be completed as quickly as possible, and site restoration would occur immediately following use.

- A supply of emergency erosion control materials would be on hand at the Phase 2 Action site.

- Any large wood, native vegetation, and weed-free topsoil displaced by construction would be stockpiled for use during site restoration. Additional boulders, rock, large wood, and any other necessary natural construction materials would be obtained from outside the Phase 2 Action Area.

- Boating activities would abide by the Marine Mammal Protection Act (1972) unless otherwise authorized by an approved permit from NMFS.

- Silt fences would be erected adjacent to areas of ground disturbance to define and isolate work areas from sensitive habitats.

- In all Phase 2 Actions involving the use of heavy equipment, best management practices would be employed, including using berms and/or silt fences to contain the placement of materials, implementing remedial measures, and minimizing the area impacted.

- All activity within vegetated marsh habitat would be minimized.

- For any activities that involve walking through a marsh repeatedly (e.g., monitoring), different paths through the marsh would be taken during consecutive visits to minimize impacts to habitat in any given area. A route would be determined which would minimize the amount of foot traffic in the marsh and maximize the use of existing roads, trails, and boardwalks to the maximum extent practicable.

- A construction personnel education program would be conducted by a qualified biologist prior to the initiation of construction or maintenance activities within tidal marsh or slough habitat, within or adjacent to habitat that supports nesting western snowy plovers, California least terns, Ridgway's rails or, or other listed species. The program would consist of a brief presentation by persons knowledgeable in the biology of the pertinent species and legislative protection to explain endangered species concerns to contractors and their employees. The program would include the following: a description of the species and their habitat needs; a report of the occurrence of the relevant species in the Phase 2 Action Area; an explanation of the status of these species and their protection under the ESA; and a list of measures being taken to reduce impacts to these species during Phase 2 construction and implementation. A fact sheet conveying this information would be prepared for distribution to the above-mentioned people and anyone else who enters the Phase 2 project site.

- For any given Phase 2 construction project, a representative would be appointed by the applicant who would be the contact source for any employee or contractor who might inadvertently kill or injure a listed species or who finds a dead, injured, or entrapped individual. The representative(s) would be identified during the employee education program. The representative's name and telephone number would be provided to the USFWS and NMFS prior to the initiation of any construction or maintenance activities.

- Chemical concentrations and associated sampling plans and activity of upland fill material or site soils planned for use on-site would be reviewed and approved according to the Quality Assurance Program Plan (QAPP) developed specifically for the Phase 2 actions. That QAPP has been approved by the Regional Water Quality Control Board, as well as by the USFWS and NMFS. The data for upland fill material proposed for use in the Action Area would be provided to the agencies for review and approval according to the terms of the QAPP.

- Sediment suspension would be minimized when removing derelict piles or other infrastructure formerly associated with salt manufacturing or other aspects of water management. Measures to accomplish this would include cutting piles at or below the mudline or using a direct pull method to minimize sediment resuspension. Piles and other structures would be removed slowly to allow sediment to slough off at, or near, the mudline.

- Clean fill materials that would be used for islands, levees, or upland transition zones would be stockpiled on-site.

- Interpretive signage prohibiting access to areas that are closed to the public, and indicating the importance of protection of sensitive biological resources, would be placed in key locations, such as along trails near sensitive habitats, at boat launches, and near the mouths of sloughs that are closed to boating access. Interpretive signage at boat launches would describe areas that are closed to boating access and describe measures to be implemented to avoid impacts to harbor seals, California Ridgway's rails, and other sensitive wildlife.

- Law enforcement activity is provided during the waterfowl hunting season (late October through January) to ensure compliance with codes, rules, and regulations.

- Trails adjacent to some nesting areas for sensitive bird species would be closed during the breeding season. The locations of trail segments to be closed, and the periods of closure would depend on whether sensitive bird species, such as western snowy plovers or terns, are nesting in certain areas in a given year, and whether nesting areas are located in close proximity to the trails. Decisions on whether to close a particular trail segment would be made early in the breeding season (and possibly later in the season as conditions change) following surveys for nesting birds within a given pond adjacent to a trail.

- Nesting Birds: State and federally protected bird species are anticipated to nest in the project area within the months of February 1 to September 14. Impact avoidance measures during the nesting season would be implemented as required by the USFWS and CDFW.

- Salt Marsh Harvest Mouse: Avoidance and minimization measures for potential impacts to ESA listed salt marsh harvest mouse (*Reithrodontomys raviventris raviventris*) would be implemented as required by the USFWS. Measures include hand removal of vegetation in tidal marsh areas, use of silt fences to define species habitat, and minimizing access through pickle weed vegetation.

- Fish: To minimize impacts to protected fish species, for any given activity, a biological monitor would be appointed as the contact source for any employee or contractor who might encounter a listed species. The representative(s) would be identified during the environmental awareness program. The representative's name and telephone number would be provided to USFWS and NMFS prior to the initiation of any activities.

- Pile Driving: To minimize impacts to marine species during pile driving operations, pile driving would occur during low tide as feasible. This would minimize both the direct transmittal of noise through water in the work area; and the presence of special-status fish in the nearby shallow waters that remain.

- Pile Driving: A "soft start" technique may be implemented during pile installation activities to reduce hydroacoustic effects on fish. The soft start technique would allow for any protected fish in the vicinity work area to leave potential impact areas before full pile driving began.

- Steelhead migration: Activities that may affect upstream migration of adults or downstream migration of juveniles would be avoided to the maximum extent practicable. In-water work that has potential to impact steelhead from December through February (adult upstream migration period) and from April through June (juvenile downstream migration period) would be avoided to the maximum extent practicable. If in-channel work were to be performed during these periods, fish exclusion methods may be implemented, including timing work during low tide cycles to avoid or minimize potential in-water impacts. If the use of work windows is applicable, the NMFS acceptable work windows for steelhead are June through November.

No compensation for potential impacts for fill or dredge in waters of the U.S. is proposed because the project is self-mitigating. As discussed in the response to Box 20, fill and discharge of fill into Waters of the US will be required in order to meet the purpose of the project: 1) restore and enhance a mix of wetland habitats; 2) provide wildlife-oriented public access and recreation; and 3) provide for flood management in the South Bay. The proposed Project activities are aimed at restoring higher-ecological value wetlands or enhanced managed ponds (using ecological functions and values such as those used in CRAM or similar function) on what are now marginal non-wetland waters of the U.S. Specifically:

- The already tidally influenced Island Ponds will be sped toward their tidal marsh destiny and have more aquatic habitat connectivity and diversity.
- The deep water managed ponds A8 and A8S will be enhanced a bit by having the habitat transition zone added.
- The relatively barren salt pannes at Ravenswood would be made to a mix of tidal marsh and enhanced managed ponds.
- The deep and relatively stagnant open water MV Ponds (A1 and A2W) would be opened to tidal flows and eventually become tidal marsh.

9 BOX 25 (ADJACENT PROPERTY OWNERS)

Table 21 presents the Assessor's Parcel Numbers (APN), owners' names, and mailing addresses of adjacent properties within 100 feet of the Phase 2 pond clusters.

Table 21. Adjacent Landowners within 100 Feet of SBSP Phase 2 Pond Clusters

APN	OWNER	ADDRESS
Alviso Island Ponds		
519-760-3	USFWS	2800 COTTAGE WAY, UNIT W-2610 SACRAMENTO, CA, 95825
519-800-1-32	USFWS	2801 COTTAGE WAY, UNIT W-2610 SACRAMENTO, CA, 95825
537-801-6	CA	N/A
519-800-1-21	USA	N/A
519-780-1	Anna M. DeSilva	694 Malarin Ave Santa Clara, CA, 95050
531-155-3-1	CA	N/A
519-800-4	SP Co	872-1-124-3
519-820-1-4	CA	N/A
519-800-1-20	USA	N/A
519-800-1-17	CA	N/A
519-800-1-30	USFWS	2800 COTTAGE WAY, UNIT W-2610 SACRAMENTO, CA, 95825
519-820-1-3	State Lands Commission	100 Howe Avenue, Suite 100 South Sacramento, CA, 95825
519-760-1	USFWS	2800 COTTAGE WAY, UNIT W-2610 SACRAMENTO, CA, 95825
519-760-2	Dowd V. Luce	2010 Evergreen Court Yakima, WA, 98902
519-780-2	Anna M. DeSilva	694 Malarin Ave Santa Clara, CA, 95050
Alviso A8 Ponds		
01533022	USFWS	2800 COTTAGE WAY, UNIT W-2610 SACRAMENTO, CA, 95825
01535005	SANTA CLARA VALLEY WATER DISTRICT	5750 ALMADEN EXPY SAN JOSE, CA, 95118
01533011	CALIFORNIA STATE OF	N/A
01535014	SANTA CLARA VALLEY WATER DISTRICT	5750 ALMADEN EXPY SAN JOSE, CA, 95118
01501025	CALIFORNIA STATE OF	N/A
01535040	SANTA CLARA VALLEY WATER DISTRICT	5750 ALMADEN EXPY SAN JOSE, CA, 95118
01535048	SANTA CLARA VALLEY WATER DISTRICT	5751 ALMADEN EXPY SAN JOSE, CA, 95118
01535047	SANTA CLARA VALLEY WATER DISTRICT	5752 ALMADEN EXPY SAN JOSE, CA, 95118
11005003	SANTA CLARA VALLEY WATER DISTRICT	5753 ALMADEN EXPY SAN JOSE, CA, 95118
01533055	USFWS	2800 COTTAGE WAY, UNIT W-2610 SACRAMENTO, CA, 95825
01535038	USFWS	2801 COTTAGE WAY UNIT W-2610 SACRAMENTO, CA, 95825

Table 21. Adjacent Landowners within 100 Feet of SBSP Phase 2 Pond Clusters

APN	OWNER	ADDRESS
01545011	AMERICA CENTER MAINTENANCE ASSOCIATION	PO BOX 130639 CARLSBAD, CA, 92013
01545031	AMERICA CENTER MAINTENANCE ASSOCIATION	PO BOX 130639 CARLSBAD, CA, 92013
Alviso Mountain View Ponds		
11619001	COMPUTER LLC	2700 BRODERICK WAY MOUNTAIN VIEW, CA, 94043
01536022	USFWS	2800 COTTAGE WAY, UNIT W-2610 SACRAMENTO, CA, 95825
01536013	CALIFORNIA STATE OF	N/A
01536046	PACIFIC GAS ELECTRIC LEASE/POSSESSORY INTEREST	N/A
01536017	CALIFORNIA STATE OF	N/A
01536026	CALIFORNIA STATE OF	N/A
01536020	CALIFORNIA STATE OF	N/A
11603015	MOUNTAIN VIEW CITY OF	444 CASTRO ST MOUNTAIN VIEW, CA, 94043
01536044	MOUNTAIN VIEW CITY OF	445 CASTRO ST MOUNTAIN VIEW, CA, 94043
01536024	USFWS	2800 COTTAGE WAY, UNIT W-2610 SACRAMENTO, CA, 95825
01536039	MOUNTAIN VIEW CITY OF	443 CASTRO ST MOUNTAIN VIEW, CA, 94043
11619002	MOUNTAIN VIEW CITY OF	444 CASTRO ST MOUNTAIN VIEW, CA, 94043
01536012	SANTA CLARA VALLEY WATER DISTRICT	5750 ALMADEN EXPY SAN JOSE, CA, 95118
01536025	MOUNTAIN VIEW CITY OF	444 CASTRO ST MOUNTAIN VIEW, CA, 94043
11603027	CHARLESTON PROPERTIES	3260 ASH ST PALO ALTO, CA, 94306
Ravenswood Ponds		
55400170	CA	State of California 303 Big Trees Park Road Felton, CA, 94560
55400480	USA	United States of America PO Box 364 Newark, CA, 94560
55400460	CA	State of California 303 Big Trees Park Road Felton, CA, 94560
55400490	City of Menlo Park	701 Laurel St. Menlo Park, CA, 94025
55170310	Menlo Park Sanitary District	West Bay Sanitary District 500 Laurel Street Menlo Park, CA, 94025

Table 21. Adjacent Landowners within 100 Feet of SBSP Phase 2 Pond Clusters

APN	OWNER	ADDRESS
54310060	Cargill (formerly Leslie Salt Company)	Attention: Pat Mapelli Cargill Salt 7220 Central Ave Newark, CA, 945601
55400580	Cargill (formerly Leslie Salt Company)	Attention: Pat Mapelli Cargill Salt 7220 Central Ave Newark, CA, 945601
55400570	USA	United States of America c/o Land Department 2100 Willow Road Menlo Park, CA, 94025
54310160	Cargil Point LLC	Attention: Pat Mapelli Cargill Salt 7220 Central Ave Newark, CA, 945601
55400590	Cargill (formerly Leslie Salt Company)	Attention: Pat Mapelli Cargill Salt 7220 Central Ave Newark, CA, 945601

10 BOX 26. LIST OF OTHER CERTIFICATES

The following permits, approvals, and other regulatory agreements are being applied for concurrently with this application:

- Endangered Species Act Section 7 consultation with U.S. Fish and Wildlife Service and National Marine Fisheries Service;
- Clean Water Act Section 401 Water Quality Certification from the San Francisco Regional Water Quality Control Board;
- San Francisco Bay Conservation and Development Commission permit;
- CDFW Letter of Concurrence / Consistency Determination.

In addition, as part of the requested Section 404 permit, an Alternatives Analysis document was prepared under Clean Water Act Section 404 (b)(1) to support the USACE's and EPA's determination of the Least Environmentally Damaging Practicable Alternative (LEDPA). That document is presented as Appendix D to this application.

11 SAN FRANCISCO DISTRICT REGIONAL CONDITIONS

11.1 NEPA Requirement

The NEPA requirements are met though the SBSP Restoration Project's Phase 2 Final EIS/R, available online at http://www.southbayrestoration.org/planning/phase2/.

11.2 Project Impacts

The actions required for the Phase 2 portion of the Project have been designed to require the least fill placement within USACE jurisdiction possible while still achieving the project goals for this phase. Any impacts (e.g., fill placement to create nesting islands) are done to create or enhance habitat for listed species, to optimize restoration activities, or to provide sufficient improvements to the existing flood risk management to allow the restoration processes to proceed; environmental benefits will result from implementation of restoration.

Project impacts, potential impacts to adjacent properties/structures, and cumulative impacts are discussed in the 2016 EIS/R, the USACE 404(b)(1) (Appendix D). That Alternatives Analysis document also identifies the proposed project as the LEDPA and described the rationale for that conclusion.

12 REFERENCES

AECOM. 2016a. South Bay Salt Pond Restoration Project Final Environmental Impact Statement/Report, Phase 2. Submitted to the U.S. Fish and Wildlife Service, and California State Coastal Conservancy. April. Online: http://www.southbayrestoration.org/planning/phase2/. [Referred to in text as "Phase 2 EIS/R."]

AECOM. 2016b. Biological Assessment for South Bay Salt Ponds Restoration Project Phase 2. Submitted to the U.S. Fish and Wildlife Service.

AECOM. 2016c. Biological Assessment for South Bay Salt Ponds Restoration Project Phase 2. Submitted to the National Marine Fisheries Service.

CDFWa (California Department of Fish and Wildlife). 2016. California Natural Diversity Database (CNDDB). Biogeographic Data Branch, Department of Fish and Game. June 2016.

DRERIP (Delta Regional Ecosystem Restoration Implementation Plan). (2010). Life History Conceptual Model and Sub-Models for Longfin Smelt, San Francisco Estuary Population.

Moyle, P. B. 2002. Inland Fishes of California. University of California Press. Chapter: Smelts, Osmeridae. p.234-239.

Rosenfield, J.A. and R.D. Baxter. 2007. Population Dynamics and Distribution Patterns of Longfin Smelt in the San Francisco Estuary. Transaction of America Fisheries Society, 136: 1557-1592.

USFWS (U.S. Fish and Wildlife Service)..2008. Formal Endangered Species Consultation on the Proposed South Bay Salt Pond Restoration Project Long-term Plan and the Project-level Phase 1 Actions, Alameda, Santa Clara, and San Mateo Counties, California (Corps File Numbers 07-27703S and 08-00103S). Online: http://www.southbayrestoration.org/pdf_files/SBSP%20FWS%20BO%20to%20Corps.pdf. [Referred to in text as "Programmatic Biological Opinion."]

USFWS. 2009. Endangered and Threatened Wildlife and Plants: 12-Month Finding on a Petition to List the San Francisco Bay-Delta Population of the Longfin Smelt (*Spirinchus thaleichthys*) as Endangered. Federal Register 74(67). 16169-16175. April 9, 2009:

USFWS and CDFG (United States Fish and Wildlife Service and California Department of Fish Game). 2003. South Bay Salt Ponds Initial Stewardship Plan. Prepared by Life Science! June 2003.

Prepared by EDAW, Philip Williams and Associates, Ltd., H.T. Harvey and Associates, Brown and Caldwell, and Geomatrix. 2007. *South Bay Salt Pond Restoration Project Environmental Impact Statement / Report*, Volumes 1 and 2, Draft, March 2007. Submitted to U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and California Department of Fish and Game. [Referred to in text as "2007 EIS/R."]

Figures

Figure 1. Project Regional Vicinity

Figure 2. Phase 2 Project Area

Figure 3. Phase 2 Project at the Alviso-Island Ponds

Figure 4. Phase 2 Project at the Alviso-A8 Ponds

Figure 5. Phase 2 Project at the Alviso-Mountain View Ponds

Figure 6. Phase 2 Project at the Ravenswood Ponds

Figure 7. Maximum Extent of USACE Jurisdiction

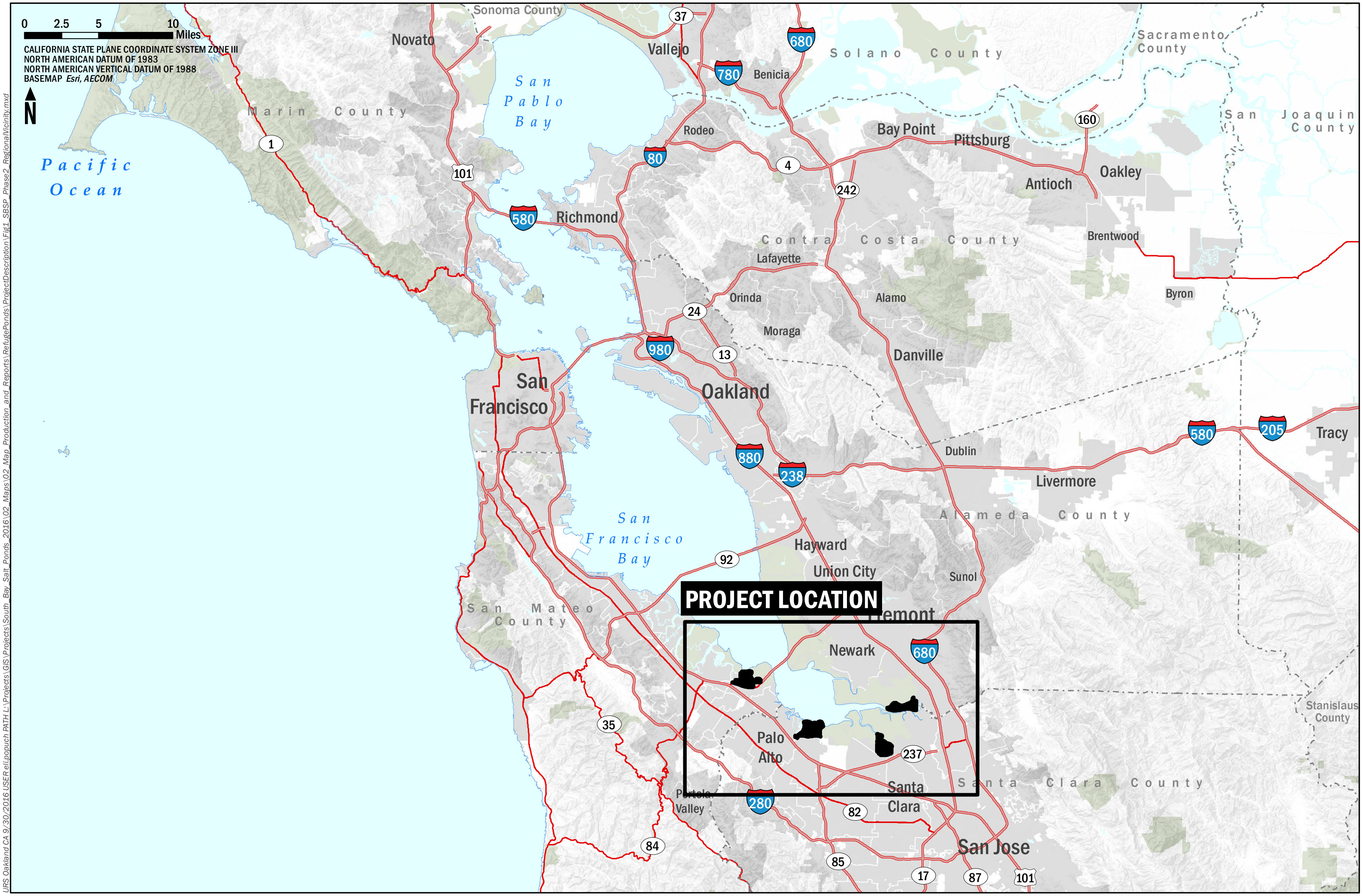
Figure 8. Impacts to Wetlands and Waters of the U.S.

Appendix A: 2016 Wetland Delineation

Appendix B: SBSP Site Photographs

Appendix C: Project Engineering Designs

Appendix D: Section 404(b)(1) Alternatives Analysis



URS Oakland CA 9/30/2016 USER eli.popuch PATH L:\Projects\GIS\Projects\South_Bay_Salt_Ponds_2016\02_Maps\02_Map_Production_and_Reports\RefugePonds\ProjectDescription\Fig1_SBSP_Phase2_RegionalVicinity.mxd

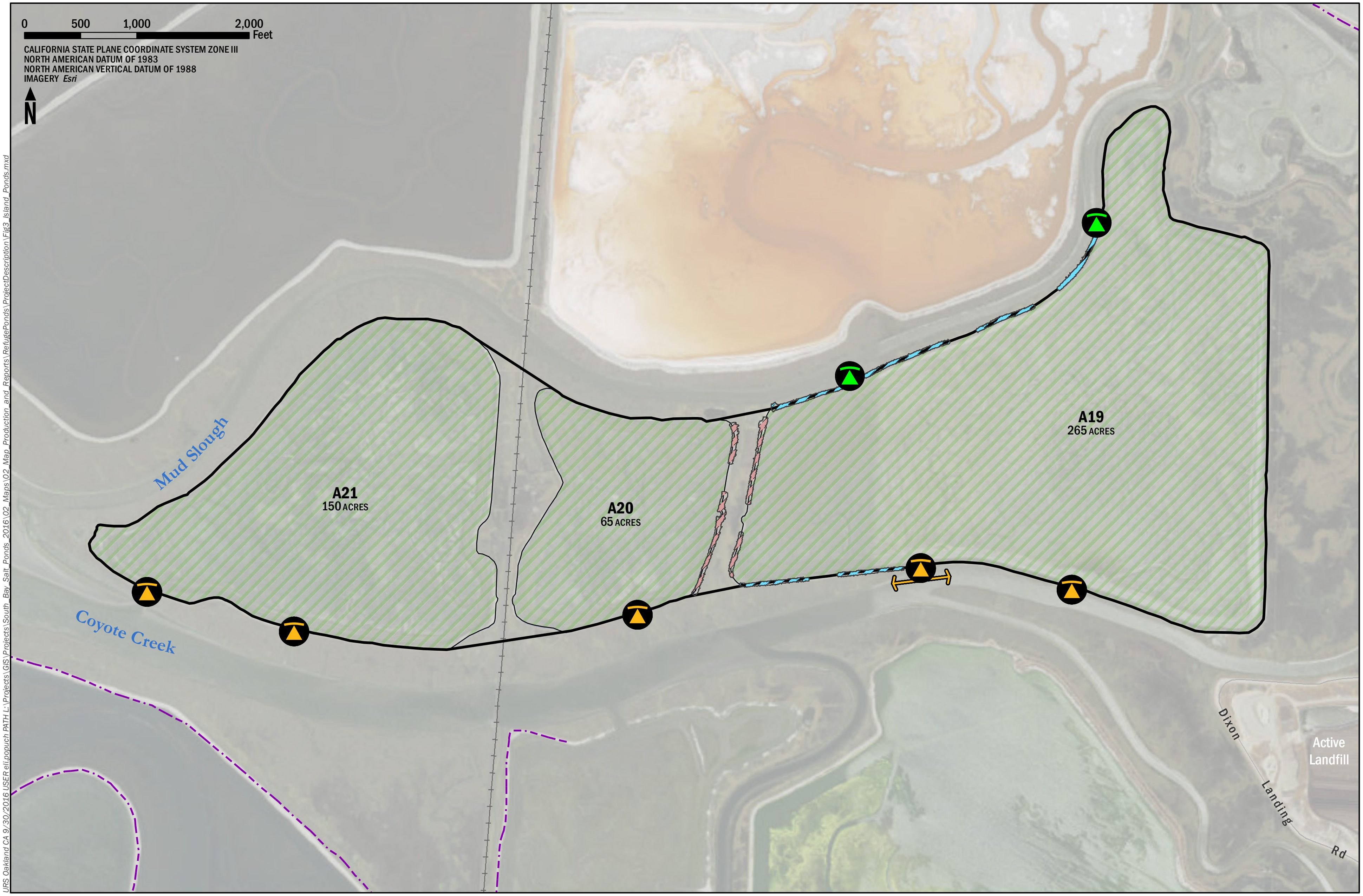
AECOM
South Bay Salt Pond Restoration Project

Figure 1
SBSP Phase 2 Regional Location

URS Oakland CA 9/30/2016 USER eli.popuch PATH L:\Projects\GIS\Projects\South_Bay_Salt_Ponds_2016\02_Maps\02_Map_Production_and_Reports\RefugePonds\ProjectDescription\Fig2_SBSP_Phase2_ProjectSites.mxd

AECOM
South Bay Salt Pond Restoration Project

Figure 2
SBSP Phase 2 Project Sites



URS Oakland CA 9/30/2016 USER eli.popuch PATH L:\Projects\GIS\Projects\South_Bay_Salt_Ponds_2016\02_Maps\02_Map_Production_and_Reports\RefugePonds\ProjectDescription\Fig3_Island_Ponds.mxd

LEGEND

Proposed breach
Existing breach
Expand existing breach
Railroad
Existing trail
Removed levee
Lowered levee
Tidal marsh
Pond boundary

AECOM

South Bay Salt Pond Restoration Project

Figure 3

Alviso Island Ponds

LEGEND

Existing reversible armored notch

Railroad

Existing trail

Pond boundary

Habitat Transition Zone

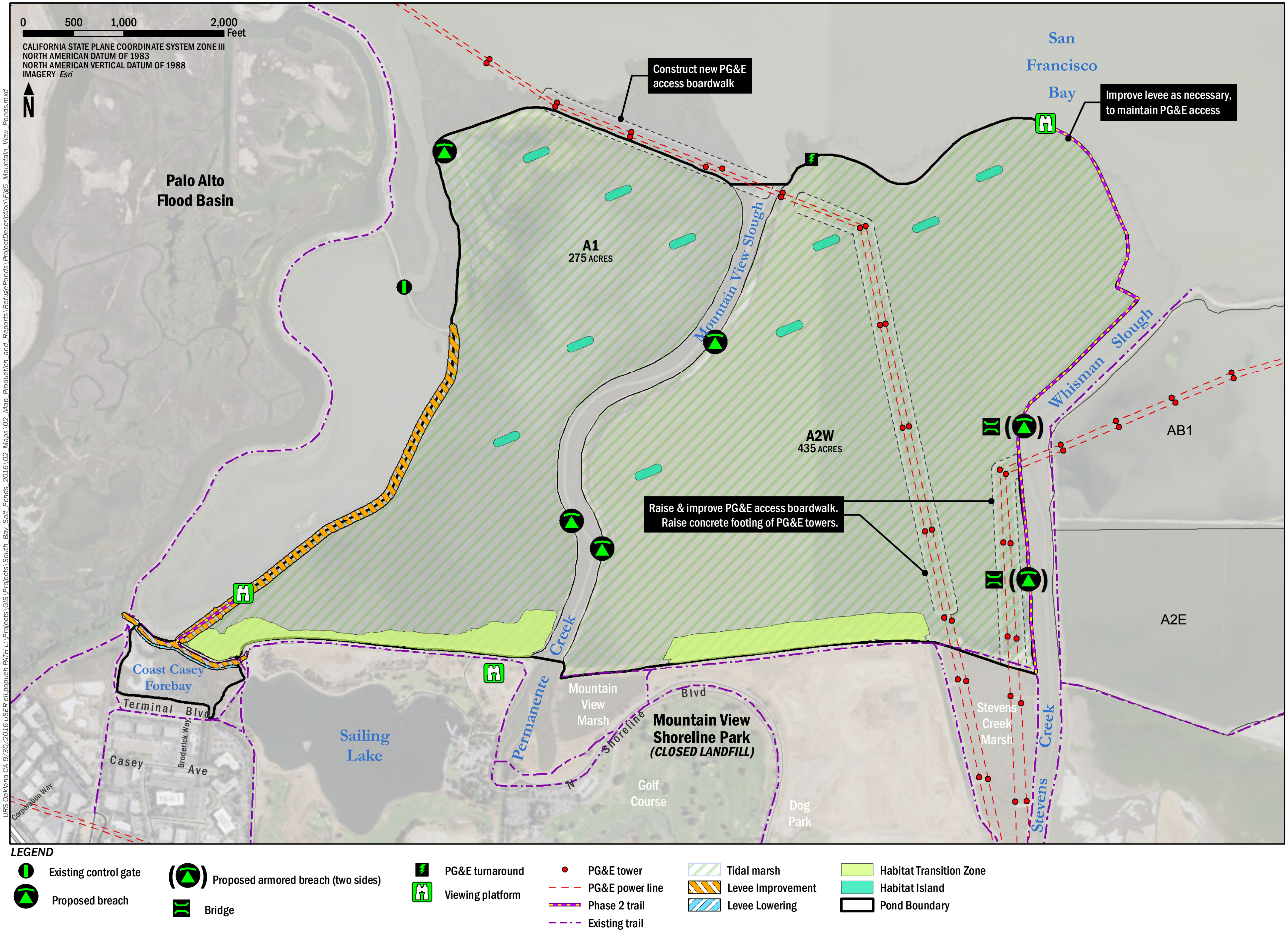
URS Oakland CA 9/30/2016 USER eli.popuch PATH L:\Projects\GIS\Projects\South_Bay_Salt_Ponds_2016\02_Maps\02_Map_Production_and_Reports\RefugePonds\ProjectDescription\Fig4_A8_Ponds.mxd

AECOM

South Bay Salt Pond Restoration Project

Figure 4

Alviso A8 Ponds



AECOM
South Bay Salt Pond Restoration Project

Figure 5
Alviso-Mountain View Ponds

URS Oakland CA 9/30/2016 USER eli.popuch PATH L:\Projects\GIS\Projects\South_Bay_Salt_Ponds_2016\02_Maps\02_Map_Production_and_Reports\RefugePonds\ProjectDescription\Fig6_Ravenswood_Ponds.mxd

LEGEND

Proposed breach	Viewing platform	Railroad	Cargill pipeline	Levee Lowering	Habitat Transition Zone	Tidal marsh
Proposed water control structure	Existing viewing platform	Existing trail	Fence	Levee Removal	Habitat Island	Managed pond
		Phase 2 trail	Levee Improvement	Pilot Channel	Ditchblock	Pond boundary

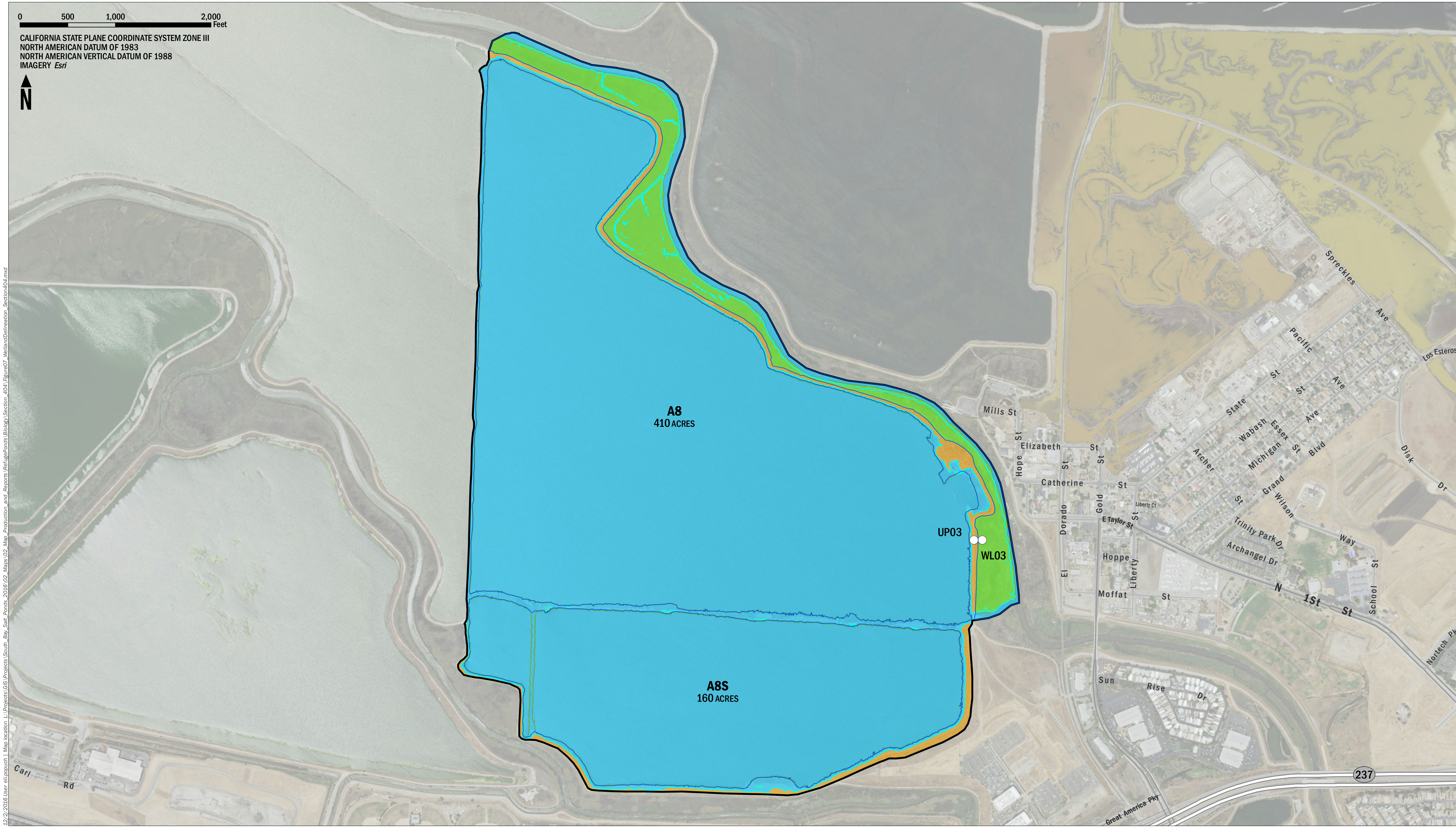
*Pending property rights/easements

AECOM

South Bay Salt Pond Restoration Project

Figure 6

Ravenswood Ponds



LEGEND

Data point	Study Area
High Tide Line	Wetland Habitat, 50.27 acres
Mean High Water Line	Open Water Habitat, 613.24 acres
	Upland Habitat, 20.16 acres

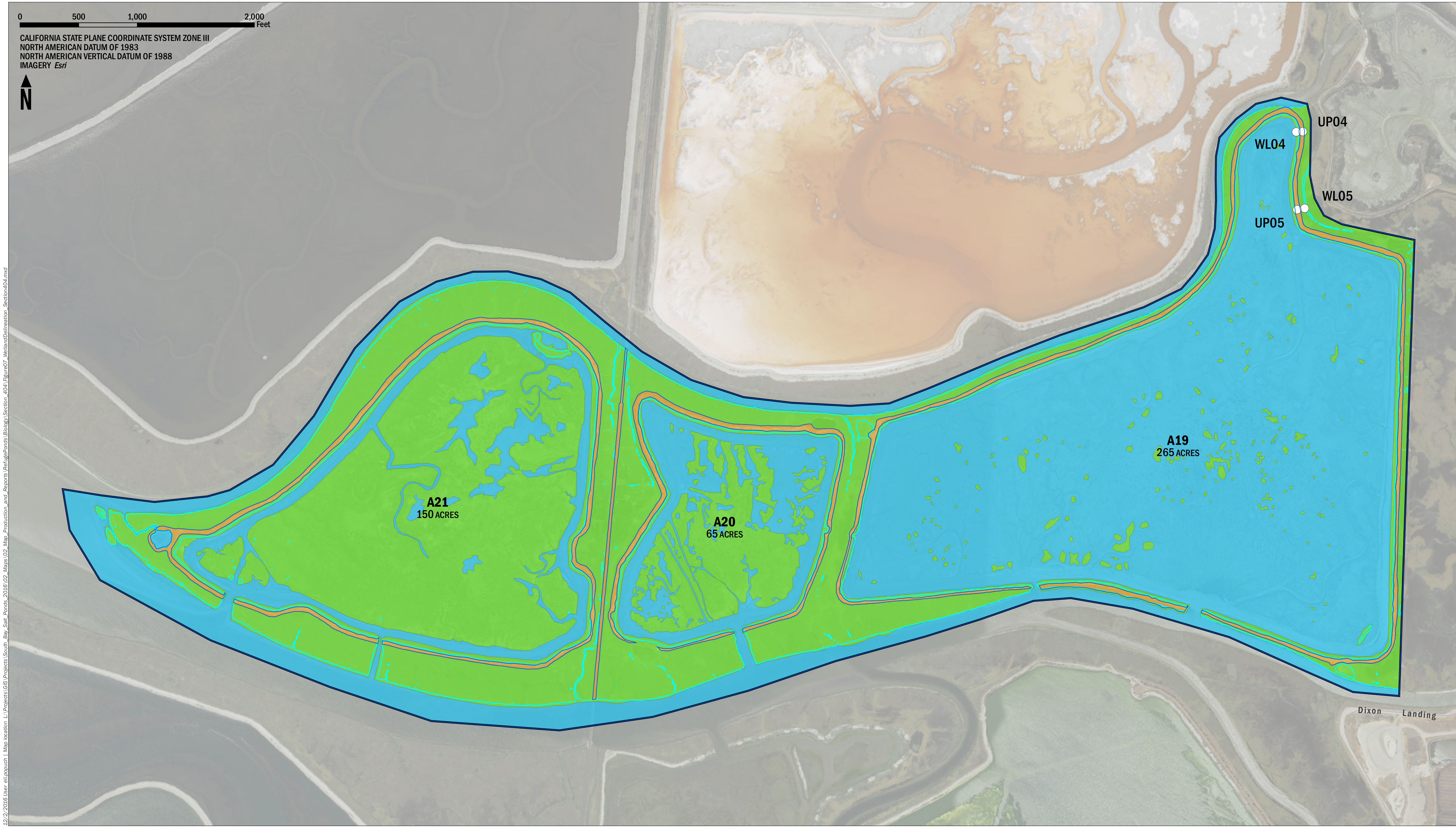
AECOM

South Bay Salt Pond Restoration Project

Figure 7

Wetlands and Waters of the U.S. (Section 10 and Section 404)

Alviso A8 Ponds



LEGEND

- Data point
- High Tide Line
- Mean High Water Line
- Study Area
- Wetland Habitat, 301.59 acres
- Open Water Habitat, 386.49 acres
- Upland Habitat, 27.63 acres

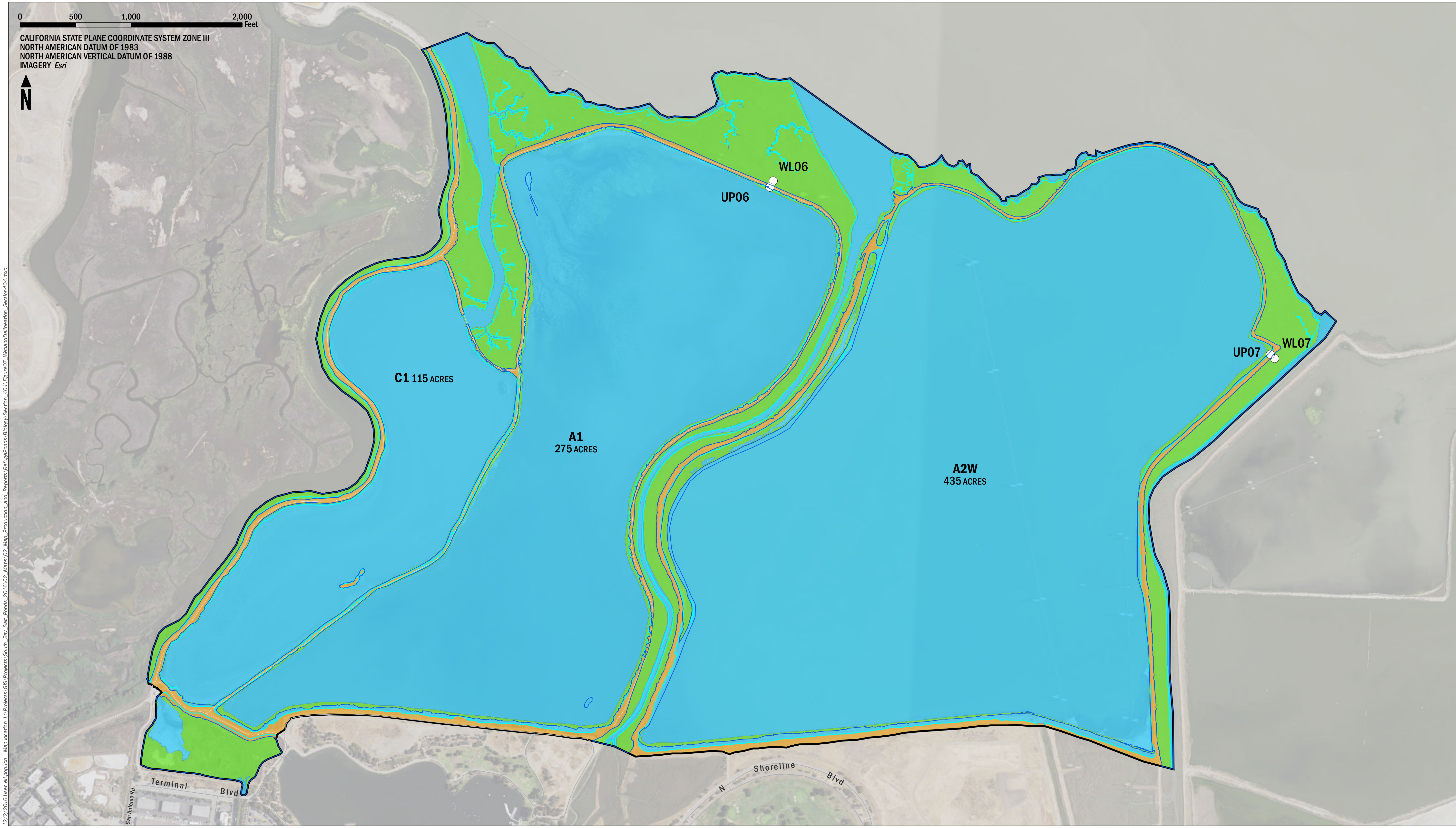
AECOM

South Bay Salt Pond Restoration Project

Figure 7

Wetlands and Waters of the U.S. (Section 10 and Section 404)

Alviso Island Ponds

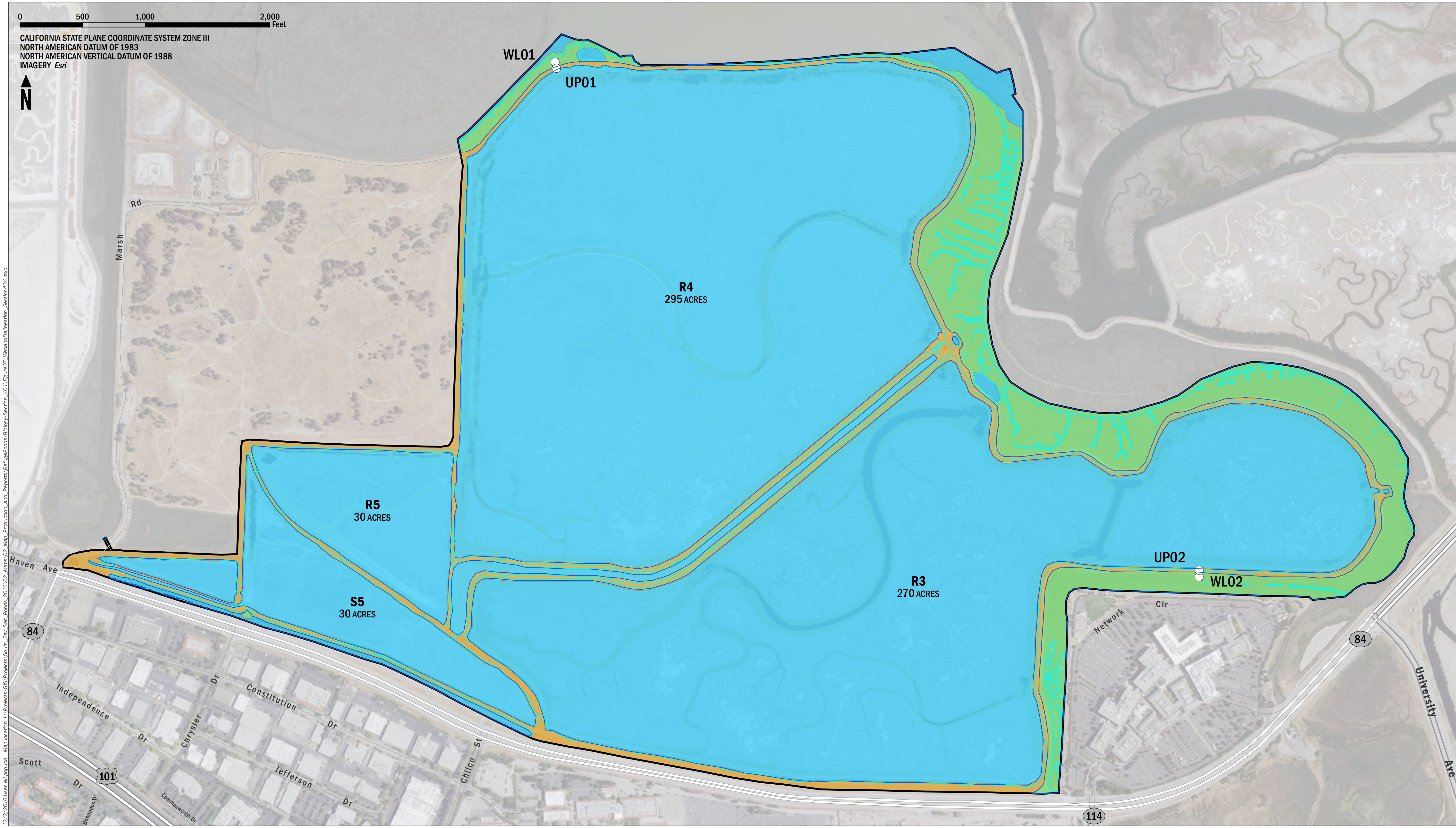


LEGEND

- Data point
- High Tide Line
- Mean High Water Line
- Study Area
- Wetland Habitat, 147.15 acres
- Open Water Habitat, 860.63 acres
- Upland Habitat, 45.69 acres

AECOM
South Bay Salt Pond Restoration Project

Figure 7
Wetlands and Waters of the U.S. (Section 10 and Section 404)
Alviso Mt. View Ponds

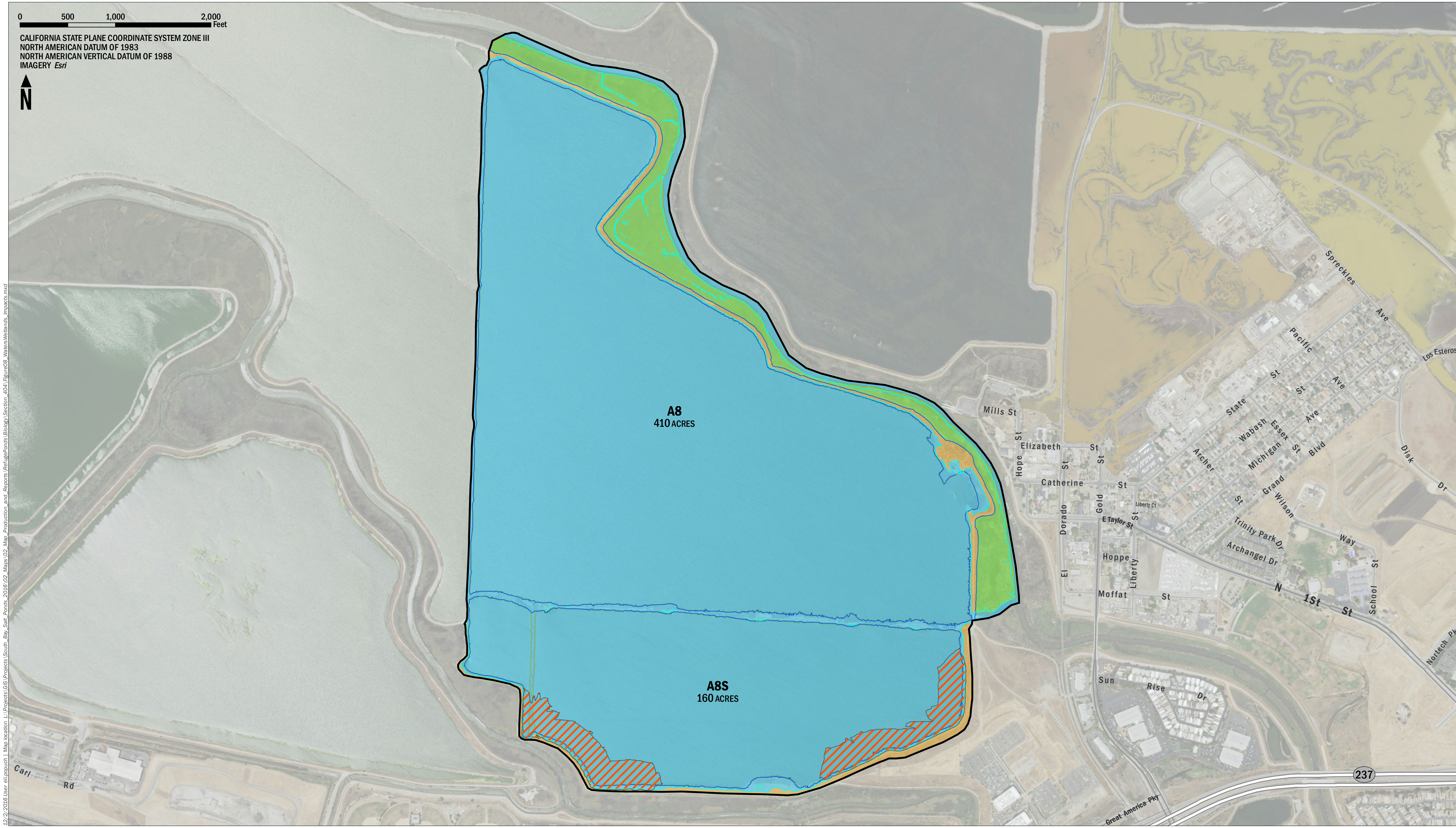


LEGEND

- Data point
- High Tide Line
- Mean High Water Line
- Study Area
- Wetland Habitat, 83.96 acres
- Open Water Habitat, 647.33 acres
- Upland Habitat, 50.53 acres

AECOM
South Bay Salt Pond Restoration Project

Figure 7
Wetlands and Waters of the U.S. (Section 10 and Section 404)
Ravenswood Ponds

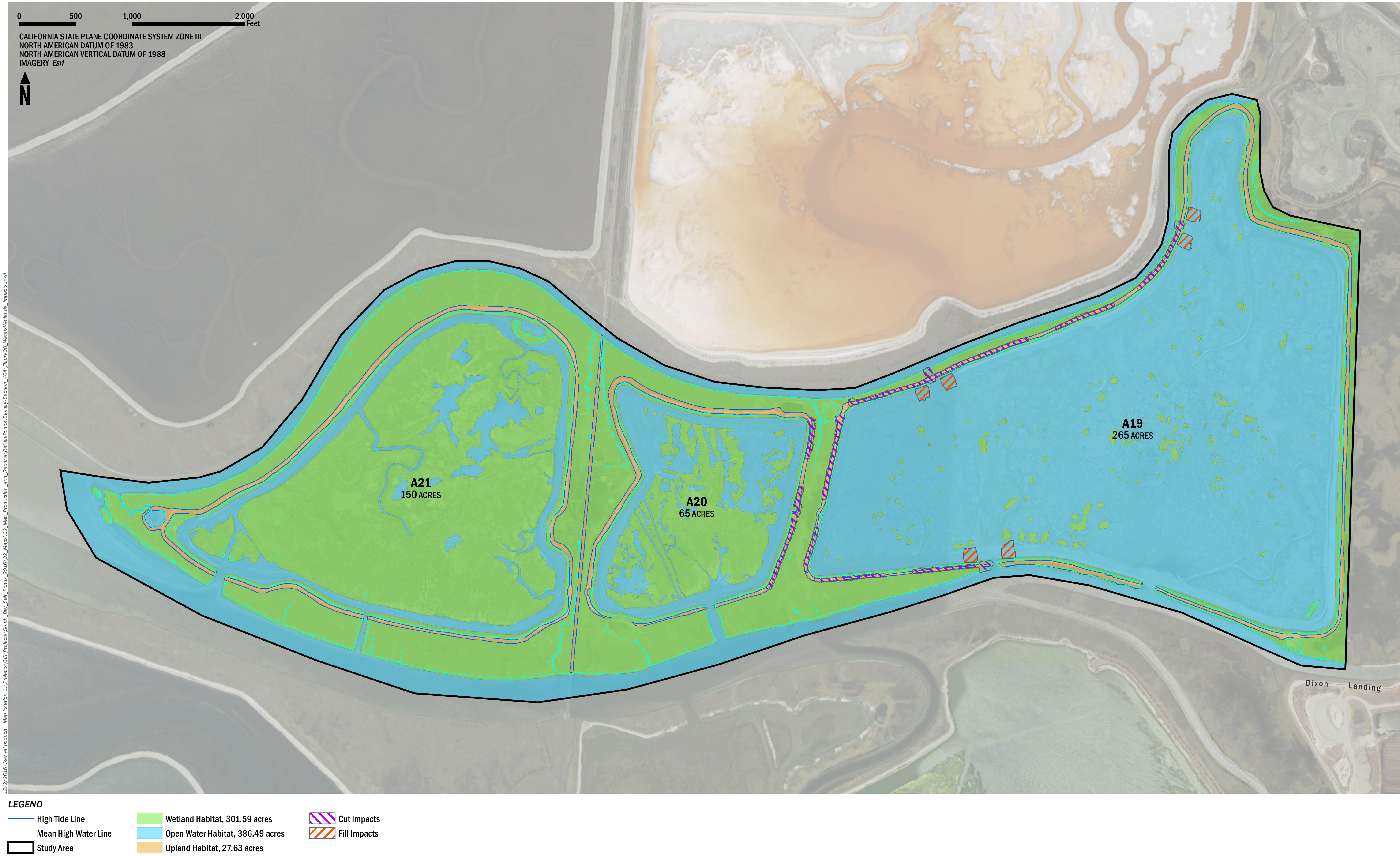


LEGEND

- High Tide Line
- Mean High Water Line
- Study Area
- Wetland Habitat, 50.27 acres
- Open Water Habitat, 613.24 acres
- Upland Habitat, 20.16 acres
- Cut Impacts
- Fill Impacts

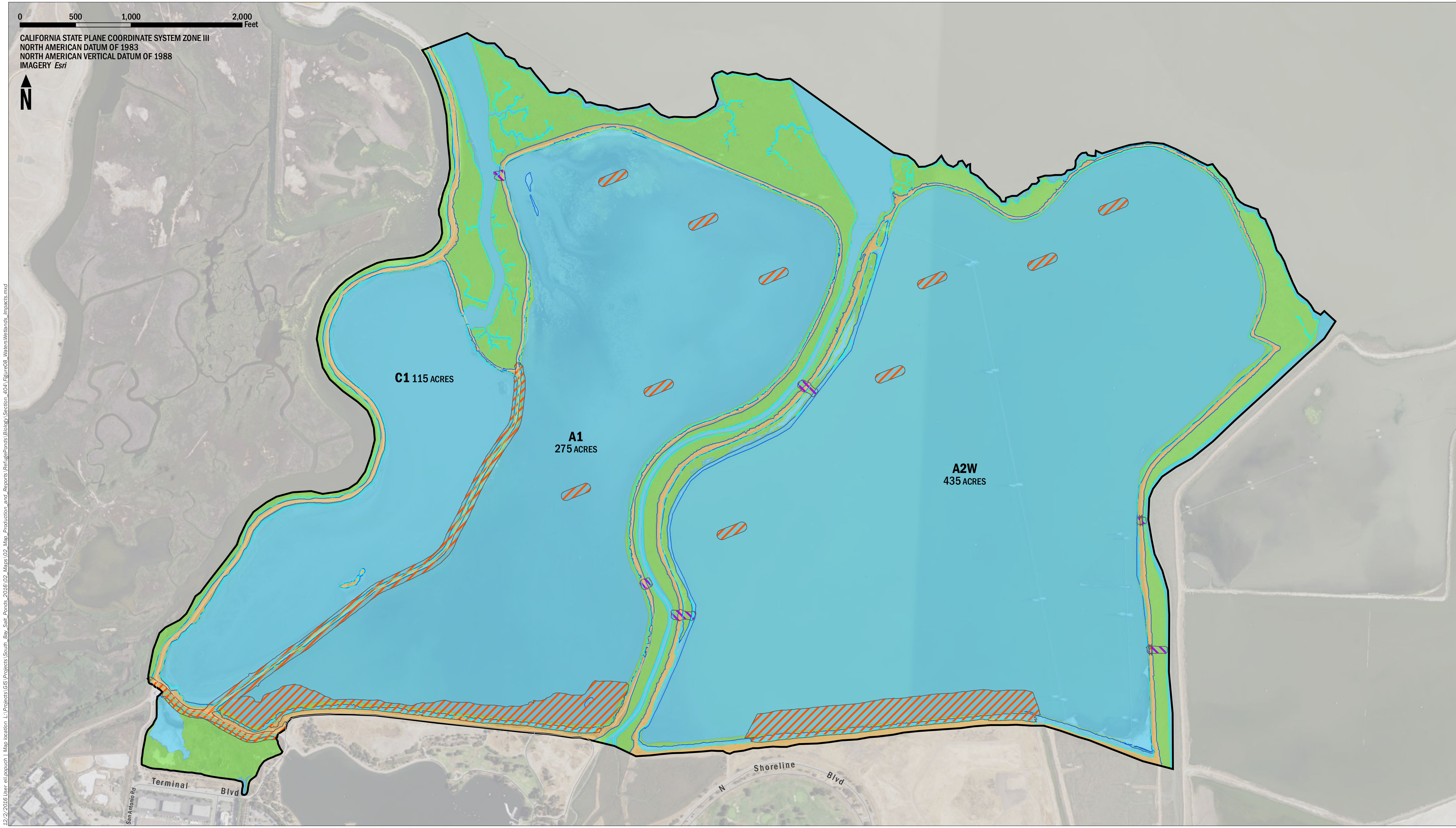
AECOM
South Bay Salt Pond Restoration Project

Figure 8
Impacts to Wetlands and Waters of the U.S.
Alviso A8 Ponds



AECOM
South Bay Salt Pond Restoration Project

Figure 8
Impacts to Wetlands and Waters of the U.S.
Alviso Island Ponds



LEGEND

- High Tide Line
- Mean High Water Line
- Study Area
- Wetland Habitat, 147.15 acres
- Open Water Habitat, 860.63 acres
- Upland Habitat, 45.69 acres
- Cut Impacts
- Fill Impacts

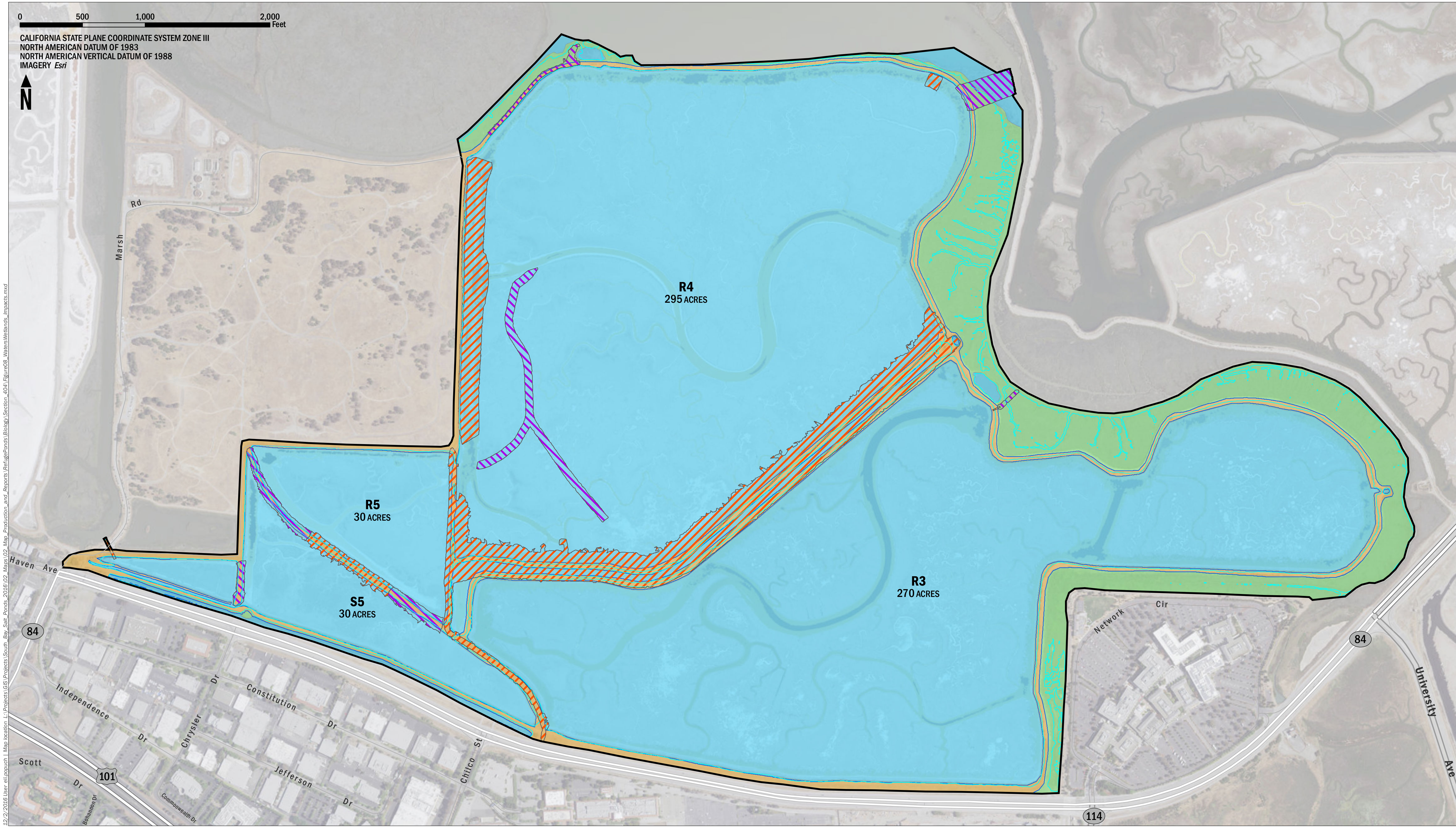
AECOM

South Bay Salt Pond Restoration Project

Figure 8

Impacts to Wetlands and Waters of the U.S.

Alviso Mt. View Ponds



LEGEND

- High Tide Line
- Mean High Water Line
- Study Area
- Wetland Habitat, 83.96 acres
- Open Water Habitat, 647.33 acres
- Upland Habitat, 50.53 acres
- Cut Impacts
- Fill Impacts

AECOM

South Bay Salt Pond Restoration Project

Figure 8

Impacts to Wetlands and Waters of the U.S.

Ravenswood Ponds

Submitted by
AECOM
1333 Broadway
Suite 800
Oakland, CA 94612
September 2016

AECOM

Wetland Delineation Report *Updated* South Bay Salt Pond Restoration Project – Phase 2

60423372

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List of Acronyms

BCDC	Bay Conservation and Development Commission
CDFW	California Department of Fish and Wildlife
CWA	Clean Water Act
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GPS	Global Positioning System
HTL	high tide line
MHW	mean high water
MSL	mean sea level
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
OHWM	ordinary high water mark
RWQCB	Regional Water Quality Control Board
SBSP	South Bay Salt Pond
SWANCC	Solid Waste Agency of Northern Cook County
TNW	Traditional navigable water
USACE	U.S. Army Corps of Engineers

1 Introduction

This report provides the results of a preliminary jurisdictional delineation of wetlands and other waters of the U.S. conducted as part of Phase 2 of the South Bay Salt Pond Restoration Project (project) located in the South San Francisco Bay (South Bay). The salt ponds within the Phase 2 Study Area discussed in this delineation are located within the Alviso Pond Complex in Alameda and Santa Clara Counties and the Ravenswood Complex in San Mateo County.

The objective of the delineation is to identify aquatic features that qualify as wetlands or other waters of the U.S. under federal jurisdiction, pursuant to Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act.

This report is organized into three primary sections:

- Introduction
- Physical Setting and Methods
- Results and Discussion

Section 1 describes the project, the project purpose, and the need for a wetland delineation. Section 2 presents the jurisdictional delineation methods. Section 3 presents the results of the jurisdictional delineation, including a description of potentially jurisdictional wetlands and other waters of the U.S. present within the Study Area.

1.1 Project Description

The South Bay Salt Pond (SBSP) Restoration Project area, Phase 2 is located in South San Francisco Bay in northern California (see Figures 1 and 2). The SBSP Restoration Study Area, Phase 2 consists of parts of two complexes of salt ponds and adjacent habitats in South San Francisco Bay that USFWS acquired from Cargill in 2003. These two salt pond complexes consist of the 8,000-acre Alviso Pond Complex and the 1,600-acre Ravenswood Pond Complex, both of which are owned and managed by U.S. Fish and Wildlife Service (USFWS) as part of the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge).The areas delineated in this report are identified in Figure 2 and collectively referred to as the Study Area.

Phase 2 project actions are also being planned to take place at ponds in the Eden Landing Ecological Reserve, near Hayward, which is owned by the California Department of Fish and Wildlife (CDFW). Actions at Eden Landing Ecological Reserve are part of a parallel planning process by the South Bay Salt Pond Restoration Project stakeholders, and the delineation of wetlands there will be covered in a separate environmental document.

The Alviso Pond Complex consists of 25 ponds on the shores of the South Bay in Fremont, San Jose, Sunnyvale and Mountain View, within Santa Clara and Alameda counties. The Pond Complex is bordered on the west by the Palo Alto Baylands Park and Nature Preserve and Charleston Slough, on the south by commercial and industrial land uses as well as NASA Ames Research Center and Sunnyvale Baylands Park, and on the east by Coyote Creek in San Jose and Cushing Parkway in Fremont.

The Phase 2 project actions in the Alviso Pond Complex focus on three clusters of ponds. Ponds A19, A20, and A21 are referred to as the Island Ponds and are located between Coyote Creek and Mud

Slough near the eastern end of the Alviso Pond Complex. The Island Ponds levees were breached in 2006 as part of tidal marsh restoration actions covered by the Initial Stewardship Plan (USFWS 2006).

Ponds A1 and A2W, referred to herein as the Mountain View Ponds, are on the western edge of the Complex. The City of Mountain View lies immediately to the south, and the Charleston Slough and the Palo Alto Flood Control Basin lie to the west. In 2106, the Coast Casey Forebay, a stormwater detention basis immediately south of Pond A1, was added to the project footprint. The north levee of the Coast Casey Forebay is part of the Southern levee of Pond A1. During proposed levee improvement, Coast Casey Forebay itself would be impacted, and is therefore included in this revised wetland delineation report.

Ponds A8 and A8S are located in the southern central portion of the Alviso Pond Complex. They are west of the town of Alviso, north of Sunnyvale and State Route (SR) 237, and east of other parts of the Pond Complex. Ponds A8 and A8S were included in the Phase 1 work; they were made reversibly tidal by installing two culverts and by notching one levee and installing a control structure with a variable opening so that the degree and the duration of tidal exchange can be controlled by the Refuge managers,.

The Ravenswood Pond Complex consists of seven ponds on the bay side of the Peninsula. The ponds are located both north and south of SR 84, west of the Dumbarton Bridge, and on the bayside of the developed areas of the City of Menlo Park in San Mateo County. Bayfront Park in the City of Menlo Park is directly west of the Pond Complex, and a portion of SR 84 and the Dumbarton Rail corridor run along its southern border. The Phase 2 project actions in the Ravenswood Pond Complex are focused on the pond cluster of Ponds R3, R4, R5, and S5.

1.1.1 Objectives

The overarching Goal and six Objectives developed for the SBSP Restoration Project, adopted by the SBSP Restoration Project Stakeholder Forum on February 18, 2004, apply to Phase 2 and are described below.

1.1.1.1 Goal

The Goal of the SBSP Restoration Project is the restoration and enhancement of wetlands in South San Francisco Bay while providing for flood management and wildlife-oriented public access and recreation.

1.1.1.2 Objectives

1. Create, restore, or enhance habitats of sufficient size, function, and appropriate structure to:

    - Promote restoration of native special-status plants and animals that depend on South San Francisco Bay habitat for all or part of their life cycles.
    - Maintain current native migratory and resident bird species that utilize existing salt ponds and associated structures such as levees.
    - Support increased abundance and diversity of native species in various South San Francisco Bay aquatic and terrestrial ecosystem components, including plants, invertebrates, fish, mammals, birds, reptiles and amphibians.

2. Maintain or improve existing levels of flood protection in the South Bay Area.

3. Provide public access and recreational opportunities compatible with wildlife and habitat goals.

4. Protect or improve existing levels of water and sediment quality in the South Bay, and take into account ecological risks caused by restoration.

5. Implement design and management measures to maintain or improve current levels of vector management, control predation on special status species, and manage the spread of non-native invasive species.

6. Protect the services provided by existing infrastructure (e.g., power lines, railroads).

1.1.2 Purpose and Need for Action

The SBSP Restoration Project is needed to address the following:

- Historic losses of tidal marsh ecosystems and habitats in San Francisco Bay and concomitant declines in populations of endangered species (e.g., clapper rail, salt marsh harvest mouse);
- Increasing salinity and declining ecological value in several of the ponds within the Study Area;
- Long-term deterioration of non-certifiable levees (for the purposes of the Federal Emergency Management Agency [FEMA]) within the Study Area, which could lead to levee breaches and flooding;
- Long-term tidal flood protection; and
- Limited opportunities in South San Francisco Bay for wildlife-oriented recreation.

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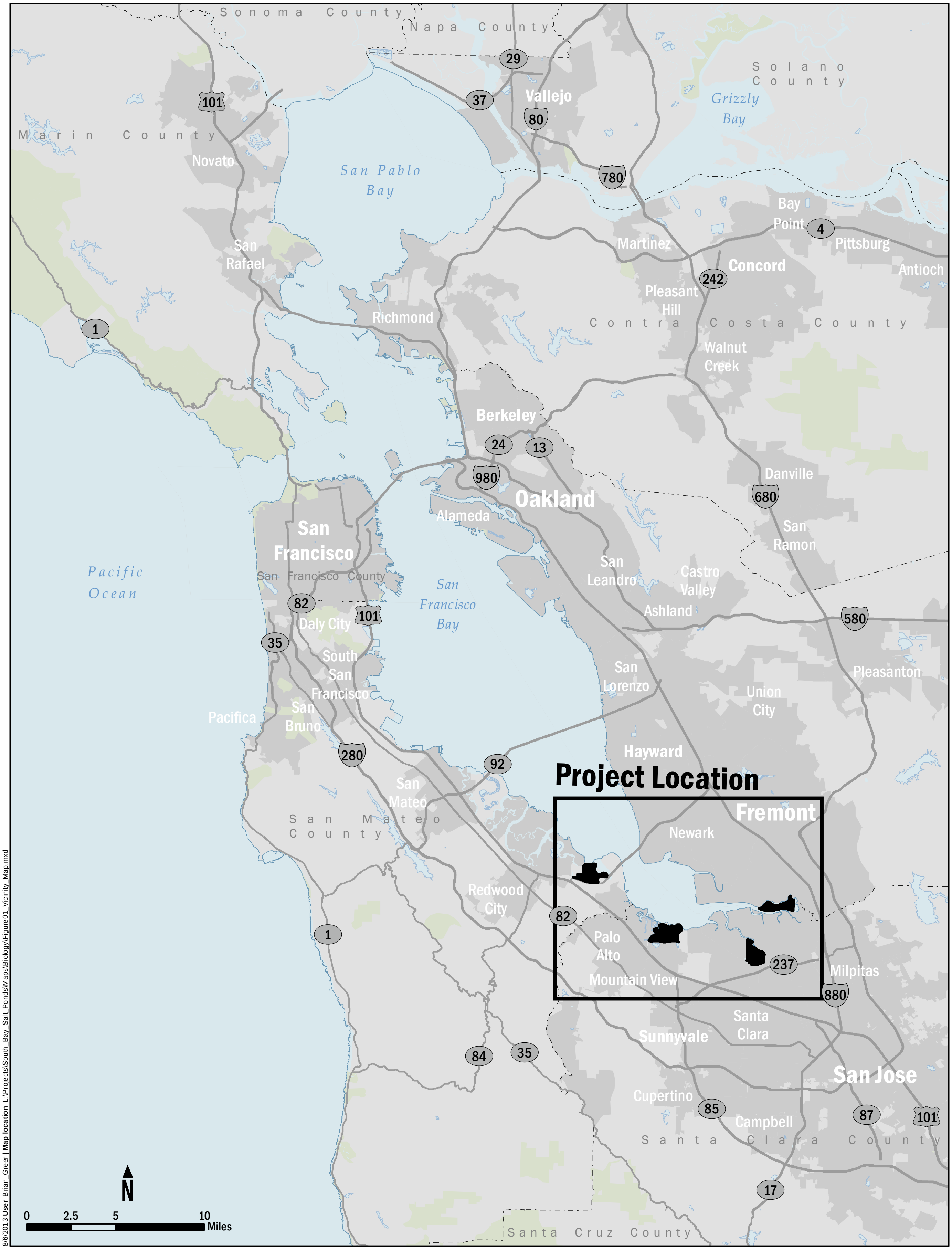

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South Bay Salt Pond Restoration Project

FIGURE 1

Vicinity Map

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South Bay Salt Pond Restoration Project

FIGURE 2

Project Area

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1.2 Background Research

Background research was conducted in order to gather supporting information related to the environmental setting of the project. The following reference materials were used to inform the findings presented in the delineation:

- Aerial imagery of the project ponds and surrounding areas
- Palo Alto, Mountain View, and Milpitas U.S. Geological Survey 7.5-minute quadrangle maps
- Natural Resource Conservation Service (NRCS) online soil survey within the immediate project area (NRCS 2013)
- Existing biological references for the SBSP Restoration Project, including:
    - South Bay Salt Pond Restoration Project. Final Environmental Impact Statement/Report. U.S. Fish and Wildlife Service. 2007.
    - South Bay Salt Pond Restoration Project Phase 1: Submittal of Application Materials for a Section 404 Individual Permit. H.T. Harvey and Associates. October 2007.
    - Habitat Evolution Mapping Project. South Bay Salt Pond Restoration Project. Final Report (2009-2011). Brian Fulfrost and Associates. 2012
- Habitat Maps, GIS shapefiles, 2016. Don Edwards San Francisco Bay National Wildlife Reserve. August 2016. USACE Wetland Delineation Manual (Environmental Laboratory 1987)
- Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (USACE 2008)
- Historic Section 10 data from the Office of Coast Survey, US Coast Survey, digitized by the San Francisco Estuary Institute (USCS, US Coast Geodetic Survey 1939).

1.3 Regulatory Background

1.3.1 U.S. Army Corps of Engineers Statutory Jurisdiction

Under Section 404 of the Clean Water Act, the USACE regulates the discharge of dredged and fill materials into “waters of the United States.” These jurisdictional waters of the U.S. include intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, and wetlands adjacent to any water of the U.S. (33 CFR § 328). In areas subject to tidal influence, Section 404 jurisdiction extends to the high-tide line. Certain waters of the U.S. are considered “special aquatic sites” because they are generally recognized as having particular ecological value. Such sites include sanctuaries and refuges, mudflats, wetlands, vegetated shallows, coral reefs, and riffle and pool complexes. Special aquatic sites are defined by the U.S. Environmental Protection Agency (EPA) and may be afforded additional consideration in the permit process for a project.

The USACE also regulates navigable waters under Section 10 of the Rivers and Harbors Act which include “… those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce” (33 CFR § 322.2).

1.3.2 Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers

On January 9, 2001, the U.S. Supreme Court issued a decision in Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army Corps of Engineers. The case involved the filling of hydrologically isolated waters that had formed from remnant excavation ditches on a parcel. In the decision, the Court denied USACE jurisdiction over isolated water bodies, which USACE had previously regulated using the “Migratory Bird Rule,” established in 1986. The Court defined isolated waters as any body of water that is non-navigable, intrastate, and lacking any significant nexus to navigable bodies of water (Pooley 2002).

As a result of the SWANCC decision, isolated seasonal wetlands (i.e. wetlands that are not hydrologically connected with other jurisdictional wetlands or non-wetland waters of the U.S.) are generally considered non-jurisdictional by the USACE.

1.3.3 Rapanos v. United States and Carabell v. Army Corps of Engineers

In 2006 Rapanos v. United States (No. 04 1034) and Carabell v. Army Corps of Engineers (No. 04-1384) (hereafter referred to as "Rapanos") challenged USACE interpretation of waters of the U.S. (USACE and EPA 2007). The USACE had interpreted the CWA 33 U.S.C. 1362(7) to regulate wetland areas that are separated from a tributary of a navigable water by a narrow, constructed berm, where there was evidence of an occasional hydrologic connection between the wetland and the tributary.

On June 19, 2006, the Court held 5 to 4 in favor of tightening the definition of "waters of the United States." According to the opinion, a water or wetland constitutes "navigable waters" under the CWA if it possesses a "significant nexus" to waters that are currently navigable or could feasibly be made navigable. The USACE and the EPA issued a joint memorandum on June 5, 2007 which included new guidelines for establishing whether or not wetlands or other waters of the U.S. fall within USACE jurisdiction (USACE and EPA 2007). Due to the court decision and resulting memorandum, the agencies now assert jurisdiction over traditional navigable waters (TNW), wetlands adjacent to traditional navigable waters, non-navigable tributaries to TNWs that are relatively permanent waters (RPW), and wetlands that abut RPWs. The agencies may take jurisdiction over non-navigable tributaries that are not RPWs, wetlands that are adjacent to non-RPWs, and wetlands adjacent to but not directly abutting a relatively permanent non-navigable tributary. The agencies will generally not assert jurisdiction over swales, erosional features or ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

1.4 Wetland Delineation

The wetlands and other waters of the U.S. discussed in this report were delineated by consultants based on National Oceanic and Atmospheric Administration (NOAA) tidal data, LiDAR data, aerial photo interpretation, field data, and ground truthing.

2 Physical Setting and Methods

Section 2 provides a description of the physical setting of the project as well as the methods used to delineate the wetlands and other waters of the U.S. in the Study Area. The delineation was updated in September 2016 after an August 11, 2016, site visit with Corps personnel determined that (a) the Coast Casey Forebay should be added to the study area, and (b) that there were small patches of pickleweed-dominated marsh habitat on the interior faces of many pond levees that should be included in a modified delineation. These areas were previously classified as non-wetland waters of the United States but would be more appropriately classified as wetlands.

2.1 Physical Setting

The physical setting of the project is described below in terms of the climate, topography and hydrology of the South Bay Salt Ponds, and soils and vegetation communities found in the project footprint.

2.1.1 Climate, Topography, and Hydrology

The San Francisco Bay area has a temperate-marine climate with cool moist winters and warm dry summer. Mean annual temperature varies around the bay, and ranges from 55°F to 61°F, and mean monthly temperature ranging from 45°F in winter to 73°F in summer. Approximately 95% of the precipitation occurs between October and April. Average relative humidity ranges from 60% in summer to 75% in winter (Eicher 1988). Average annual precipitation for the region is 15.24 inches.

The SBSP Restoration Project sites are at the northern end of Santa Clara Valley, in a broad alluvial fan composed of material deposited from the local ranges. Topography of the site is primarily flat with elevations ranging from 1.5 feet below mean sea level (MSL) to 11 feet above MSL.

The entire Study Area is located within the San Francisco Bay hydrologic unit (Figure 3). San Francisco Bay estuary tidal marshes can be characterized as relatively flat plains which tend to increase slightly in elevation at the border of sloughs and at the shoreline. The elevation of these marsh plains is generally near the mean high tide level. Open water and subtidal habitats in the South Bay include tidal sloughs and channels, areas of standing water or flowing waters within the salt ponds and tidal marshes, and mudflats. The tidal sloughs and channels carry water through the marshes and between salt ponds and marsh remnants.

The tidal cycle in the San Francisco Bay estuary has a mixed semidiurnal pattern, characterized by two high tides of unequal magnitude and two low tides of unequal magnitude every day. Tidal exchange between the Pacific Ocean and the estuary occurs through the Golden Gate. Overall, about 24% of the bay’s water is exchanged every 12.5 hours (Jones and Stokes, et. al. 1979). Circulation patterns within the bay are driven by tidal exchange and freshwater inflow. Sources of freshwater inflow to the Study Area are from Coyote Creek, Stevens Creek, Adobe Creek, and the Guadalupe River.

Each cluster of salt ponds has somewhat different internal hydrology. The Phase 2 Ravenswood Ponds are seasonal ponds that receive direct rainfall and some runoff. In addition, water is added to these ponds during the fall and winter to provide waterfowl habitat. The Alviso-Island Ponds were breached in 2006 to restore them to a tidal regime. The breaches were on their southern borders, and these ponds now receive daily tidal flows via Coyote Creek. The Alviso-A8 Ponds were converted to muted and reversible tidal flows as part of a Phase 1 project action. A notch with a variably sized opening was added on the southeastern side of A8 to expose it to muted tidal flows coming in from the Guadalupe River. Finally, the Alviso-Mountain View Ponds are deep ponds with subsided bottoms that receive bay water at an intake at Pond A1 and discharge at Pond A2W. These two ponds are connected to one another via underground culverts. They also receive seasonal rainfall.

2.1.2 Soils

The NRCS (2013) has identified and mapped 11 soil types occurring within the Ravenswood Ponds, Alviso-Mountain View Ponds, Alviso-A8 Ponds, and the Alviso-Island Ponds clusters (Figure 4).

The soils that occur within the Ravenswood Ponds include the following:

- **Novato clay, 0 to 1 percent slopes, ponded**: Novato clay, 0 to 1 percent slopes, ponded is a very deep, very poorly drained soil in saltwater marshes along the San Francisco Bay. It formed in alluvium derived from various kinds of rock, and the texture is clay. Permeability and runoff are slow and the soil is not subject to water erosion. The hydric soils list identifies two hydric inclusions occurring within this soil type: Novato occurring within salt marshes and Reyes occurring within salt marshes.
- **Novato clay, 0 to 1 percent slopes:** Novato clay, 0 to 1 percent slopes, is a very deep, very poorly drained soil in saltwater marshes along the edges of San Francisco Bay. It formed in alluvium derived from various kinds of rock, and the texture is clay. Permeability and runoff are slow. The soil is not subject to water erosion, and is subject to tidal flooding. The hydric soils list identifies three hydric inclusions occurring within this soil type: Novato occurring within salt marshes, an unnamed, drained inclusion occurring within salt marshes and an unnamed, stratified organic surface occurring within salt marshes.
- **Pits and Dumps**: Pits and dumps consist of gravel pits, refuse dumps, and rock quarries. The hydric soils list does not identify any hydric inclusions within this soil type within San Mateo County.

2.1.3 The soils that occur within the Alviso-Mountain View Ponds include the following:

- **Aquic Xerorthents, bay mud substratum, 2 to 5 percent slopes**: Aquic Xerorthents, bay mud substratum, 2 to 5 percent slopes are poorly drained soils located in marshes, formed from human transported material in basin floors. Permeability is moderately low to moderately high, and texture is gravelly sandy loam to silty clay. The hydric soils list does not identify any hydric inclusions within this soil type within Santa Clara County.
- **Novato clay, 0 to 1 percent slopes, tidally flooded**: Novato clay, 0 to 1 percent slopes, tidally flooded is a very deep, very poorly drained soil in saltwater marshes along the edges of San Francisco Bay. It formed in alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics, and the texture is clay. Permeability and runoff are slow. The soil is not subject to water erosion, and is subject to tidal flooding. The hydric soils list does not identify any hydric inclusions within this soil type within Santa Clara County.
- **Novato clay, 0 to 1 percent slopes, protected**: Novato clay, 0 to 1 percent slopes, protected is a very deep, very poorly drained soil in salt marshes along the edges of San Francisco Bay. It formed in alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics, and the texture is clay. Permeability and runoff are slow. The soil is not subject to water erosion. The hydric soils list does not identify any hydric inclusions within this soil type within Santa Clara County.

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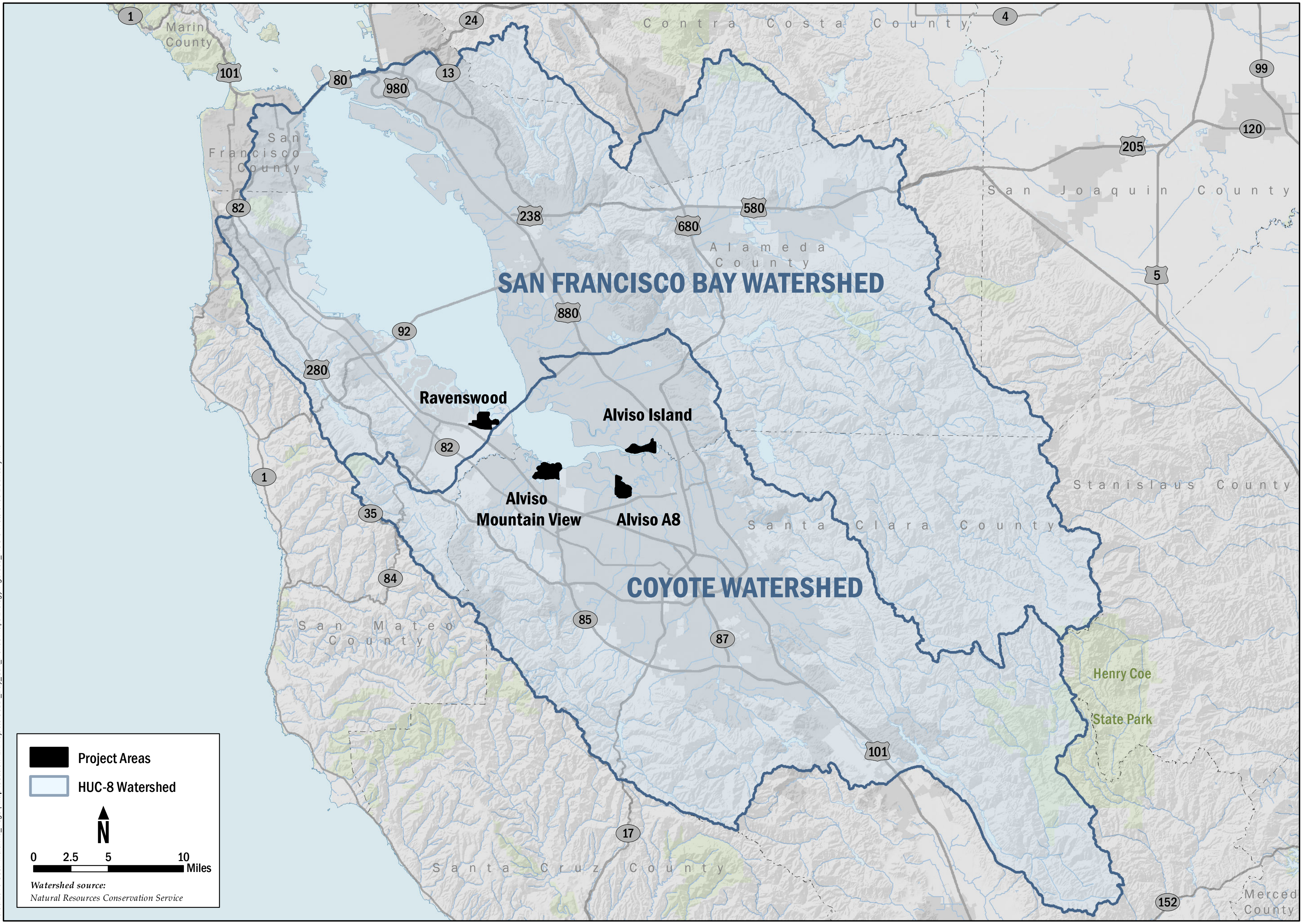

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FIGURE 3

HUC-8 Watershed Boundaries

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Soil Type

- **108_SM**, Botella-Urban land complex, 0 to 5 percent slopes
- **117_SM**, Novato clay, 0 to 1 percent slopes
- **118_SM**, Novato clay, 0 to 1 percent slopes ponded
- **121_SM**, Orthents, cut and fill, 0 to 15 percent slopes
- **125_SM**, Pits and Dumps
- **131_SM**, Urban land
- **132_SM**, Urban land-Orthents, cut and fill complex, 0 to 5 percent slopes
- **134_SM**, Urban land-Orthents, reclaimed complex, 0 to 2 percent slopes
- **W_SM**, Water

Soil codes are not globally unique, they are unique to each county. Each code has been appended with "_SM", "_SC," or "_AC" to indicate San Mateo, Santa Clara, and Alameda counties, respectively.
Source *USDA-NRCS, SSURGO*

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FIGURE 4
Soils, *Ravenswood*

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- **Novato silty clay loam, excessive salinity, 0 to 1 percent slopes, protected**: Novato silty clay loam, excessive salinity, 0 to 1 percent slopes, protected is a very deep, very poorly drained soil in managed ponds along the edges of San Francisco Bay. It formed in alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics, and the texture is silty clay loam. Permeability and runoff are slow. The soil is not subject to water erosion, and is subject to tidal flooding. The hydric soils list does not identify any hydric inclusions within this soil type within Santa Clara County.

The soils that occur within the Alviso-A8 Ponds include the following:

- **Xerorthents, trash substratum, 0 to 2 percent slopes**: Xerorthents, trash substratum, 0 to 2 percent slopes are well drained soils located in marshes, formed from human transported material in basin floors. Permeability is moderately low to moderately high, and texture is clay loam. The hydric soils list does not identify any hydric inclusions within this soil type within Santa Clara County.
- **Aquic Xerorthents, bay mud substratum, 0 to 2 percent slopes**: Aquic Xerorthents, bay mud substratum, 0 to 2 percent slopes are poorly drained soils located in marshes, formed from mixed human transported material over mixed silty and clayey fluviomarine deposits in basin floors. Permeability is moderately low to moderately high, and texture is gravely sandy loam to silty clay. This soil unit has low potential for erosion. The hydric soils list does not identify any hydric inclusions within this soil type within Santa Clara County.
- **Aquic Xerorthents, bay mud substratum, 2 to 5 percent slopes**: See description above.
- **Novato clay, 0 to 1 percent slopes, tidally flooded**: See description above.
- **Novato silty clay loam, excessive salinity, 0 to 1 percent slopes, protected**: See description above.

The soils that occur within the Alviso-Island Ponds include the following:

- **Reyes clay**: Reyes clay is a very deep, very poorly drained soil that formed in alluvium that derived from mixed sources. The soil is on tidal flats, with a slope of less than 2 percent. Texture is an alkaline clay or alkaline silty clay. Permeability is very slow, runoff is slow and most areas are subject to inundation. The soil has no hazard for erosion. The hydric soils list identifies three hydric inclusions occurring within this soil type: Reyes occurring in tidal flats, Pescadero in basin floors and unnamed, strongly saline inclusion occurring within salt marshes.
- **Reyes clay, ponded**: Reyes clay, ponded is a very deep, very poorly drained soil that formed in alluvium that derived from mixed sources. The soil is on tidal flats, with a slope of less than 2 percent. Texture is an alkaline clay or alkaline silty clay. Permeability is very slow, the soil is ponded and is protected from tidal inundation by levees. The soil is devoid of vegetation, and there is no hazard for erosion. The hydric soils list identifies three hydric inclusions occurring within this soil type: Reyes occurring in tidal flats, Pescadero in basin floors and unnamed, strongly saline inclusion occurring within marshes.

2.1.4 Natural Communities

Natural communities within the Study Area include several types of vegetation communities, mudflats, and unvegetated non-mudflats. Vegetation communities are assemblages of plant species that occur together in the same area that are defined by species composition and relative abundance. The San Francisco Bay and Coyote watersheds (Figure 3) are located in the San Francisco Bay Area subregion of the California Floristic Province (Baldwin, et.al., 2012) and support vegetation communities that are characteristic of the region. The habitats included in the South Bay region of the San Francisco Bay Area are open waters and subtidal habitats to the upper reaches of tidal action, tidal and nontidal wetlands, former salt evaporation ponds adjacent to the Bay, and the upland areas immediately adjacent to these features.

Within the project footprint, tidal salt marsh, freshwater marsh, upland/levees, mudflats, and unvegetated non-mudflats occur. These communities are presented in the South Bay Salt Pond Restoration Project Final EIS/EIR (USFWS 2007) and are described below. Photos of these vegetation communities are include in Appendix A, and a list of all observed plants is available in Appendix B,. A more comprehensive vegetation list has been produced for the Don Edwards San Francisco Bay National Wildlife Refuge Comprehensive Conservation Plan (USFWS, 2012)

The indicator statuses of all plants within the Study Area are included below in the community description. Plant indicator status categories include (Environmental Laboratory 1987):

- OBL - Plants that almost always occur in wetlands under natural conditions (estimated probability >99%), but which rarely occur in non-wetlands.
- FACW - Plants that occur usually (estimated probability >67% to 99%) in wetlands, but also occur in non-wetlands.
- FAC - Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and non-wetlands.
- FACU - Plants that occur sometimes (estimated probability 1% to <33%) in wetlands, but occur more often in non-wetlands.
- UPL - Plants that occur rarely (estimated probability <1%) in wetlands, but occur almost always in non-wetlands.

2.1.4.1 Tidal Salt Marsh and Brackish Marsh

Tidal salt marsh and brackish marsh vegetation consists of halophytic (salt tolerant) species which receive occasional to regular (tidal) saltwater inundation. Tidal salt marsh occurs on the outboard (San Francisco Bay) portions of salt pond levees where salinities are higher. Brackish marsh occurs along the intertidal reaches of the creeks and sloughs that drain to the Bay, where salinities are lower due to freshwater input.

In tidal salt marsh, cordgrass (*Spartina* sp. – OBL) dominates low marsh areas and pickleweed (*Salicornia* sp. – OBL) dominates middle marsh areas. Both of these communities formed relatively monotypic stands. The outboard areas from pond levees and lower reaches of sloughs surrounding R4, A1, and A2W typify tidal salt marsh in the Study Area.

Brackish marsh is found where intermediate interstitial soil salinities occur along creeks and sloughs; where freshwater channels experience periodic tidal inundation and groundwater emerges into tidal marshlands. Vegetative diversity and richness increases with greater freshwater influence. Where sediment deposits form terraced floodplains along low flow channels, short bulrushes such as seacoast bulrush (*Bolboschoenus robustus* –OBL) and saltmarsh bulrush (*Bolboschoenus maritimus* ssp. *paludosus* – OBL) dominate the brackish habitat. These terraced areas may also support dense populations of the invasive perennial pepperweed, which can quickly develop into monotypic stands with increasing levels of disturbance. Other moderately halophytic plants such as brass buttons (*Cotula coronopifolia* –OBL), and taller bulrushes including California bulrush (*Schoenoplectus californicus* –OBL) and hard stemmed tule (*Schoenoplectus acutus* var. *occidentalis* –OBL) occur in areas of lower soil salinity, for example, towards the upland edges of brackish marsh (USFWS 2007). Tidal salt marsh species including pickleweed, alkali heath, saltgrass, and spearscale may also colonize brackish habitat. The periphery of Pond A19 and the adjacent Mud Slough are exemplary of brackish marsh in the Study Area.

2.1.4.2 Discontinuous Internal Marsh

Discontinuous internal marsh consists of a mix of halophytic (salt tolerant) species and brackish marsh species, occurring as intermittent bands of marsh on the internal edges of many of the salt pond levees. Halophytic species occur above the water line on portions of salt pond levees where salinities are higher. Brackish marsh species occur at and below the water line, where salinities are lower due to freshwater inputs.

Halophytic vegetation dominates the levee edge, where the levee soils are high saline. Vegetation is similar to that found in the high marsh areas, feature a mixture of pickleweed and other moderately halophytic species including alkali heath (*Frankenia salina* – FACW), saltgrass (*Distichlis spicata* – FAC), saltmarsh dodder (*Cuscuta salina* –NL), small flowered iceplant (*Mesembryanthemum nodiflorum* – FAC), fleshy jaumea (*Jaumea carnosa* – OBL), spearscale (*Atriplex prostrate* –FACW), perennial pepperweed (*Lepidium latifolium*). Moderately halophytic plants dominate the brackish habitat, including: short bulrushes, (seacoast bulrush (*Bolboschoenus robustus* –OBL) and saltmarsh bulrush (*Bolboschoenus maritimus* ssp. *paludosus* – OBL)), brass buttons (C*otula coronopifolia* –OBL), and taller bulrushes (*California bulrush* (Schoenoplectus californicus –OBL) and hard stemmed tule (*Schoenoplectus acutus* var. *occidentalis* –OBL)). The areas may also support dense populations of the invasive perennial pepperweed, which can quickly develop into monotypic stands with increasing levels of disturbance.

2.1.4.3 High Marsh

High marsh is considered an ecotone (transitional ecological community) between the tidal salt marsh and the upland communities with a distinct plant community and unique physicochemical characteristics (Traut, 2005). Many of the species present within this community occurred both above and below the high tide line, indicated by wrack material (water-transported organic and synthetic detritus). Vegetation found within the high marsh areas feature a mixture of pickleweed and other moderately halophytic species including alkali heath (*Frankenia salina* – FACW), saltgrass (*Distichlis spicata* – FAC), saltmarsh dodder (*Cuscuta salina* –NL), small flowered iceplant (*Mesembryanthemum nodiflorum* – FAC), fleshy jaumea (*Jaumea carnosa* – OBL), spearscale (*Atriplex prostrate* –FACW), perennial pepperweed (*Lepidium latifolium* – FAC), New Zealand spinach (*Tetragonia tetragonioides* – NL), and marsh gumplant (*Grindelia stricta* var. *angustifolia* – NL) (USFWS 2007). High marsh occurred in the same areas as tidal salt marsh.

2.1.4.4 Freshwater Marsh

Freshwater marsh vegetation in and around the Study Area exists along the upper reaches of sloughs and creeks and primarily consists of emergent vegetation adapted to freshwater wetland conditions. Though some freshwater marshes may experience tidal influence and periodic salt water inundation, soil salinity remains relatively low due to freshwater flowing through these areas on a regular basis. The upper reach of Ravenswood Slough (along the eastern edge of R3) demonstrates the vegetation transition that occurs as freshwater influence increases. Dense stands of California bulrush and hard stemmed tule interspersed with perennial pepperweed or curly dock (*Rumex crispus* –FAC) compose the majority of emergent vegetation in freshwater marsh habitat. Areas less frequently exposed to freshwater flow but still exposed to occasional salt water inundation may also host halophytic species such as marsh gumplant and pickleweed. The Guadalupe River side of A8 is a location where freshwater species colonize the majority of the floodplain terrace.

2.1.4.5 Upland/Levees

The primary upland habitat existing in the Ravenswood, Alviso-Mountain View, Alviso-A8, and Alviso-Island Ponds clusters exists along the tops of levees and along the landward sides of the Study Area. Levees were constructed from native tidal salt marsh soils (silty clay) in the immediate vicinity and may occasionally be reinforced with concrete debris. Due to the high salinity of these soils and their inherent disturbed nature, many levees feature areas of bare soil, or are otherwise populated by non-native halophytic species including small flowered iceplant, New Zealand spinach, sea fig (*Carpobrotus chilensis* –FACU), Russian thistle (*Salsola soda* –FACW), and Australian saltbush (*Atriplex semibaccata* –FAC) (USFWS 2007).

On levees and portions of levees where freshwater (groundwater or rain) has reduced soil salinity over time, other common ruderal species (non-native species that thrive in areas of disturbance) of forbs and grasses dominate; including black mustard (*Brassica nigra* –NL), Italian thistle (*Carduus pycnocephalus* –NL), yellow star thistle (*Centaurea solstitialis* –NL), sweet fennel (*Foeniculum vulgare* –NL), perennial pepperweed, common mallow (*Malva neglecta* -NL), bird's foot trefoil (*Lotus corniculatus* –FAC), wild oats (*Avena fatua* –NL), ripgut brome (*Bromus diandrus* –NL), crabgrass (*Digitaria sanguinalis* –FACU), Italian rye grass (*Lolium multiflorum* –NL), tall wheat grass (*Elymus ponticus* –NL), and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum* –FAC). Native shrubs may colonize more substantial levees, for instance the coyote bush (*Baccharis pilularis* –NL) found on the A19 levees.

2.1.4.6 Mudflat

Naturally occurring mudflats on the outboard sides of many South Bay managed ponds, including those in the Ravenswood Complex, begin at low tidal salt marsh areas and extend into the Bay. Covered by shallow water during high tide, these mudflats are exposed during low tide (Schoellhammer 2005). These intertidal habitats are inhospitable to most vascular emergent vegetation; typically supporting 0 to 10 percent cover of cordgrass or pickleweed. Narrow stretches of mudflat occur within slough and creek channels and at the mouths of major sloughs. Mudflats also exist in the basins of former salt evaporator ponds, such as Charleston Slough, adjacent to the Alviso-Mountain View Ponds, and in portions of the Alviso-Island Ponds Complex where the levees have been breached and the pond re-exposed to Bay waters and tides.

2.1.4.7 Unvegetated Non-Mudflat

The margins and basins of some former salt evaporator ponds, such as R3 and R4 at Ravenswood Pond Complex, that are seasonally ponded but dry much of the year, consist of bare ground and salt flat (non-mudflat soils) areas. Historically these basins were subject to regular tidal inundation, but following installation of levees and their use as salt evaporator ponds, the salinity has increased beyond the tolerance of most halophytic vegetation. The only vascular plant species surviving in this environment is the non-native small flowered iceplant; which occurs sparsely along the margins of the basins and on top of the soil terrace of the salt flats (USFWS 2007).

2.2 Methods

Prior to the commencement of field work, the approach URS (now AECOM) biologists took to delineate wetland and water features was verified and confirmed by the USACE (J. Hicks. San Francisco District Regulatory Division Chief. San Francisco, California. June 28, 2013. Personal Communication). The mean high water (MHW) elevations were established through desktop analysis and conversions of data from tide gauge stations and using the NAVD88 datum. The two tide gage stations that were used were the Coyote Creek gage (for the Mountain View Ponds, the A8 Ponds, and the Island Ponds) and Dumbarton gage (for the Ravenswood Ponds). The conversions were made using methods published by Amy Foxgrover and others (2007). Aerial image interpretation was also performed to map all wetlands, uplands, ponds, and open water features prior to ground-truthing in the field. The primary source is the maps of the United States Coast Survey (USCS; later U.S. Coast and Geodetic Survey), a federal agency renowned for the accuracy and detail of its 19th-century maps of America's shoreline. In most parts of the country, these maps provide the best historic pictures of coastal and estuarine habitats prior to substantial Euro-American modification. The MHW was used to delineate the current Section 10 Waters of the U.S. The High Tide Line (HTL) was delineated in the field.

To delineate the HTL in the field, teams collected Global Positioning System (GPS) points at the HTL around each pond at approximately every 300 to 500 feet. The HTL was identified in the field by shoreline indicators which in most cases included drift lines or wrack lines and in some cases, the uppermost limit of barnacles on rock rip rap along the Bay. This data was then combined using ArcGIS 10 with LiDAR overlay to create the HTL boundary for each pond. The HTL boundary was derived using the contour tool in the spatial analysis tools of ESRI's ArcGIS 10. Based on field collection, specific elevation contours, or isolines, representing the HTL, were derived from the LiDAR (elevation) surface. The contour tool was used to create a line representing a specific elevation across a defined area. The boundaries of the HTL were used to determine the extent of Section 404 jurisdiction of other waters

For non-tidally influenced ponds, the ordinary high water mark (OHWM) was used to determine the extent of the open water features. Paired upland and wetland data points were also collected in the field to verify the extent of all wetland and open water features. Within each pond complex the paired wetland and upland data points were taken using the methods described in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008) and Wetland Determination Data Forms for the Arid West Region were completed (Appendix C). All wetland types (brackish marsh, freshwater marsh, and tidal marsh) were delineated collectively in the field and the total acreage of wetlands within each pond complex reflects all wetland feature types combined. Wetland and open water polygons were then revised based on GPS data collected in the field.

A plant list was compiled while in the field by URS (now AECOM) biologists based on what was identifiable at the time of the field effort within the Study Area (Appendix B).

In 2016, after the August 11 site visit with USACE regulatory staff, additional internal wetland features were identified in the ponds. Strips of discontinuous marsh vegetation have developed along the internal pond levees and should be manually added to the classification initially done by aerial image analysis. AECOM biologists verified a method for mapping these internal marsh vegetation features, which was confirmed by USACE (F. Malamud-Roam, San Francisco District Regulatory Project Manager, San Francisco, California. August 16, 2016. Personal Communication). The internal discontinuous fringing wetland features were mapped in a desktop study, using the following agency-approved rules. Wetland areas of internal marsh vegetation were then estimated using a conservative average width, specific to each pond cluster:

- Ravenswood Ponds = wetland strips 8 feet wide were applied all the way around all pond interiors.
- Mountain View Ponds = wetland strips 12 feet wide were added along the southern interior borders of each pond and 8 feet wide along the rest of the interior levees. The external western levee of Pond A1 (facing Charleston Slough) was treated as an interior border and used the same 8-foot border. There is a large section of marsh inside of Pond A2W, along the interior of its western levee. This marsh was mapped in the previous delineation, and so the averaging technique was not applied here. The previously developed polygon was overlain for this large internal marsh.
- A8 Ponds = wetland strips 6 feet wide were applied all the way around the interiors. The internal fringe wetland in these ponds is extremely patchy. Several wetland sections are 18-25 feet wide, but most of the southern interior of the southern border and the corners bending up toward Pond A8 are sparsely vegetated. There is a notable erosion scarp along the interior southeastern corner of Pond A8S adjacent to the closed landfill behind these ponds.. The exterior fringing marshes are well-characterized in the delineation and so were not changed.
- Island Ponds = AECOM acquired the GIS vegetation layer from the boat-enabled surveys done by the Refuge staff. The Refuge's GIS data was be applied to the Island Ponds to update the data and internal wetland areas.

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3 Results and Discussion

3.1 Delineation Results

A total of 3,052.7 acres of potentially jurisdictional wetlands and other (non-wetland) waters of the U.S. were identified within the study area (the footprint and immediate surroundings) for Phase 2 of the SBSP Restoration Project (Figure 5). Of the features identified in this report, 583.1 acres are freshwater marsh, tidal marsh, and seasonal wetland and 2,469.6 acres are other waters. A total of 477.0 acres of historic Section 10 water features were identified within the Study Area and 2,083.2 acres of current Section 10 waters are present within the Study Area boundaries. This section provides brief descriptions of these features, the delineations of which were based on NOAA tidal datum, photographic interpretation and data collected in the field.

3.2 Significant Nexus Determination

The San Francisco Bay is a TNW waterway under 33 CFR 328.3(a)(3)(i), based on its usage by ships for interstate commerce. It flows into the Pacific Ocean north of San Francisco underneath the Golden Gate Bridge (Figure 3). All ponds in Phase 2 of the SBSP Restoration Project have a significant nexus to San Francisco Bay, either directly by means of an existing levee breach or hydrologically connected through subterranean flow (flow of water below the levee). Therefore, all ponds within the Study Area are considered to be potentially jurisdictional under Section 404 of the Clean Water Act.

3.2.1 Section 404 Wetlands and Other Waters of the U.S.

Wetland features within the Study Area, as defined under Section 404 of the CWA, include brackish and freshwater marshes and a few seasonal wetlands. Other waters features as defined by Section 404 include open water, mudflats, natural sloughs, channels, and former salt ponds.

- **Ravenswood Pond Complex:** The Phase 2 ponds at the Ravenswood Pond Complex include R3, R4, R5, and S5 (Figure 5). These ponds are a subset of the larger Ravenswood Pond Complex. Section 404 wetlands occur on the outboard portions of Ravenswood: tidal salt marsh occurs on the northern portion of the R4 levee, and the eastern edge of R4. Wetlands near R3 are characterized by brackish marsh transitioning to freshwater marsh further upstream in Ravenswood Slough. Freshwater marsh also occurs along the southern edge of the S5 levee in two isolated patches. The interiors of these ponds are edged with discontinuous internal marsh vegetation and are unvegetated non-mudflat in the centers, which are considered other waters of the U.S.
- **Alviso Pond Complex – A8 Ponds:** This pond cluster is in the central part of the Alviso Pond Complex, and includes Pond A8 and Pond A8S. These ponds contain Section 404 wetlands as bands of internal discontinuous brackish and salt marsh. The outboard edge of A8, which borders the Guadalupe River, has large external fringing marshes, also Section 404 wetlands. The external fringing marsh wetlands are characterized by dense, exclusive stands of freshwater marsh. The Guadalupe River itself, and the interiors of the A8 and A8S ponds, are considered other waters of the U.S.
- **Alviso Pond Complex – Island Ponds:** The ponds in this part of the Alviso Pond Complex are referred to as the Island Ponds. This pond cluster includes A19, A20, and A21. The levees of all three ponds are breached and are subject to tidal influence; at low tide the interiors of A19, A20, and A21 drain to reveal mudflats, bordered by hydric vegetation. The vegetation at these ponds is entirely brackish due to the freshwater influence of Coyote Creek to the south and Mud Slough to the north. The brackish marshes and internal discontinuous marshes are Section 404 wetlands, and the interiors of the ponds and the creek and slough channels constitute other waters of the U.S.

- **Alviso Pond Complex – Mountain View Ponds:** The ponds in this part of the Alviso Pond Complex are referred to as the Alviso-Mountain View Ponds. For the purposes of this delineation, this pond cluster includes A1 and A2W, plus the adjacent Charleston Slough (C1) to the west, Permanente Creek which flows into Mountain View Slough between A1 and A2W, and Stevens Creek to the east of A2W. The outboard edges of A1 and A2W are host to tidal salt marsh, which transitions into brackish marsh travelling upstream into Charleston Slough, Mountain View Slough, and Stevens Creek. The portion of the western levee of C1 at the outlet of Adobe Creek (bordering Palo Alto Baylands Park) is host to freshwater marsh. Ponds A1 and A2W contain water at all times because their levees are not breached; however, C1 is exposed to tidal action and drains at low tide to reveal mudflats. The water/mudflat areas within the levees of these ponds are considered other waters of the U.S., and the marsh, internal discontinuous marsh, and outboard areas constitute Section 404 wetlands.

3.2.2 Section 10 Waters

Waters of the U.S. subject to jurisdiction under Section 10 of the Rivers and Harbors Act are defined as those waters subject to the ebb and flow of the tide shoreward to the MHW mark and/or presently used, or have been used in the past, or are susceptible for use to transport interstate or foreign commerce. These waters were delineated based on the MHW (Figure 6). The MHW for each Pond Complex was determined using a dataset that integrated several sources of data describing the historical features of South Bay tidal marshes. The MHW, as interpreted through the NAVD88 datum, used for each pond cluster is listed below:

- Ravenswood – 6.79 feet elevation
- Alviso-A8 – 6.91 feet elevation
- Alviso-Island –6.91 feet elevation
- Alviso-Mountain View – 6.91 feet elevation

Current Section 10 waters within the Study Area include the San Francisco Bay present in the Ravenswood Complex and the Alviso-Mountain View Ponds, Ravenswood Slough in the Ravenswood Complex, Charleston Slough, Mountain View Slough and Stevens Creek in the Alviso-Mountain View Ponds, Mud Slough and Coyote Creek in the Alviso-Island Ponds, and the Alviso Slough in the Alviso-A8 Ponds. All current Section 10 waters overlap with and are also designated as Section 404 other waters. The features that are now ponds within the Study Area were present as tidally influenced areas before the construction of the levees and the flooding of the ponds. Some historical Section 10 waters also overlap current Section 404 jurisdiction (Figure 5).

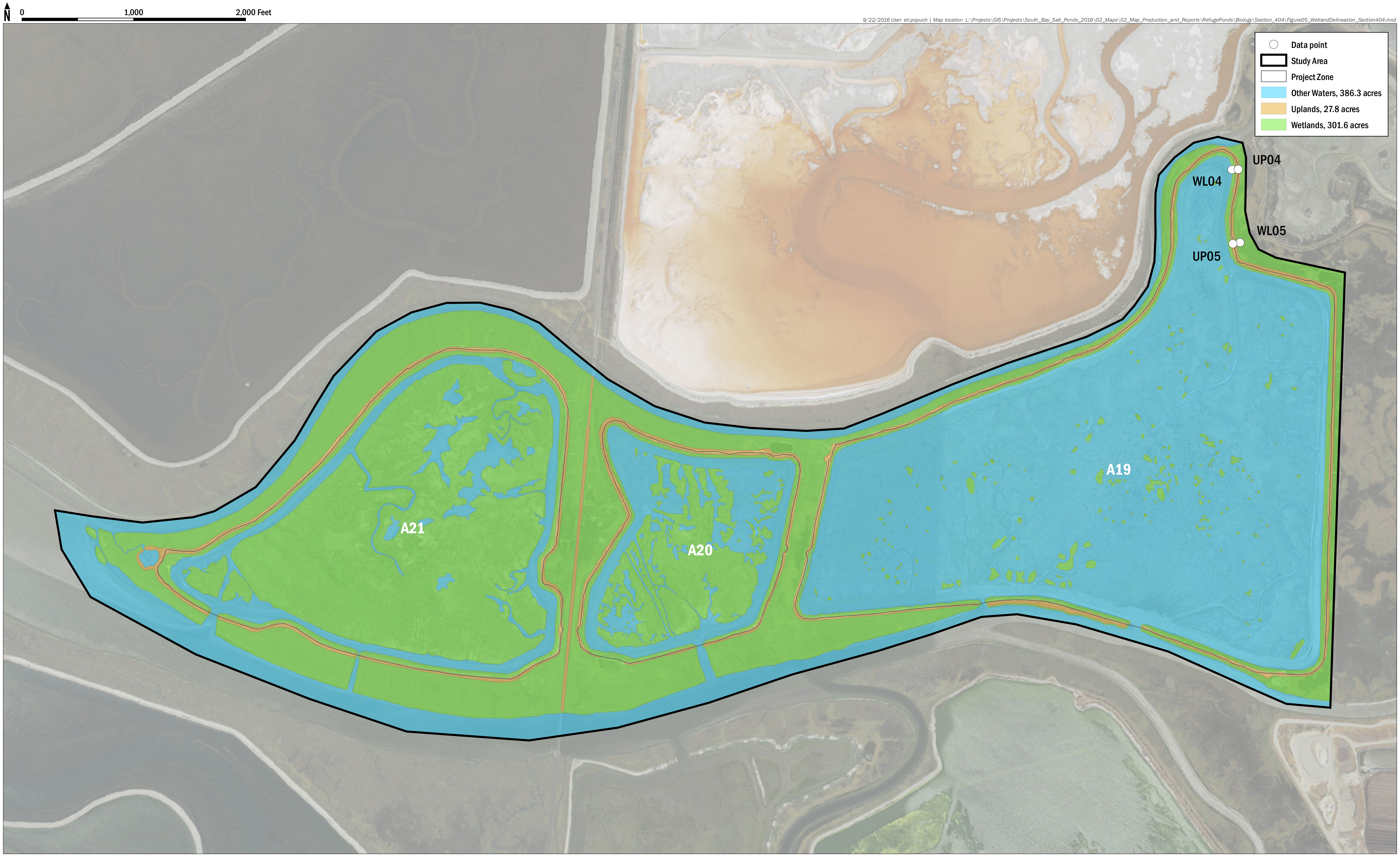
AECOM

South Bay Salt Pond Restoration Project

FIGURE 5

Section 404 Waters of the U.S.

Alviso A8 Ponds



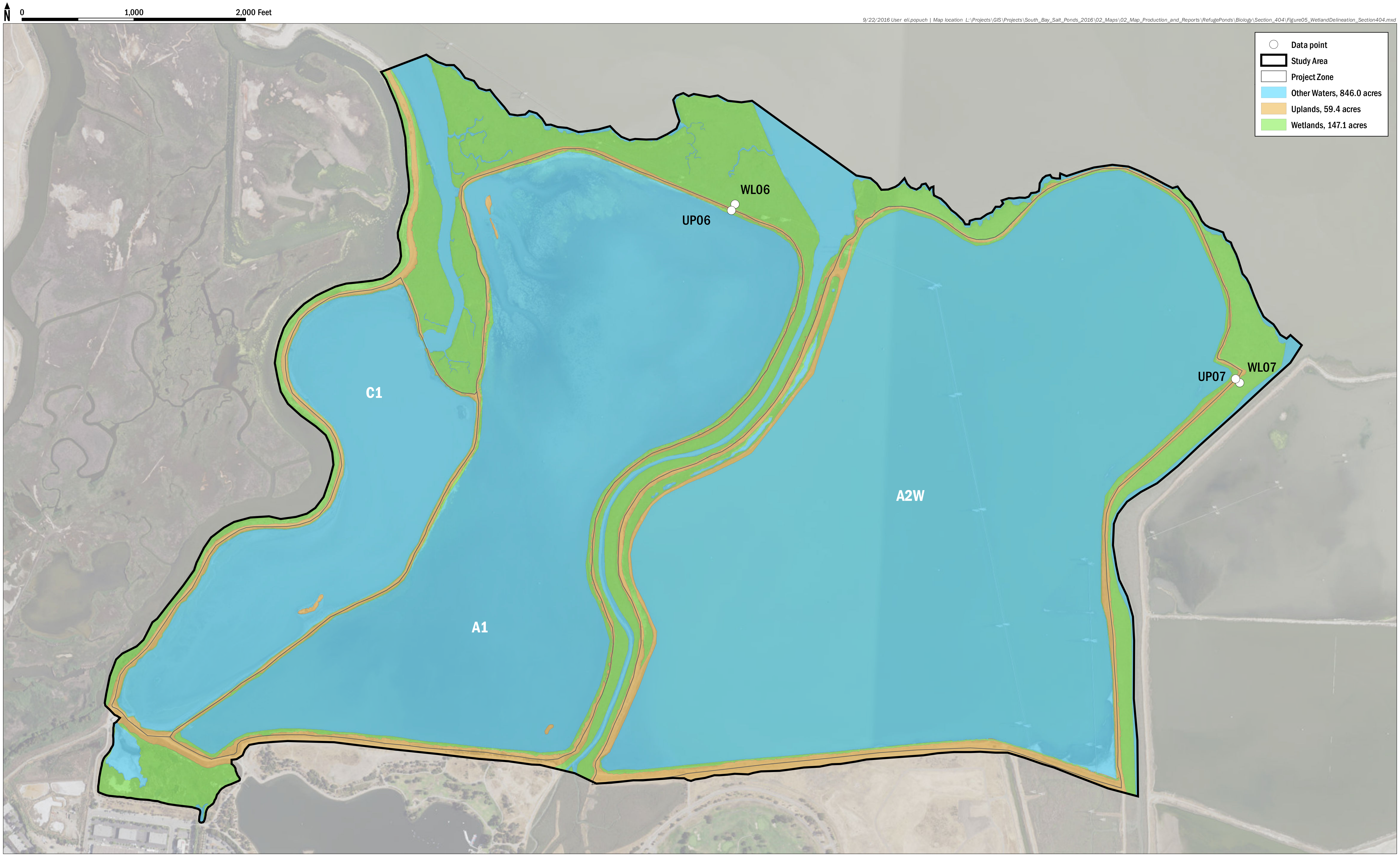
AECOM

South Bay Salt Pond Restoration Project

FIGURE 5

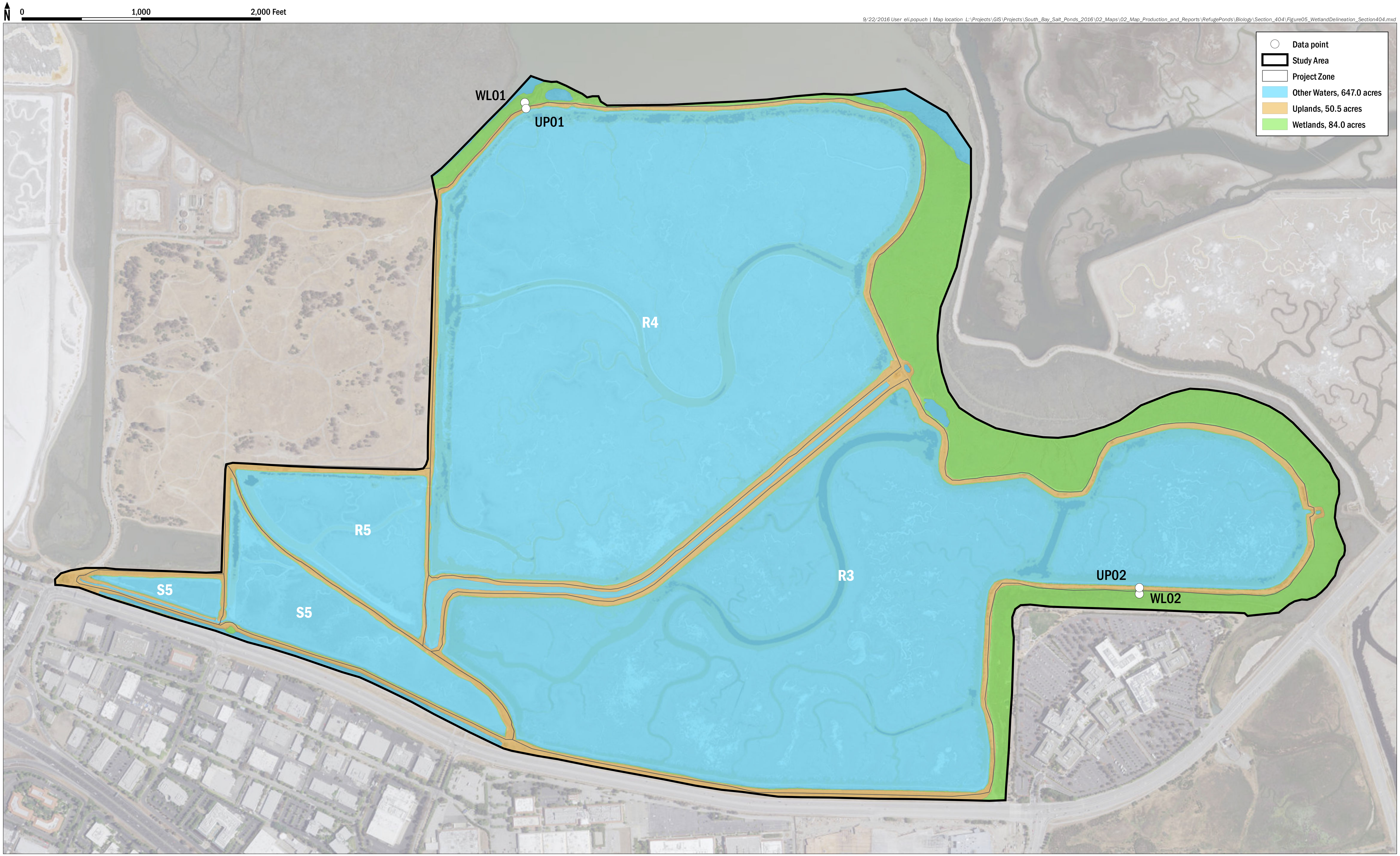
Section 404 Waters of the U.S.

Alviso Island Ponds



AECOM
South Bay Salt Pond Restoration Project

FIGURE 5
Section 404 Waters of the U.S.
Alviso Mt. View Ponds



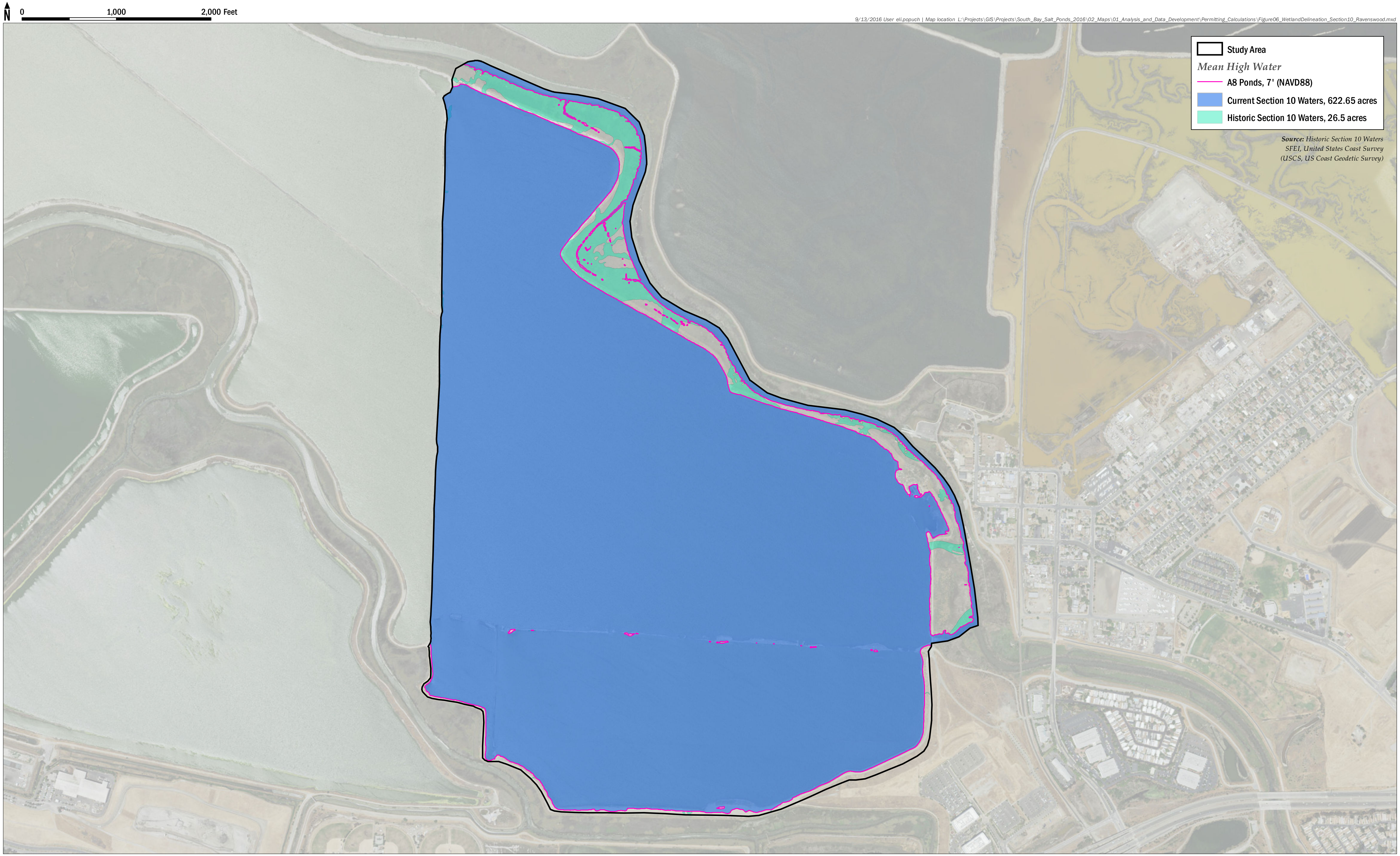
AECOM

South Bay Salt Pond Restoration Project

FIGURE 5

Section 404 Waters of the U.S.

Ravenswood Ponds



AECOM

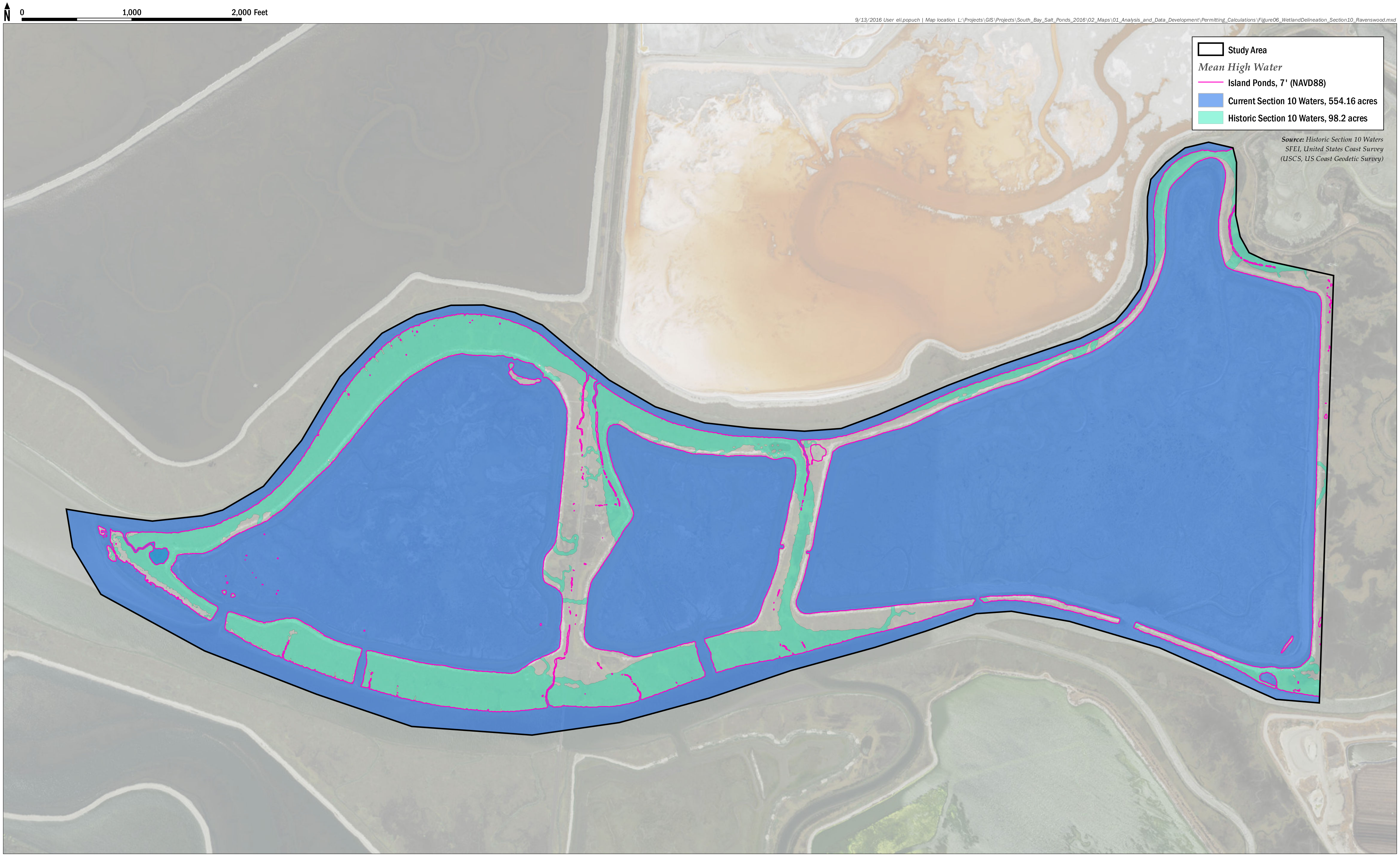
South Bay Salt Pond Restoration Project

FIGURE 6

Current & Historic Section 10

Based on 2016 Delineation & Aerial Interpretation

Alviso A8 Ponds



AECOM

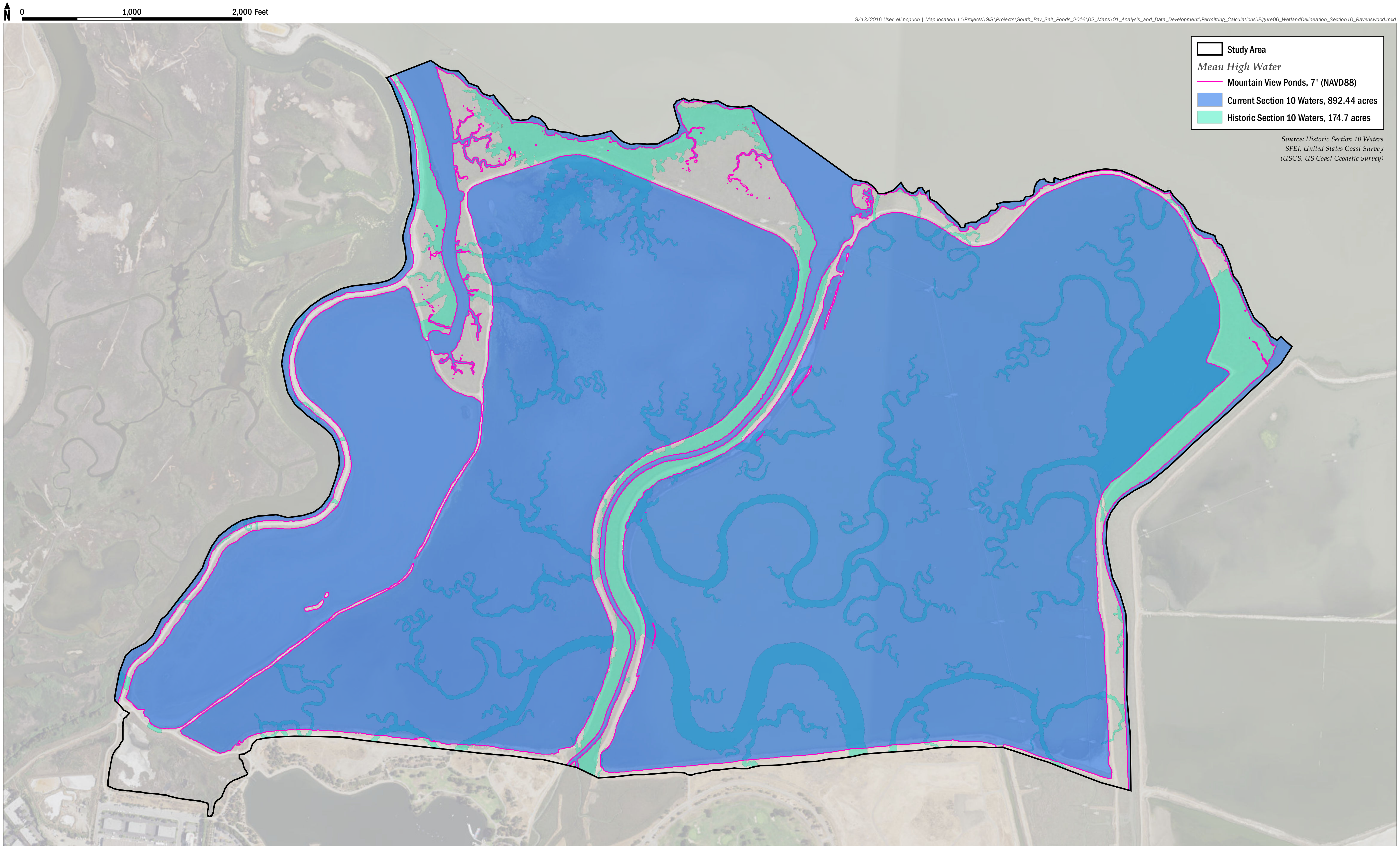
South Bay Salt Pond Restoration Project

FIGURE 6

Current & Historic Section 10

Based on 2016 Delineation & Aerial Interpretation

Alviso Island Ponds



AECOM

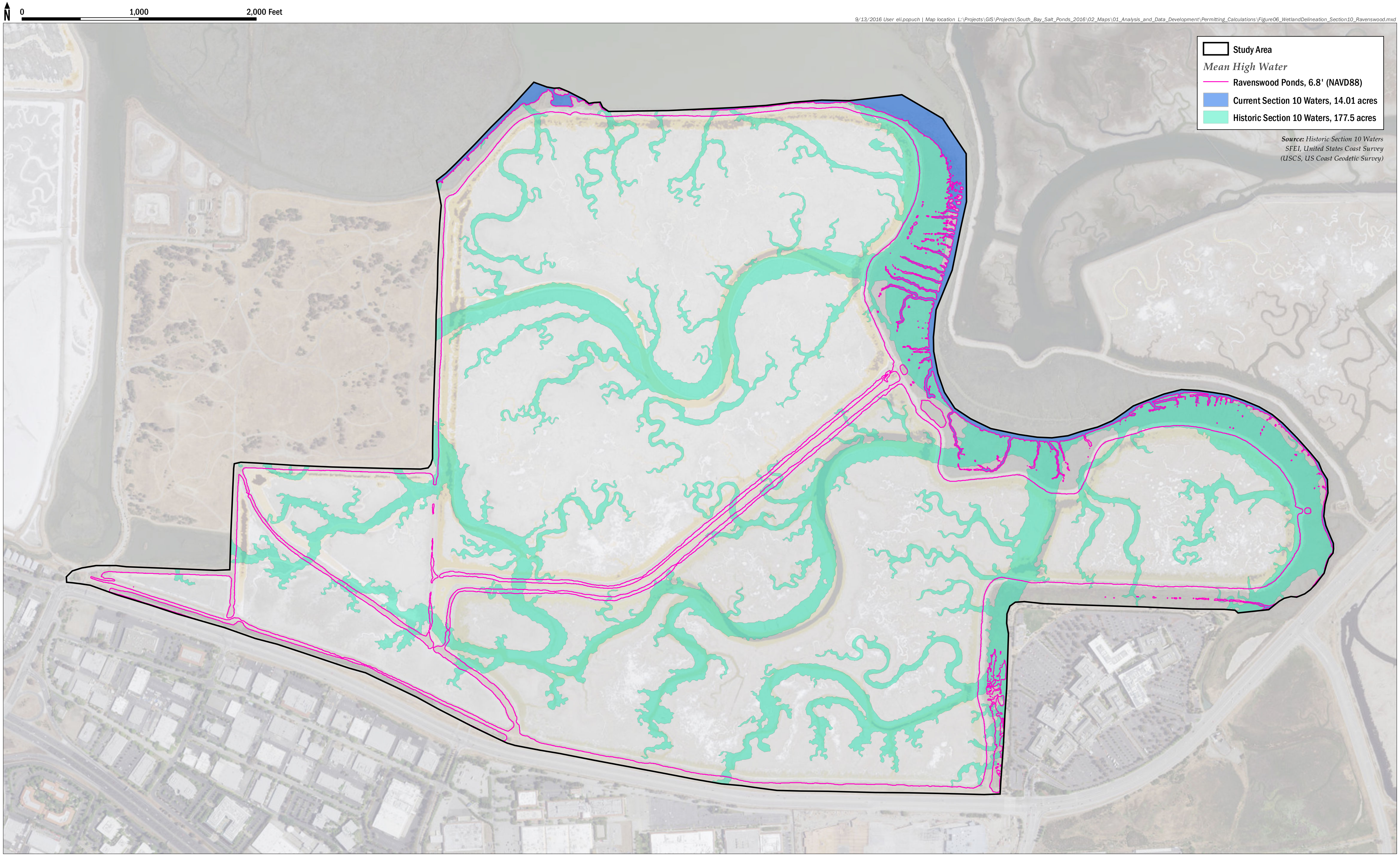
South Bay Salt Pond Restoration Project

FIGURE 6

Current & Historic Section 10

Based on 2016 Delineation & Aerial Interpretation

Alviso Mt. View Ponds



AECOM

South Bay Salt Pond Restoration Project

FIGURE 6

Current & Historic Section 10

Based on 2016 Delineation & Aerial Interpretation

Ravenswood Ponds

3.3 Summary of Findings

A total of 583.1 acres of potentially jurisdictional wetlands and 2,469.6 acres of other waters of the U.S. were identified within the Study Area. These features are summarized in Table 3-1. In addition, 477.0 acres of historic Section 10 waters and 2,083.2 acres of current Section 10 waters were identified within the Study Area. These features are summarized in Table 3-2.

Table 3-1. Summary of Section 404 Features Identified in the Study Area

	Section 404 Wetland Feature Name	
Pond Complex	**Wetlands**	**Acres**
Alviso A8	Alviso Slough East Fringing Marsh	44.7
Alviso A8	A8S Fringing Marsh	2.4
Alviso A8	A8 Fringing Marsh	3.2
	Subtotal Alviso A8 Wetlands	***50.3***
Alviso Island	A19/A20 Fringing Marsh	114.1
Alviso Island	A21 Fringing Marsh	72.0
Alviso Island	A19 Interior Marsh	5.6
Alviso Island	A21 Interior Marsh	110.0
	Subtotal Alviso Island Wetlands	***301.7***
Alviso Mt. View	A2W Fringing Marsh	49.8
Alviso Mt. View	A1 Fringing Marsh	66.4
Alviso Mt. View	Outer Charleston Slough Fringing Marsh	18.7
Alviso Mt. View	Inner Charleston Slough	2.2
Alviso Mt. View	Coast Casey Forebay Brackish Marsh	10.0
	Subtotal Alviso Mt. View Wetlands	***147.1***
Ravenswood	Ravenswood Slough Fringing Marsh	71.8
Ravenswood	Caltrans Ditch Fringing Marsh	0.3
Ravenswood	West Point Slough Fringing Marsh	3.0
Ravenswood	R4 Fringing Marsh	2.6
Ravenswood	R3 Fringing Marsh	3.6
Ravenswood	S5 Fringing Marsh	1.8
Ravenswood	R5 Fringing Marsh	0.9
	Subtotal Ravenswood Wetlands	***84.0***
TOTAL of Wetlands		**583.1**
	Other Waters of the U.S.	
Alviso A8	Alviso Slough	11.1
Alviso A8	A8S	172.0
Alviso A8	A8	406.5
	Subtotal Alviso A8 Other Waters	***589.6***
Alviso Island	Coyote Creek	46.4
Alviso Island	Mud Slough	21.6
Alviso Island	A19	255.1
Alviso Island	A21	31.9
Alviso Island	A20	31.3
	Subtotal Alviso Island Other Waters	***386.3***
Alviso Mt. View	Permanente Creek/Mountain View Slough	18.2
Alviso Mt. View	A2W	429.9

Table 3-1. Summary of Section 404 Features Identified in the Study Area

Section 404 Wetland Feature Name		
Alviso Mt. View	A1	270.0
Alviso Mt. View	Inner Charleston Slough	106.9
Alviso Mt. View	San Francisco Bay	4.1
Alviso Mt. View	Stevens Creek	3.9
Alviso Mt. View	Outer Charleston Slough	11.3
Alviso Mt. View	Coast Casey Forebay	2.5
	Subtotal Alviso Mt. View Other Waters	***846.8***
Ravenswood	Caltrans Ditch	2.9
Ravenswood	R4	295.5
Ravenswood	R3	271.9
Ravenswood	S5	33.4
Ravenswood	R5	30.9
Ravenswood	All American Canal	6.9
Ravenswood	AAC Pool 1	0.1
Ravenswood	R3 Pool 1	0.6
Ravenswood	R4 Pool 1	0.4
Ravenswood	San Francisco Bay	3.6
Ravenswood	West Point Slough	0.7
	Subtotal Ravenswood Other Waters	***646.9***
Total of Other Waters of the U.S.		**2,469.6**
TOTAL of Potentially Jurisdictional Features		**3,052.7**

Table 3-2. Summary of Historic and Current Section 10 Waters Identified in the Study Area

Pond Complex	Section 10 Waters	Area (acres)*
Ravenswood	Historic	177.5
Alviso A8	Historic	26.5
Alviso Island Ponds	Historic	98.2
Alviso Mountain View	Historic	174.7
	Total acres of historic waters	***477.0***
Ravenswood	Current	14.0
Alviso A8	Current	622.6
Alviso Island Ponds	Current	554.2
Alviso Mountain View	Current	892.4
	Total acres of current waters	***2,083.2***

Implementation of the South Bay Salt Pond Restoration Project is anticipated to have temporary and permanent impacts on the potentially jurisdictional features identified in this delineation report. To comply with federal and state regulations protecting aquatic resources, permits will be required from the U.S. Army Corps of Engineers (USACE), the San Francisco Bay Conservation and Development Commission (BCDC), and the Regional Water Quality Control Board (RWQCB).

4 References

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken. “The Jepson Manual, Vascular Plants of California.” Second Edition. Berkeley California: University of California Press. 2012.

Eicher, A.L. 1988. Soil-Vegetation Correlations in Wetlands and Adjacent Upland of the San Francisco Bay Estuary, California. U.S. Fish and Wildlife Service Biological Report 88(21) 35pp.

Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1, U.S. Army Engineers Waterways Experiment Station, Vicksburg, Mississippi.

Foxgrover, et. al., 2007. 2005 Hydrographic Survey of South San Francisco Bay, California, U.S. Geological Survey Open-File Report 2007-1169 113 p. [URL: http://pubs.usgs.gov/of/2007/1169]Jones and Stokes Associates, Inc., Harvey and Stanley Associates, Inc., and John Blayney Associates. 1979. Protection and Restoration of San Francisco Bay Fish and Wildlife Habitat. Vols. 1 and 2. U.S. Fish and Wildlife Service and California Department of Fish and Game.

Natural Resources Conservation Service (NRCS). 2013. Official series descriptions. Accessed in 2013 at: NRCS. https://soilseries.sc.egov.usda.gov/osdnamequery.asp. National Resource Conservation Service, United States Department of Agriculture.

Pooley, D.S. 2002. The Future of Wetlands Regulation in the Wake of the SWANNC Decision. Environmental Monitor. Summer 2002.

Schoellhammer, D., J. Lacy, et al. 2005. Draft Science Synthesis. Issue 2. Sediment management: Creating desired habitat while preserving existing habitat.

Traut, B.H. 2005. The role of coastal ecotones: a cast study of the salt marsh/upland transition zone in California. Journal of Ecology 2005 93 279-290.

U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (EPA). 2007. Clean Water Act Jurisdiction Following the U.S. Supreme Court’s Decision in Rapanos v. United States & Carabell v. United States. June 5. Memorandum.

U.S. Army Corps of Engineers (USACE). 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. Wetlands Regulatory Assistance Program. Washington, D.C.

USCS, US Coast Geodetic Survey. 1939. San Francisco Estuary Institute, United States Coast Survey Map T2312.

USDA Soil Conservation Service. 1991. Soil Survey of San Mateo County, Eastern Part, and San Francisco County, California.

USDA Soil Conservation Service. 1981. Soil Survey of Alameda County, California, Western Part.

U.S. Fish and Wildlife Service Don Edwards National Wildlife Refuge and Santa Clara Valley Water District. 2007. Restoration and Mitigation Monitoring Plan for the Island Ponds Restoration.

U.S. Fish and Wildlife Service (USFWS). 2007. South Bay Salt Pond Restoration Project. Final Environmental Impact Statement/Report.

U.S. Fish and Wildlife Service (USFWS). 2012. Don Edwards San Francisco Bay National Wildlife Refuge Draft Comprehensive Conservation Plan.

Personal Communication

Hicks, Jane. 2013. San Francisco District Regulatory Division Chief, USACE, San Francisco, California. June 28, 2013. Email to Jan Novak, URS, regarding mapping of tidal waters; July 8, 2013. Email to Jan Novak, URS, confirming the methodology for mapping tidal waters within the San Francisco Bay,

Malamud-Roam, Frances. 2016. San Francisco District Regulatory Project Manager, San Francisco, California. August 16, 2016. Email to David Halsing, AECOM, regarding mapping of fringing wetlands, confirming methodology for mapping the fringing wetlands within the tidal and non-tidal ponds.

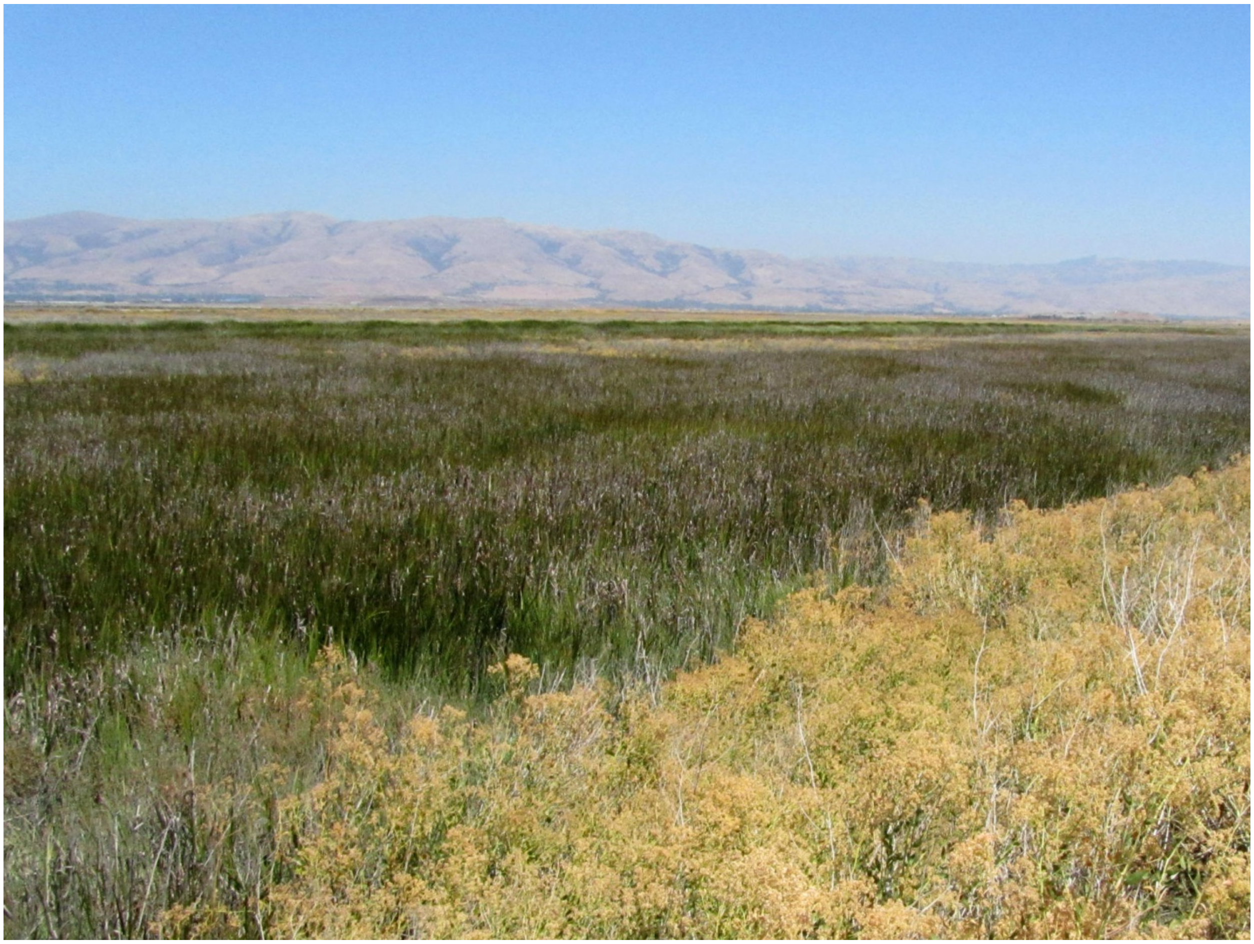
Appendix A.
Representative Photographs of Delineated Wetlands and Waters

Tidal Salt Marsh and Brackish Marsh

Tidal salt marsh near the mouth of Mountain View Slough between ponds A1 and A2W; featuring cordgrass low marsh, pickleweed middle marsh, and gumplant and alkali heath high marsh.

Characteristic brackish marsh at A19 pond interior (top) and along Mud Slough (bottom) featuring a mixture of pickleweed, perennial pepperweed, and bulrush species.

Freshwater Marsh



Dense stands of bulrush on the terraced floodplain of the Guadalupe River, adjacent to A8.

Upland/Levees

Ruderal, upland vegetation found on levee tops (R4- left, R3-right) including ripgut brome, Italian thistle (dry), and Australian saltbush.

Mudflat

Photo 5. Pickleweed margin unvegetated mudflat of A19 pond basin.

Unvegetated Non-Mudflat

Interior basins of salt ponds R3 (top left), S5 (top right), and R4 (bottom).

Appendix B.
Plant List

List of Vascular Plant Species Identified

Species Name	Common Name	Wetland Indicator	Nativity	Cal-IPC status
Atriplex prostrata	spearscale	FACW	non native	NL
Atriplex semibaccata	Australian saltbush	FAC	non native	moderate
Avena fatua	wild oats	NL	non native	moderate
Baccharis pilularis	coyote brush	NL	native	n/a
Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush	OBL	native	n/a
Bolboschoenus robustus	seacoast bulrush	OBL	native	n/a
Brassica nigra	black mustard	NL	non native	moderate
Bromus diandrus	ripgut brome	NL	non native	moderate
Carduus pycnocephalus	Italian thistle	NL	non native	moderate
Carpobrotus chilensis	sea fig	FACU	non native	moderate
Centaurea solstitialis	yellow star-thistle	NL	non native	high
Cotula coronopifolia	brass buttons	OBL	non native	limited
Cuscuta salina	saltmarsh dodder	NL	native	n/a
Digitaria sanguinalis	crabgrass	FACU	non native	NL
Distichlis spicata	saltgrass	FAC	native	n/a
Elymus ponticus	tall wheat grass	NL	non native	NL
Foeniculum vulgare	sweet fennel	NL	non native	high
Frankenia salina	alkali heath	FACW	native	n/a
Grindelia stricta var. *angustifolia*	marsh gumplant	NL	native	n/a
Hordeum marinum ssp. *gussoneanum*	Mediterranean barley	FAC	non native	NL
Jaumea carnosa	marsh jaumea	OBL	native	n/a
Lepidium latifolium	perennial pepperweed	FAC	non native	high
Lolium multiflorum	Italian rye grass	NL	non native	moderate
Lotus corniculatus	bird's foot trefoil	FAC	non native	NL
Malva neglecta	common mallow	NL	non native	NL
Mesembryanthemum nodiflorum	small flowered iceplant	FAC	non native	NL
Rumex crispus	curly dock	FAC	non native	limited

Salicornia depressa	pickleweed	OBL	native	n/a
Salicornia pacifica	Pacific pickleweed	OBL	native	n/a
Salsola soda	Russian thistle	FACW	non native	moderate
Schoenoplectus acutus var. *occidentalis*	hard stemmed tule	OBL	native	n/a
Schoenoplectus californicus	California bulrush	OBL	native	n/a
Spartina foliosa	Pacific cordgrass	OBL	native	n/a
Spartina sp. *(S. alterniflora, S. alterniflora* x *S. foliosa)*	saltwater cordgrass	OBL	non native	high
Tetragonia tetragonioides	New Zealand spinach	NL	non native	high

Wetland Indicator:
NL = not listed
FAC = Facultative: equally likely to occur in upland or wetland habitats.
FACW = Facultative Wetland: more commonly occurs in wetlands but can occur in uplands.
FACU = Facultative Upland: more commonly occurs in uplands but can occur in wetlands.
OBL = Obligate Wetland: almost always occurs in wetlands, rarely occurs in uplands.

Cal-IPC:
High – Species with severe ecological impacts in California: on physical processes, ecological communities, and vegetation structure.
Moderate – Species with substantial and apparent – but generally not severe – impacts in California on physical processes, ecological communities, and vegetation structure.
Limited – Species that are invasive in California but whose ecological impacts may be minor (though potentially locally persistent and problematic), or information is limited.

References

Calflora: Information on California plants for education, research and conservation. [web application]. 2013. Berkeley, California: The Calflora Database [a non-profit organization]. Available: http://www.calflora.org/ (Accessed: August 12, 2013).

Jepson Flora Project (eds.) [2013] *Jepson eFlora*, http://ucjeps.berkeley.edu/IJM.html [accessed on August 12, 2013]

Lichvar, R.W. 2013. *The National Wetland Plant List*: 2013 wetland ratings. Phytoneuron 2013-49: 1-241.

USDA, NRCS. 2013. The PLANTS Database (http://plants.usda.gov, 12 August 2013). National Plant Data Team, Greensboro, NC.

Appendix C.
Arid West Data Sheets

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Ravenswood | City/County: Menlo Park, San Mateo County | Sampling Date: 7/10/13

Applicant/Owner: USFWS | State: CA | Sampling Point: WL01

Investigator(s): S. Lindquist, J. Novak, D. Peña, E. Maroni | Section, Township, Range: S14 T5S R3W

Landform (hillslope, terrace, etc.): | Local relief (concave, convex, none): none | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: 37.49797157 | Long: -122.1657307 | Datum:

Soil Map Unit Name: Novato clay | NWI classification: L2USKh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )
Hydric Soil Present?	Yes (●)	No ( )
Wetland Hydrology Present?	Yes (●)	No ( )

Is the Sampled Area within a Wetland? **Yes** (●) **No** ( )

Remarks: Photos 0918-0924

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Salicornia depressa*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

- [x] Dominance Test is >50%
- [x] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

Remarks:

SOIL

Sampling Point: WL01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	Gley1 3/1	80	5YR 4/6	20	C	PL	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ◉ **No** ○

Remarks: Munsell M-3

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0-12

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Located within high tide location of San Francisco Bay.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Ravenswood City/County: Menlo Park, San Mateo County Sampling Date: 7/10/13

Applicant/Owner: USFWS State: CA Sampling Point: UP01

Investigator(s): S. Lindquist, J. Novak, D. Peña, E. Maroni Section, Township, Range: S14 T5S R3W

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): C - Mediterranean California Lat: 37.49791468 Long: -122.1657342 Datum:

Soil Map Unit Name: Novato clay NWI classification: L2USKh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? **Yes** ( ) **No** (●)

Remarks: Photos 0925-0927. Point located on San Francisco Bay side of levee.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Bromus diandrus*	60	Yes	UPL
2. *Frankelia salina*	25	Yes	FACW
3. *Salicornia depressa*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
Total Cover:	95 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 5 % % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:			Multiply by:
OBL species	10	x 1 =	10
FACW species	25	x 2 =	50
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species	60	x 5 =	300
Column Totals:	95 (A)		360 (B)

Prevalence Index = B/A = 3.79

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ( ) **No** (●)

Remarks:

SOIL

Sampling Point: UP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-8	10YR 3/4	100					loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? **Yes** ○ **No** ◉

Remarks: 40% gravel.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? **Yes** ○ **No** ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Located within high tide location of San Francisco Bay.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Ravenswood City/County: Menlo Park, San Mateo County Sampling Date: 7/10/13

Applicant/Owner: USFWS State: CA Sampling Point: WL02

Investigator(s): J. Novak and D. Peña Section, Township, Range: S24 T5S R3W

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): C - Mediterranean California Lat: 37.48718592 Long: -122.1475286 Datum:

Soil Map Unit Name: Novato clay NWI classification: L2USKh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )
Hydric Soil Present?	Yes (●)	No ( )
Wetland Hydrology Present?	Yes (●)	No ( )

Is the Sampled Area within a Wetland? **Yes** (●) **No** ( )

Remarks: Photos 4533-4540

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Scirpus schoenoplectus*	5	No	OBL
2. *Grindelia*	25	Yes	FACW
3. *Lepidium latifolium*	5	No	FAC
4. *Salicornia*	50	Yes	OBL
5. *Digitaria sanguinalis*	40	Yes	FACU
6.			
7.			
8.			
Total Cover:	125 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum ____ % % Cover of Biotic Crust ____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	55	x 1 =	55
FACW species	25	x 2 =	50
FAC species	5	x 3 =	15
FACU species	40	x 4 =	160
UPL species		x 5 =	0
Column Totals:	125 (A)		280 (B)

Prevalence Index = B/A = 2.24

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

Remarks: Edge of Schoenoplectus complex; channel has Salicornia / Schoenoplectus as dominants.

SOIL

Sampling Point: WL02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-6	2.5YR 5/1		5YR 5/8	15	C	M	sapric\hemic	Semi "greasy" muck horizon
6-14	Gley1 3/1	70	Gley1 2.5/black	20			clay	See remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [x] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [ ] 1 cm Muck (A9) (**LRR D**)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1)
- [x] Loamy Gleyed Matrix (F2)
- [x] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- [x] 1 cm Muck (A9) (**LRR C**)
- [ ] 2 cm Muck (A10) (**LRR B**)
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes (●) No ( )

Remarks: Hand lens test; Hemic horizon when unrubbed (50%). Sapric horizon when rubbed (<15%).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1) (**Nonriverine**)
- [ ] Sediment Deposits (B2) (**Nonriverine**)
- [ ] Drift Deposits (B3) (**Nonriverine**)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Salt Crust (B11)
- [ ] Biotic Crust (B12)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Plowed Soils (C6)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water Marks (B1) (**Riverine**)
- [ ] Sediment Deposits (B2) (**Riverine**)
- [ ] Drift Deposits (B3) (**Riverine**)
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Thin Muck Surface (C7)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ( ) No ( ) Depth (inches):
Water Table Present? Yes ( ) No ( ) Depth (inches):
Saturation Present? (includes capillary fringe) Yes ( ) No ( ) Depth (inches):

Wetland Hydrology Present? Yes (●) No ( )

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Edge of standing water at low tide, channel between two levees.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Ravenswood | City/County: Menlo Park, San Mateo County | Sampling Date: 7/10/13

Applicant/Owner: USFWS | State: CA | Sampling Point: UP02

Investigator(s): J. Novak and D. Peña | Section, Township, Range: S24 T5S R3W

Landform (hillslope, terrace, etc.): | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): C - Mediterranean California | Lat: 37.48721975 | Long: -122.1475466 | Datum:

Soil Map Unit Name: Novato clay | NWI classification: L2USKh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Pictures 4541-4542. On top of levee at top of bank.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Bromus diandrus*	65	Yes	UPL
2. *Atriplex sp.*	40	Yes	
3. *Lepidium latifolium*	1	No	FAC
4. *Grindelia*	4	No	FACW
5.			
6.			
7.			
8.			
Total Cover:	110 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum ____ % % Cover of Biotic Crust ____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	4	x 2 =	8
FAC species	1	x 3 =	3
FACU species		x 4 =	0
UPL species	65	x 5 =	325
Column Totals:	70 (A)		336 (B)

Prevalence Index = B/A = 4.80

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: UP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-14	5Y 3/2		N/A				silty clay loam	High root content -
								very light when dry.
								Mildly hydrophobic.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ○ **No** ◉

Remarks: No hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ○ Depth (inches):

Water Table Present? Yes ○ No ○ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ○ Depth (inches):

Wetland Hydrology Present? **Yes** ○ **No** ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Top of bank of levee.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Alviso Pond A8 City/County: San Jose, Santa Clara County Sampling Date: 7/12/13

Applicant/Owner: USFWS State: CA Sampling Point: WL03

Investigator(s): S. Lindquist, E. Maroni Section, Township, Range: S9 T6S R1W

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): C - Mediterranean California Lat: 37.42548194 Long: -121.9803801 Datum:

Soil Map Unit Name: Novato clay NWI classification: L2UBK1h

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )		
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?**	**Yes** (●) **No** ( )
Wetland Hydrology Present?	Yes (●)	No ( )		

Remarks: Wetland east side of levee. Photos 1049-1050.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Schoenoplectus sp.*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

- [x] Dominance Test is >50%
- [x] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

Remarks:

SOIL

Sampling Point: WL03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	2.5YR 3/1	90	10YR 4/6	10	C	PL	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ◉ **No** ○

Remarks: Munsell M-3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☒ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Alviso Pond A8 | City/County: San Jose, Santa Clara County | Sampling Date: 7/12/13

Applicant/Owner: USFWS | State: CA | Sampling Point: UP03

Investigator(s): S. Lindquist, E. Maroni | Section, Township, Range: S9 T6S R1W

Landform (hillslope, terrace, etc.): | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): C - Mediterranean California | Lat: 37.4254814 | Long: -121.9804279 | Datum:

Soil Map Unit Name: Novato clay | NWI classification: L2UBK1h

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? **Yes** (●) **No** ( )

Remarks: Upland on back side of levee. Photos 1052-1053.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Baccharis pilularis*	25	Yes	UPL
2.			
3.			
4.			
5.			
Total Cover:	25 %		
Herb Stratum			
1. *Foeniculum vulgare*	75	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	75 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ( ) **No** (●)

Remarks:

SOIL

Sampling Point: UP03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks: Crushed rock from back of levee formed majority of matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☒ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ◉ No ○ Depth (inches): 0

Wetland Hydrology Present? Yes ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Alviso Island Ponds City/County: Fremont, Alameda County Sampling Date: 7/12/13

Applicant/Owner: USFWS State: CA Sampling Point: WL04

Investigator(s): Shannon Lindquist, Erin Maroni Section, Township, Range: S27 T5S R1W

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): C - Mediterranean California Lat: 37.47455533 Long: -121.9544606 Datum:

Soil Map Unit Name: Reyes clay NWI classification: E2EM1Nh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )
Hydric Soil Present?	Yes (●)	No ( )
Wetland Hydrology Present?	Yes (●)	No ( )

Is the Sampled Area within a Wetland? **Yes** (●) **No** ( )

Remarks: Pond A21. Photos 1015-1016.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Salicornia depressa*	85	Yes	OBL
2. *Frankelia salina*	15	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	85	x 1 =	85
FACW species	15	x 2 =	30
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	100 (A)		115 (B)

Prevalence Index = B/A = 1.15

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

Remarks:

SOIL

Sampling Point: WL04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	2.5YR 3/1	85	2.5YR 4/8	15	C	PL	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks: Munsell M-3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☒ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☒ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	○	◉	
Water Table Present?	○	◉	
Saturation Present? (includes capillary fringe)	◉	○	0

Wetland Hydrology Present? Yes ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Alviso Island Ponds | City/County: Fremont, Alameda County | Sampling Date: 7/12/13

Applicant/Owner: USFWS | State: CA | Sampling Point: UP04

Investigator(s): Shannon Lindquist, Erin Maroni | Section, Township, Range: S27 T5S R1W

Landform (hillslope, terrace, etc.): | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): C - Mediterranean California | Lat: 37.47455156 | Long: -121.9544399 | Datum:

Soil Map Unit Name: Reyes clay | NWI classification: E2EM1Nh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	(●)	( )
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Pond A21. Photos 1017-1018.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Brassica nigra*	85	Yes	UPL
2. *Frankelia salina*	15	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100%		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % | % Cover of Biotic Crust %

Remarks:

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species	15	x 2 = 30
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species	85	x 5 = 425
Column Totals:	100 (A)	455 (B)

Prevalence Index = B/A = 4.55

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

SOIL

Sampling Point: UP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-8	2.5YR 4/1	95	7.5YR 5/8	5	C	PL	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [ ] 1 cm Muck (A9) (**LRR D**)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [x] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- [ ] 1 cm Muck (A9) (**LRR C**)
- [ ] 2 cm Muck (A10) (**LRR B**)
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** (●) **No** ( )

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1) (**Nonriverine**)
- [ ] Sediment Deposits (B2) (**Nonriverine**)
- [ ] Drift Deposits (B3) (**Nonriverine**)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Salt Crust (B11)
- [ ] Biotic Crust (B12)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [x] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Plowed Soils (C6)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water Marks (B1) (**Riverine**)
- [ ] Sediment Deposits (B2) (**Riverine**)
- [ ] Drift Deposits (B3) (**Riverine**)
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Thin Muck Surface (C7)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ( ) No (●) Depth (inches):

Water Table Present? Yes ( ) No (●) Depth (inches):

Saturation Present? (includes capillary fringe) Yes ( ) No (●) Depth (inches):

Wetland Hydrology Present? **Yes** (●) **No** ( )

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Alviso Island Ponds | City/County: Fremont, Alameda County | Sampling Date: 7/12/13

Applicant/Owner: USFWS | State: CA | Sampling Point: WL05

Investigator(s): Shannon Lindquist, Erin Maroni | Section, Township, Range: S27 T5S R1W

Landform (hillslope, terrace, etc.): | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): C - Mediterranean California | Lat: 37.47276001 | Long: -121.9543397 | Datum:

Soil Map Unit Name: Reyes Clay | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )
Hydric Soil Present?	Yes (●)	No ( )
Wetland Hydrology Present?	Yes (●)	No ( )

Is the Sampled Area within a Wetland? Yes (●) No ( )

Remarks: Wetland point on backside of levee. Pond A21. Photos 1031-1032.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Salicornia depressa*	75	Yes	OBL
2. *Carex sp.*	25	Yes	
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	75	x 1 =	75
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	75 (A)		75 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:

SOIL

Sampling Point: WL05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	10YR 3/1	100					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ◉ **No** ○

Remarks: Munsell M-3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Alviso Island Ponds | City/County: Fremont, Alameda County | Sampling Date: 7/12/13

Applicant/Owner: USFWS | State: CA | Sampling Point: UP05

Investigator(s): Shannon Lindquist, Erin Maroni | Section, Township, Range: S27 T5S R1W

Landform (hillslope, terrace, etc.): | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): C - Mediterranean California | Lat: 37.47274559 | Long: -121.9543691 | Datum:

Soil Map Unit Name: Reyes clay | NWI classification: E2EM1Nh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Upland point on backside of levee. Pond A21. Photos 1033-1034.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Baccharis pilularis*	20	Yes	UPL
2.			
3.			
4.			
5.			
Total Cover:	20 %		
Herb Stratum			
1. *Brassica nigra*	50	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	50 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species	70	x 5 =	350
Column Totals:	70 (A)		350 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: UP05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-8	2.5YR 4/1	95	7.5YR 5/8	5	C	PL	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ **No** ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Alviso Mountain View Ponds
City/County: Mountain View, Santa Clara Co
Sampling Date: 7/11/13
Applicant/Owner: USFWS
State: CA
Sampling Point: WL06
Investigator(s): Jan Novak, Danielle Pena
Section, Township, Range: S33 T5S R2W
Landform (hillslope, terrace, etc.):
Local relief (concave, convex, none):
Slope (%):
Subregion (LRR): C - Mediterranean California
Lat: 37.44896232
Long: -122.0809111
Datum:
Soil Map Unit Name: Novato clay
NWI classification: L2UBK1h

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	●	
Hydric Soil Present?	●	
Wetland Hydrology Present?		●

Is the Sampled Area within a Wetland? **Yes** ( ) **No** (●)

Remarks: Photos 4633-4635

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Frankelia*	98	Yes	FACW
2. *Salicornia depressa*	2	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum ____ % % Cover of Biotic Crust ____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	98	x 2 =	196
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	100 (A)		198 (B)

Prevalence Index = B/A = 1.98

Hydrophytic Vegetation Indicators:

- [x] Dominance Test is >50%
- [x] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

Remarks:

SOIL

Sampling Point: WL06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
3-0	-		-				-	organic matter
0-6	2.5YR 4/1		10R 4/8	30			clay	
6-15	2.5YR 4/2		10YR 4/8	30			clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ **No** ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? Yes ○ **No** ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: 2.5' above high tide line. Soil moist but not saturated, near top of levee.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Alviso Mountain View Ponds | City/County: Mountain View, Santa Clara Co | Sampling Date: 7/11/13

Applicant/Owner: USFWS | State: CA | Sampling Point: UP06

Investigator(s): Jan Novak, Danielle Pena | Section, Township, Range: S33 T5S R2W

Landform (hillslope, terrace, etc.): | Local relief (concave, convex, none): | Slope (%):

Subregion (LRR): C - Mediterranean California | Lat: 37.44896232 | Long: -122.0809111 | Datum:

Soil Map Unit Name: Novato clay | NWI classification: L2UBK1h

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )		
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ( )	No (●)	**within a Wetland?**	**Yes** ( ) **No** (●)

Remarks: Photos 4633-4635

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Frankelia*	98	Yes	FACW
2. *Salicornia depressa*	2	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum ____ % % Cover of Biotic Crust ____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	98	x 2 =	196
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	100 (A)		198 (B)

Prevalence Index = B/A = 1.98

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

Remarks:

SOIL

Sampling Point: UP06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
3-0	-		-				-	organic matter
0-6	2.5YR 4/1		10R 4/8	30			clay	
6-15	2.5YR 4/2		10YR 4/8	30			clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ◉ **No** ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? **Yes** ○ **No** ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: 2.5' above high tide line. Soil moist but not saturated, near top of levee.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Alviso Mountain View Ponds City/County: Mountain View, Santa Clara Co Sampling Date: 7/11/13

Applicant/Owner: USFWS State: CA Sampling Point: WL07

Investigator(s): Shannon Lindquist, Erin Maroni Section, Township, Range: S3 T6S R2W

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): C - Mediterranean California Lat: 37.44511 Long: -122.0651734 Datum:

Soil Map Unit Name: Novato clay NWI classification: L2UBK1h

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )
Hydric Soil Present?	Yes (●)	No ( )
Wetland Hydrology Present?	Yes (●)	No ( )

Is the Sampled Area within a Wetland? **Yes** (●) **No** ( )

Remarks: Wetland on Bay side of A2W. Photos 0990-0992.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Salicornia depressa*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

Remarks:

SOIL

Sampling Point: WL07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	10YR 3/2	85	5YR 4/6	15	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ◉ **No** ◯

Remarks: Munsell M-1.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☒ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◯	No ◉	Depth (inches):
Water Table Present?	Yes ◉	No ◯	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes ◉	No ◯	Depth (inches): 0-12

Wetland Hydrology Present? **Yes** ◉ **No** ◯

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: SBSP Alviso Mountain View Ponds City/County: Mountain View, Santa Clara Co Sampling Date: 7/11/13

Applicant/Owner: USFWS State: CA Sampling Point: UP07

Investigator(s): Jan Novak, Danielle Pena Section, Township, Range: S33 T5S R2W

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): C - Mediterranean California Lat: 37.44896232 Long: -122.0809111 Datum:

Soil Map Unit Name: Novato clay NWI classification: L2UBK1h

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	(●)	( )
Hydric Soil Present?	(●)	( )
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Photos 4633-4635

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Frankelia*	98	Yes	FACW
2. *Salicornia depressa*	2	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum ___ % % Cover of Biotic Crust ___ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	98	x 2 =	196
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	100 (A)		198 (B)

Prevalence Index = B/A = 1.98

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [X] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:

SOIL

Sampling Point: UP07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
3-0	-		-				-	organic matter
0-6	2.5YR 4/1		10R 4/8	30			clay	
6-15	2.5YR 4/2		10YR 4/8	30			clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ **No** ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ **No** ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: 2.5' above high tide line. Soil moist but not saturated, near top of levee.

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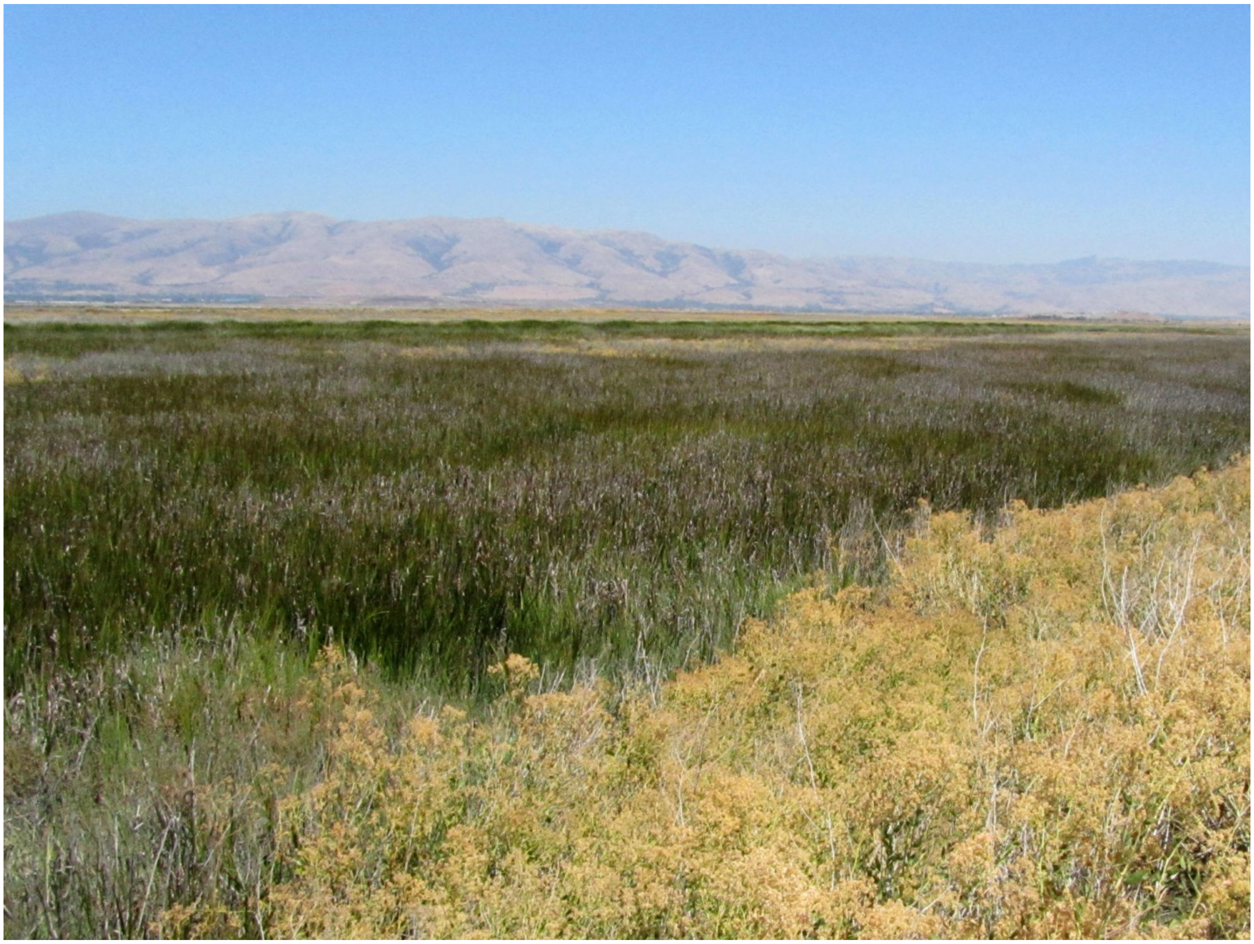
Tidal Salt Marsh and Brackish Marsh

Tidal salt marsh near the mouth of Mountain View Slough between ponds A1 and A2W; featuring cordgrass low marsh, pickleweed middle marsh, and gumplant and alkali heath high marsh.

Characteristic brackish marsh at A19 pond interior (top) and along Mud Slough (bottom) featuring a mixture of pickleweed, perennial pepperweed, and bulrush species.

Freshwater Marsh



Dense stands of bulrush on the terraced floodplain of the Guadalupe River, adjacent to A8.

Upland/Levees

Ruderal, upland vegetation found on levee tops (R4- left, R3-right) including ripgut brome, Italian thistle (dry), and Australian saltbush.

Mudflat

Photo 5. Pickleweed margin unvegetated mudflat of A19 pond basin.

Unvegetated Non-Mudflat

Interior basins of salt ponds R3 (top left), S5 (top right), and R4 (bottom).