South Bay Salt Pond Restoration Project

Restoring the Wild Heart of the South Bay

15 March 2017

Naomi Feger
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

RE: South Bay Salt Pond Restoration Project, Phase 2, Application for Section 401 Certification and Notice of Discharge

Dear Ms. Feger:

On behalf of the U.S. Fish and Wildlife Service (USFWS) Don Edwards San Francisco Bay National Wildlife Refuge (Refuge) and the State Coastal Conservancy (SCC), and per the Clean Water Act, Section 401 (33 U.S.C. 1341), I am transmitting an application for a Clean Water Act Section 401 Certification and Notice of Discharge for Phase 2 of the South Bay Salt Pond (SBSP) Restoration Project. Please find enclosed here the SBSP Restoration Project's application form and supplemental information for your review.

The SBSP Project is the largest wetland restoration project on the West Coast, encompassing 15,100 acres of the former Cargill Inc. (Cargill) salt ponds in the South San Francisco Bay (South Bay) that were acquired by a public-private partnership for restoration and management by the USFWS and the California Department of Fish and Wildlife (CDFW) in 2003. The Refuge and SCC propose to continue implementing the SBSP Restoration Project through the construction, operation, and maintenance of selected ponds as part of Phase 2 project activities that cover approximately 2,200 acres on the Refuge. Phase 2 of the SBSP Restoration Project continues the collaborative efforts 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. These activities will result in the restoration, enhancement or conservation of thousands of acres of tidal marsh, managed pond, subtidal, or open water habitats as well as contribute to the recovery of endangered, threatened, and other special-status terrestrial and aquatic species.

Restoration of habitat was successfully achieved during Phase 1 which converted former commercial salt ponds to 1,600 acres of tidal habitats and 1,440 acres of muted tidal habitats. These tidal habitats will contribute to the recovery of protected species; tidal marsh-dependent species; and the recovery of South Bay fisheries and water quality. In fitting with the SBSP Restoration Project goals, Phase 2 work was

designed to increase the net conservation benefits to the Bay and the protected species and the estuarine habitats that they rely on. Based on these goals, the results of the project's Initial Stewardship Plan, and Phase 1 action results, we are confident that the SBSP Restoration Project has demonstrated a proven track record of successful implementation of producing a beneficial effect to Waters of the State and protected species therein.

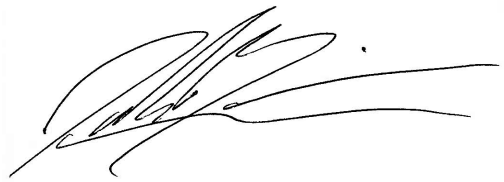
Summary of the Enclosed 401 Certification Request

Phase 2 operations to restore tidal marsh habitat, reconfigure former salt production ponds and maintain or improve existing flood protections would include levee modifications, installation of habitat transition zones and bird habitat islands. Additionally Phase 2 would add new, and improve existing, public access features. The proposed fill and discharge associated with these operations, necessary to achieve project goals, were designed to maximize beneficial environmental effects and increase the quality and amount of aquatic habitat on the site compared to existing conditions. The proposed fill and discharge would result in a very small impact in terms of lost total Waters of the State. However, the overall quality and ecological value of the aquatic habitat in SBSP Restoration Project Phase 2 area would increase substantially because the overwhelming majority of the change would be from open waters to tidal marsh wetlands and/or from seasonally dry salt pannes (currently unavailable to aquatic species) to tidal marsh wetlands and enhanced managed ponds. These changes are designed and expected to increase the South Bay's resilience to sea-level rise and the higher tides expected in the coming decades.

The project would include minor impacts to Waters of the State by removing small amounts of Waters of the State or converting Waters of the State from one type (generally of poorer quality) to another type (of higher quality). The net change in the functions and values of the Waters of the State would, in some cases, be a small loss, while in other cases there would be a large net gain. The overall project would self-mitigate as the gain in a large amount of higher quality Waters of State would outweigh the small loss of poorer quality waters.

Thank you for your consideration of this request and for the important work you do in our shared goal of protecting and restoring the San Francisco Bay. Please feel free to contact me if you have further questions at John.Bourgeois@scc.ca.gov or 408.314.8859.

Sincerely,



John Bourgeois
Executive Project Manager
South Bay Salt Pond Restoration Project

California State Coastal Conservancy
1515 Clay Street, 10th floor
Oakland, California 94612

cc: Anne Morkill, Chris Barr, and Jared Underwood, USFWS
John Krause, CDFW
Brenda Buxton, SCC
Seth Gentzler, AECOM

STATE OF CALIFORNIA – CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD
1515 CLAY STREET, SUITE 1400
OAKLAND, CALIFORNIA 94612

APPLICATION FOR 401 WATER QUALITY CERTIFICATION AND/OR REPORT OF WASTE DISCHARGE

(FORM R2C502-E)

1. APPLICANT'S NAME John Bourgeois, Sbsp Executive Project Manager	**4. AUTHORIZED AGENT'S NAME AND TITLE** (an agent is not required) Dillon Lennebacker
2. APPLICANT'S ADDRESS California State Coastal Conservancy 1515 Clay St., 10th Floor Oakland, Ca 94612	**5. AGENT'S ADDRESS** Aecom 300 Lakeside Avenue, Suite 400 Oakland, CA 94612
3. APPLICANT'S PHONE & FAX NOS. (email optional) 408-314-8859 (Mobile) John.Bourgeois@Scc.Ca.Gov	**6. AGENT'S PHONE & FAX NOS.** (email optional) (510) 282-3835 (Mobile) (510) 874-3035 (Direct) (510) 874 3268 (Fax)

7. STATEMENT OF AUTHORIZATION

I hereby authorize Dillon Lennebacker to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE — DATE: 3/17/17

(This must be signed by the Applicant, not the authorized agent)

PROJECT OR ACTIVITY INFORMATION

8. PROJECT NAME OR TITLE (See instructions.)
South Bay Salt Pond Restoration Project, Phase 2, Refuge Ponds

9. NAME OF AFFECTED WATERBODY(IES) (See instructions.) See Supplemental Information.	**10. PROJECT STREET ADDRESS** (if applicable) See Supplemental Information.

11. LOCATION OF PROJECT

-Choose One-	See Supplemental Information,	Region 2 – San Francisco Bay
COUNTY	CITY/TOWN (or unincorporated)	REGIONAL WATER BOARD REGION

12. OTHER LOCATION DESCRIPTIONS (watershed, latitude & longitude, river mile, etc. Attach map. See instructions.)
See Supplemental Information.

13. DIRECTIONS TO THE SITE
See Supplemental Information.

14. PROJECT PURPOSE (Describe the reason or purpose for the overall project. See instructions.)
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; and 3) provide for flood management in the South Bay. See supplemental information.

15. DESCRIPTION OF ACTIVITY AND ENVIRONMENTAL IMPACTS (Provide a full, technically accurate description of the entire activity and associated environmental impacts. See instructions.)
See Supplemental Information.

16. AVOIDANCE OF IMPACTS (Describe efforts to avoid and minimize impacts to waters of the State. See instructions.)
See Supplemental Information.

17. **ENVIRONMENTAL DOCUMENTS** (list any non-CEQA environmental documents that have been prepared for the project and/or the project site. Provide the date of the document and the name of the individual, firm, or agency that prepared it. Provide a copy of delineations and endangered species surveys. See instructions.)

See Supplemental Information and SBSP Restoration Project website, www.southbayrestoration.org/documents/permit-related

DREDGE & FILL INFORMATION

18. The following items must be completed for each action where fill or other material will be temporarily (T) or permanently (P) discharged to a wetland or other waterbody, and where material will be dredged from a waterway (add additional pages as necessary). Provide a map showing the location of each action (See instructions):

Map Location Number	LOCATION (show on plan & indicate waterbody)	REASON FOR ACTION (See instructions)	AMOUNT AND TYPE OF MATERIAL (in cubic yards, see instructions)	SURFACE AREA OF FILL (in acres and/or linear feet, specify (T) or (P); see instructions)
	See Supplemental Information		See Supplemental Information	

MITIGATION

19. **MITIGATION** (Describe the size, type, and functions, and values of the proposed mitigation. Describe success criteria, monitoring, and long-term funding, management, and protection of the mitigation site. Attach a Mitigation Plan if needed. See instructions and contact Regional Board staff for additional assistance.)

See Supplemental Information.

CEQA

20. **CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) Documents: Indicate the status of CEQA documents prepared for the project (see instructions).**

TYPE OF DOCUMENT	STATUS	DATE COMPLETED (or expected to be complete)	TYPE OF DOCUMENT	STATUS	DATE COMPLETED (or expected to be complete)
Initial Study	Not Applicable		Notice of Preparation	Complete	9/2013
Draft Environmental Impact Report	Complete	07/1/15	Final Environmental Impact Report	Complete	4/1/16
Negative Declaration	Not Applicable		Mitigated Negative Declaration	Not Applicable	
Notice of Categorical Exemption Exemption Number:	Not Applicable		Notice of Statutory Exemption Exemption Number:	Not Applicable	
Other (describe)	Not Applicable				
Notice of Determination*	Complete	5/27/16	*Note: A Notice of Determination or Notice of Exemption from the Lead Agency is required before a certification or waiver can be issued.		

Lead Agency: California State Coastal Conservancy **Contact:** Brenda Buxton **Telephone:** 510-286-0753

State Clearing House Number: 20130922010_

ADDITIONAL INFORMATION

21. **HAS ANY PORTION OF THE WORK BEEN INITIATED?** YES ☐ NO ☒

IF YES, DESCRIBE THE INITIATED WORK, and explain why it was initiated prior to obtaining a permit. Indicate whether any enforcement action has been taken against the project.

22. **HAS A FEDERAL AGENCY OR THE APPLICANT PROVIDED PUBLIC NOTICE OF THIS APPLICATION FOR WATER QUALITY CERTIFICATION?**

Federal Agency:	YES ☐	NO ☒	**Date:**	**Type of Notification:**	**Agency Name and Contact:**
Applicant:	YES ☐	NO ☒	**Date:**	**Type of Notification:**	**Media Name and Contact:**

IF PUBLIC NOTICE HAS NOT BEEN MADE, provide the name, address, and phone number (if available) of adjacent property owners, lessees, etc., and any other parties known to be interested in the project:

See Supplemental Information

23. **OTHER PERMITS** (List other local, state or federal licenses, permits, and agreements that will be required for any construction, operation, maintenance, or other actions associated with the project. Attach copies of all draft or final documents. See instructions.)

AGENCY	CONTACT (with phone number)	TYPE OF APPROVAL	PERMIT OR ID NUMBER	DATE APPLIED	STATUS	DATE OF ACTION
US Corps of Engrs	Frances Malamud-Roam	404, 404b1	TBD		In Review	
US Fish Wildlife	Kaylee Allen	Section 7 BO	TBD		In Review	
Ca Dept Fish Game					In Review	
Not Applicable					-Choose One-	
Not Applicable					-Choose One-	
SF BCDC	Brenda Goeden	Major Permit	TBD		In Review	
NOAA Fisheries	Gary Stern	Section 7 BO			In Review	
Other or Local Agency					-Choose One-	
Other or Local Agency					-Choose One-	

24. **OTHER PROJECTS** (List and describe other projects implemented or planned that are related to the proposed project, or that may impact the same waterbody. See instructions. Add additional sheets if necessary.)

PROJECT NAME	DESCRIPTION	WATERBODY AND WATERSHED	DATE IMPLEMENTED/PLANNED
	See Supplemental Information		

25. Application is hereby made for a permit or permits to authorize the work described in this application. I certify, under penalty of perjury, that this application is complete and accurate to the best of my knowledge. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

3/17/17

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (Applicant) or a duly authorized agent if the statement in Block 7 has been filled out and signed.

Attach fee deposit (see Instructions page 7) and any additional documents and submit this application to:

SFBRWQCB
Attention: 401 Water Quality Certification
1515 Clay Street, Suite 1400
Oakland, CA 94612

Note: This form, FORM R2C502-E, was designed for electronic use as a Microsoft Word document or template.
For assistance using this form or to relay suggestions on how it may be improved, please call 510-622-2330.
If you would like a standard, non-electronic form, please call 510-622-2300 and request
401 Application FORM R2C502 – Non-electronic version.

Sent via electronic mail: No hard copy to follow

April 20, 2017
CIWQS Place ID No. 833812
CIWQS Reg. Meas. ID No. 412258
Corps File No. SPN-277030S

California State Coastal Conservancy
1515 Clay Street, 10th Floor
Oakland, CA 94612

Attn: John Bourgeois, South Bay Salt Pond Executive Project Manager
(John.Bourgeois@Scc.Ca.Gov)

Subject: Incomplete Application for Certification for the South Bay Salt Pond Restoration Phase 2 Project

Dear Mr. Bourgeois:

San Francisco Bay Regional Water Quality Control Board (Water Board) staff has reviewed the application materials submitted for Clean Water Act (CWA) Section 401 water quality certification (Certification) and Waste Discharge Requirements (WDRs) pursuant to the California Water Code that were submitted by Aecom (the Applicant's authorized agent) on behalf of the California State Coastal Conservancy (the Applicant) for the subject project (Project), and received by the Water Board on March 21, 2017. This letter provides our comments on the application. In summary, the application is not yet complete, as it does not yet include sufficient information regarding ongoing operation of ponds managed in accordance with prior phases of the Project or the Adaptive Management Plan (AMP) and Monitoring Plans (MPs) for the ecotone and flood management components of the Project. As is discussed below in more detail, to complete the application, please submit the requested information. We would be happy to meet with you to discuss this matter further, and we look forward to continuing to work with you on the Project

The Water Board supports this important project, which is a key part of restoring and improving San Francisco Bay's beneficial uses, including for fishing, recreation, and wildlife habitat. Our comments below are intended to facilitate the issuance of Certification and WDRs for the Project.

Project Description

Phase 2 of the South Bay Salt Pond Restoration Project (SBSPRP) 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 within portions of the former Cargill Inc. (Cargill) salt ponds in

South San Francisco Bay (Bay), which were acquired by the United States Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) in 2003. The former salt ponds covered in Phase 2 are part of the USFWS-owned and managed Don Edwards San Francisco Bay National Wildlife Refuge (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.

Comment 1.

Box 15, Description of Activity and Environmental Impacts, from the Application for 401 Water Quality Certification and/or Report of Waste Discharge (Application). The application materials lack sufficient detail to allow Water Board staff to address any changes to operations at the remaining ISP and Phase 1 ponds.

The application materials describe in detail the Phase 2 proposed changes in configuration and operation of the Island Ponds, Ponds A8 and A8S, the Alviso-Mountain View Ponds, and the Ravenswood Ponds. However, more detail is necessary to assess the extent of any Phase 2-related changes to operation of the remaining ponds in the SBSPRP in comparison to the activities permitted at those ponds in Board Order R2-2004-0018 for the Interim Stewardship Period (ISP) of the SBSPRP and in Board Order R2-2008-0078, as modified by Board Order R2-2012-0014, for Phase 1 of the SBSPRP. Please describe any proposed changes to the physical layout or operation of ponds in Phase 2 of the SBSPRP that would deviate from the activities approved in Board Orders R2-2004-0018, R2-2008-0078, and Order R2-2012-0014. This information is necessary to accurately describe any management activities authorized under Board Order R2-2004-0018, issued for the ISP, which were subsequently incorporated in Board Order R2-2008-0078 for Phase 1 Restoration Activities. The Board Order for Phase 2 of the SBSPRP will incorporate ongoing ISP activities, as updated by the Phase 1 order or in response to adaptive management, into the Phase 2 Order.

Based on the application materials, Ponds A1 and A 2W in the Alviso-Mountain View Ponds and Pond R4 in the Ravenswood Ponds are the only ponds in Phase 2 that are being converted from managed ponds to tidal ponds. Please confirm if this is correct. Please review Findings 41 through 52 of Board Order R2-2008-0078 and provide us with a description of any Phase 2-related changes in the pond management activities described in those findings. Monitoring of potential impacts to Bay waters associated with discharges from ponds and potential impacts to listed species were covered in Findings 53 through 67 of Board Order R2-2008-0078. Please review these findings and provide us with a description of any changes that are proposed for activities covered by these monitoring programs.

Comment 2.

Box 19, Mitigation, of the Application. The Adaptive Management Plan and Monitoring Plans developed for the ISP and Phase 1 must be revised to track the successful enhancement of habitat necessary to mitigate the fill of waters of the State associated with providing ecotones and maintaining flood management.

Phase 2 of the SBSPRP includes activities that were not components of the ISP or Phase 1: the construction of broad transition zones (also referred to as ecotones) between some ponds and levees and the enhancement of existing levees to replace flood management services that will be lost as the result of Project-related levee breaching. Both of these activities require fill of waters of the State in quantities much larger than the amount of fill authorized for the ISP or Phase 1. The supplemental information provided for Box 19 states that the Phase 2 activities will remove small amounts of waters of the State. However, Table 24 of the supplemental materials indicates that about 15 acres of wetlands and 90 acres of other waters of the State would be filled by

Project implementation; this is a large amount of fill for a project. Most of this fill will be associated with creating ecotones and with enhancing landward levees for flood management. Water Board staff acknowledge that ecotones between marshes and uplands are locally scarce and that the ecotones provide habitat that is essential to sustaining five endangered species: two endangered animals, California clapper rail (*Rallus longirostris obsoletus*) and salt marsh harvest mouse (*Reithrodontomys raviventris*), and three endangered plants, *Cirsium hydrophilum* var. *hydrophilum* (Suisun thistle), *Chloropyron molle* ssp. *molle* (soft bird's-beak), and *Suaeda californica* (California sea-blite). Water Board staff also acknowledge that breaching of bayside levees, which is essential to restoring tidal wetlands in the former salt ponds, would not be allowed if communities adjacent to the former salt ponds were not provided with replacement flood management. In addition, the ecotones will provide habitat resiliency to sea level rise and, over time, portions of the ecotones that will be uplands immediately after ecotone creation will eventually convert to tidal marshes. Therefore, the fill summarized in Table 24 of the supplemental materials for Box 19 is essential to tidal marsh restoration.

The fill summarized in Table 24 would usually require significant mitigation to be consistent with the San Francisco Bay Basin Water Quality Control Plan (Basin Plan), which incorporates the State of California's no net loss policy (Governor's Executive Order W-59-93 and Senate Concurrent Resolution No. 28). However, the Basin Plan also directs the Water Board to consider specific guidelines and requirements, including the following, as a part of its mandated duty to protect waters of the State.

- The *Baylands Ecosystem Habitat Goals* (1999) (*Habitat Goals*), and
- The *Baylands Ecosystem Species and Community Profiles* (2000) (referred to collectively as the "Habitat Goals Reports"), which are to be used as guides for wetlands restoration in the vicinity of San Francisco Bay.

Chapter 5 of the Habitat Goals contains goals for the South Bay Subregion of San Francisco Bay.

> The overall goal in the South Bay subregion is to restore large areas of tidal marsh connected by wide corridors of similar habitat along the perimeter of the Bay. Several large complexes of salt ponds, managed to optimize shorebird and waterfowl habitat functions, should be interspersed throughout the subregion, and naturalistic, unmanaged salt ponds (facsimiles of historical, hypersaline backshore pans) should be restored on the San Leandro shoreline. ***There should be natural transitions from mudflat through tidal marsh to adjacent uplands*** **[*emphasis added*]**, wherever possible. Adjacent moist grasslands, particularly those with vernal pools, should be protected and improved for wildlife. Riparian vegetation and willow groves should be protected and restored wherever possible

The unique characteristics of the restoration opportunities in Phase 2 of the SBSPRP justify a focus on listed species that depend on tidal marshes. Both the Habitat Goals and the *USFWS Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (Recovery Plan) (USFWS, August 27, 2013), which include recovery actions for the California Ridgeway rail (formerly California Clapper Rail) and salt marsh harvest mouse (SMHM), support both the restoration of as many acres of tidal marsh as feasible and the creation of ecotones between marsh habitats and upland high water refuges.

It is important to establish that the ecotones create sufficient habitat benefits to allow the Water Board to conclude that it is consistent with the directives of the Basin Plan to issue Certification

and WDRs to a project with significant fill. A robust monitoring program to track the successful establishment of functioning ecotones and the ongoing stability of flood management levees will be an important mitigation element for the proposed amount of fill of waters of the State necessary for the Project. Data from the monitoring program should also provide data for adaptive management as future ecotones are designed and constructed. Adaptive Management Plans (AMP) and Monitoring Plans (MP) were prepared for the ISP and Phase 1 of the SBSPRP. The AMP was last revised in May 2015 and MPs were last revised in 2012. Please update the AMP and MPs to track the establishment of habitat benefits at the ecotones and the condition of flood management levees. We will rely on monitoring data from the restored tidal wetlands and the created ecotones to demonstrate that the habitat benefits provided to listed tidal marsh species and other wildlife have been sufficient to compensate for the fill of waters of the State summarized in Table 24 of the supplemental application materials.

We look forward to continuing to work with you to move this important project forward.

Please contact me at (510) 622-5680 or brian.wines@waterboards.ca.gov if you have any questions. All future correspondence regarding this Project should reference the CIWQS Place ID Number indicated at the top of this letter.

Sincerely,

Brian Wines
Water Resource Control Engineer
Watershed Management Division

cc: Corps, Frances Malamud-Roam (Frances.P.Malamud-Roam@usace.army.mil)
SF BCDC, Brenda Goeden (brenda.goeden@bcdc.ca.gov)
USFWS, Kaylee Allen (kaylee_allen@fws.gov)
NMFS, Gary Stern (gary.stern@noaa.gov)
AECOM, Dillon Lennebacker (dillon.lennebacker@aecom.com

United States Department of the Interior

FISH AND WILDLIFE SERVICE
San Francisco Bay National Wildlife Refuge Complex
1 Marshlands Road
Fremont, California 94555

21 February 2018

Brian Wines, Water Resource Control Engineer
Watershed Management Division
San Francisco Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

RE: CIWQS Place ID No. 833812

Subject: South Bay Salt Pond Restoration Project Phase 2
Supplemental Information to the Regional Water Quality Control Board

Dear Mr. Brian Wines

On March 15, 2017, the U.S. Fish and Wildlife Service (USFWS) submitted an application for a Clean Water Act Section 401 Water Quality Certification and Notice of Discharge for the South Bay Salt Pond (SBSP) Restoration Project Phase 2 actions at Don Edwards San Francisco Bay National Wildlife Refuge (Refuge). Subsequently, the Refuge has received and responded to comments from the San Francisco Bay Regional Water Quality Control Board (RWQCB) in letters and emails requesting clarification. The following pages present responses to questions received from the RWQCB's Brian Wines in emails from February 8, 2018, to February 12, 2018 regarding planned Phase 2 actions.

The numbering and the titles in the list below were added to provide ease of reference to these items in any follow-up discussions or emails that may follow. The italicized text following each enumerated item is the text from Mr. Wines, which is followed by answers to those questions.

1. Nomenclature.

First, a nomenclature question. The Phase One documents referred to "Phase I". The supplemental application materials for Phase Two refer to "Phase 2". Have you settled on a preference? Should I refer to "Phase I and Phase II" or to "Phase 1 and Phase 2"?

Please use the Arabic numerals (1 and 2) instead of the Roman numerals (I and II) that had been used in earlier documents. In the early stages of Phase 2 planning, the Project Management Team decided to make that switch, and the Phase 2 documents have attempted to make each new document consistent with that change.

2. Finding 10 from Modification 10 to the Phase 1 Board Order.

I have attached Finding 10 from Modification 1 to the Phase 1 Order. The last column in the table is "anticipated construction completion". Can you provide me with the actual completion dates? Also, can you create a similar table for Phase 2? I don't think I saw one in the supplemental application materials for Phase 2.

This item includes two related requests: one for an update to a particular table that was presented in the Phase 1 Board Order, and one for a similar table to be presented for the proposed Phase 2 actions. The updated Table 1 from the Phase 1 Board order is the first table presented below. It uses a combination of strikethrough text and red underline text (~~strikethough~~ and red) to update the information it presents to reflect what actually happened in Phase 1. Table 2 below presents similar information for the proposed/planned Phase 2 work.

Table 1 Proposed Phase 1 Restoration Actions

PHASE I RESTORATION ACTION	ANTICIPATED START OF CONSTRUCTION	TYPE OF RESTORATION	ACREAGE	~~ANTICIPATED~~ CONSTRUCTION COMPLETION
Alviso Pond Complex (FWS)				
Pond A6	Summer 2010	Tidal habitat	~~330~~ 360[3]	2010
Pond A8	Summer 2009	Reversible muted tidal habitat	1,440[1]	~~2009~~ 2011
Pond A16 and A17	~~Summer 2009~~Fall 2011	Reconfigured managed pond and tidal habitat	~~242~~373[2]	~~2011-2012~~2013
Ravenswood Pond Complex (FWS)				
Pond SF2	Fall 2008	Reconfigured managed pond	237	2010
Eden Landing Pond Complex (DFG)				
Pond E8A, E9, and E8X	Summer 2009	Tidal habitat	630	2011
Ponds E12 and E13	Summer ~~2009~~ 2012	Reconfigured managed pond	230	~~2012~~ 2013
Total Acreage			~~3,069~~3,270	

[1] This acreage includes Ponds A5, A7, and A8S, which would be affected by tidal inundation over the low internal levees that separate these ponds from Pond A8. The total acreage for Pond A8 was incorrect in the Order No. R2-2008-0078. The correct acreage is 1,440 acres, instead of 1,400 acres

[2] This acreage ~~does not~~ includes both Pond A16 (242 acres) which will be a reconfigured managed pond and Pond A17 (131 acres) which will be ~~operated jointly with Pond A16 to manage water levels within Pond A16~~breached to create tidal habitat~~; species supported in Pond A17 are not expected to change~~.

[3] Acreage for Pond A6 was incorrect in Order No. R2-2008-0078. The correct acreage is 360 acres, instead of 330.

Note 1: Recreational facilities include: Alviso Pond Complex improvements to the Bay Trail; Ravenswood Pond Complex improvements to Bay Front Park and Pond SF2; and Eden Landing Complex trail construction, kayak launch, and viewing platforms.

Note 2: Not shown in Table 1 is the 480-acre Island Pond tidal marsh restoration already approved by the Regional Water Board under the ISP, Order No. R2-2004-0018.

Table 2 Proposed Phase 2 Restoration Actions

PHASE 2 RESTORATION ACTION	ANTICIPATED START OF CONSTRUCTION	TYPE OF RESTORATION	ACRES	ANTICIPATED CONSTRUCTION COMPLETION
Alviso Pond Complex (FWS)				
Pond A1	2019	Tidal habitat	275	2021
Pond A2W	2019	Tidal habitat	435	2021
Pond A191	2019	Tidal habitat enhancements	65	2020
Pond A20	2019	Tidal habitat enhancements	265	2020
Pond A8S2	2018	Enhancements to previously reconfigured managed ponds	160	2019
Ravenswood Pond Complex (FWS)				
Pond R3	Fall 2018	Reconfigured managed pond	270	2021
Pond R4	Fall 2018	Tidal habitat	295	2021
Pond R5	Fall 2018	Reconfigured managed pond	30	2021
Pond S5	Fall 2018	Reconfigured managed pond	30	2021
Eden Landing Pond Complex (CDFW) The Phase 2 action at Eden Landing is still pending CEQA/NEPA selection of a preferred alternative. The dates for the "Bay Ponds" (E1, E2, E4, E7) are still uncertain, and the full restoration of the other groups of ponds has not been determined at this time.				
Total Acreage			1,825	2021

[1] In previous documents in the SBSP Restoration Project, Ponds A19, A20, and A21 were typically treated together as a group referred to as "the Island Ponds". That terminology has persisted in the Phase 2 documents, including the request for a 401 Water Quality Certification, largely because the Phase 2 CEQA/NEPA document's range of alternatives for a Phase 2 action at the Island Ponds includes all three of these ponds, even though the selected alternative to move forward into design and permitting included only Ponds A19 and A20. The acreage of Pond A21 is 150 acres, and it will remain on its trajectory to tidal habitat establishment.

2 The Phase 2 action at the A8 Ponds only includes a direct action (construction of habitat transition zones) in Pond A8S, which is why the table listed above only lists that pond. However, the Phase 1 action hydraulically connected Ponds A8, and A8S. Their combined acreage is 570 acres.

PHASE 2 RESTORATION ACTION	ANTICIPATED START OF CONSTRUCTION	TYPE OF RESTORATION	ACRES	ANTICIPATED CONSTRUCTION COMPLETION
Note: The Phase 2 actions at Ravenswood include a trail section to complete a loop trail around Ponds R5 and S5 with connections to existing trails in Bedwell Bayfront Park and to the Bay Trail spine adjacent to State Route 84. Phase 2 also includes a viewing platform near the midpoint of that new trail segment. The Phase 2 actions at the Alviso pond complex include several new trails and viewing platforms at the Alviso-Mountain View Ponds (A1 and A2W) as well as enhancements or preservation or reconstruction of existing public access facilities. No new public access or recreational facilities are proposed as the Island Ponds (A19 and A20) or the A8 Ponds as part of Phase 2.				

3. Percentage of Tidal Marsh Habitat Following Phase 2

The Phase 1 Order talked about the percentage of the SBSPRP area that would consist of restored tidal habitat at the end of implementing Phase 1 actions. And then compared that to the target range of 10:90 to 50:50 for restored tidal marsh:managed ponds. Can you get me that information for Phase 2?

Following implementation of Phase 2 actions at the USFWS-managed Refuge (that is, not yet including the future implementation of Phase 2 at the CDFW-managed Eden Landing Ecological Reserve), there will have been 2,605 acres of tidal marsh restoration. That is approximately 17% of the total project area. Future Phase 2 implementation at Eden Landing could bring the total area of tidal marsh restoration up to 35% of the total project area. Additional marsh restoration planning is underway as part of the Shoreline Study Project, which would bring the total percentage of tidal marsh restoration up to approximately 50%.

4. Adaptive Management Plan (AMP) Updates

I provided some requested edits to the Adaptive Management Plan. You made some of the edits, but explained to me why a few of my edits weren't appropriate for the project, and suggested alternate wording. Did the Adaptive Management Plan get revised to reflect your responses to the comments? If so, please email me a copy. If not, do you know when a revised Plan will be available?

In the July 20, 2017, response to the RWQCB's request for additional information on the Phase 2 project actions, our proposed action was not to revise the SBSP Restoration Project Adaptive Monitoring Plan (AMP) itself but instead to append it with new project goals, triggers, actions, and monitoring mechanisms. Our response included submission of those proposed additions as new rows in the AMP's summary table of management actions. We have been waiting for the RWQCB's input on those additions before actually making those changes. If the RWQCB approves them as they are, they will be formally added to the AMP. Alternatively, edits or modifications to them suggested by the RWQCB would be added.

5. Monitoring Plans

The Phase I Order had the following attachments:

- *Attachment C: Adaptive Management Plan*
- *Attachment D: Water Quality Self-Monitoring Program (SMP)*
- *Attachment E: (Draft) Landscape, Habitat, and Biological Species Monitoring Plan*

- *Attachment F: Standard Provisions and Reporting Requirements*

How have these documents changed since 2008? Which document will be used to guide monitoring and maintenance of ecotones?
Have any of these plans been superseded by the MAMP used with the Shoreline Protection Order.

The AMP has not changed yet, though it would be, if the proposed appendix is approved by the RWQCB. The revised AMP would then be the guide to monitoring of Habitat Transition Zones. Maintenance of these areas will be guided by the SBSP Restoration Project's Programmatic EIS/R in combination with the Refuge's Weed Management Plan, Levee Operations and Maintenance Permit, Pond Management Plan, and Comprehensive Conservation Plan.
None of the other attachments listed above have been changed since 2008. However, the annual report submitted per the Water Quality SMPs had documented subsequent changes to what is monitored. The Shoreline Protection Order and its accompanying MAMP have not superseded any of these ongoing monitoring plans.

6. Construction Activities

Will Phase 2 activities include the break up gypsum layer in some pond bottoms by mechanical means?

Gypsum-layer breakup is not proposed for Phase 2 as a discrete action. Monitoring of gypsum-dominant areas in the Initial Stewardship Plan (ISP) and Phase 1 at the Island Ponds and Eden Landing have indicated that the gypsum layer does not provide a barrier to marsh vegetation establishment, and therefore has not been explicitly proposed for Phase 2 actions at the Refuge.

However, it would take place as a by-product of some actions in three ponds. Only seasonally dry ponds have a gypsum layer, and the only seasonally dry ponds in Phase 2 are the four at Ravenswood. Of these, Pond R3 will remain as a seasonally dry salt panne with no work on the interior of that pond. Pond R4 will have a channel network excavated through a portion of it to increase tidal circulation. In those areas, the excavation would necessarily break through the gypsum layer. In addition, excavation equipment (even low ground pressure equipment) traversing the pond bottom will also have effect on the gypsum layer.

7. Recreation Elements

Will any kayak/boat launches be constructed in Phase 2?

No boat launches are proposed or planned for Phase 2.

8. Alviso System A23

The Phase I Orders says that Ponds A22 and A23 were to be transferred from Cargill to FWS in 2011. When did the transfer happen?

Ponds A22 and A23 were transferred to the USFWS in 2011.

9. Migration of Salmonids

Is Pond A9 operated with closed inlet during salmonid migration periods? Is the intake from Pond A17 to Pond A16 equipped with fish screens?

From the Refuge Pond Operations Plan:

During the winter season, the A9 intake will be closed to prevent entrainment of migrating salmonids; December through May 31. Excess water from rainfall would be drained from the system after larger storms and will require additional active management to adjust the interior control gates. In years with low rainfall and because there is no inflow to this entire system during the winter, water levels in A9 are often very low by spring.

Also, yes, the connection between Pond A16 and A17 is fitted with a fish screen.

10. Dissolved Oxygen and Within Pond Fish Mortality

Were there any fish kill incidents during the Phase I period?

The table below lists the dates and ponds in which more than 10 dead fish (of various species) were observed. It is not clear whether these events were related to low dissolved oxygen in the ponds or adjacent waters. Note, however, that the earlier dates were prior to Phase 1 implementation, which took place over several years (2008-2014). Also note that no fish kills have occurred in ponds affected by Phase 1 actions. The kills in A16 and A17 were prior to initiation of Phase 1.

Table 3 SBSP Fish Kill Observations at Refuge Ponds by Date

DATE	POND
08/10/05	A16
08/10/05	A17
09/04/07	A5
09/04/07	A7
09/02/08	A9
09/02/08	A3W
01/16/09	A5
10/12/11	A11
10/17/11	A12
02/11/13	A5
07/19/16	A12

11. Altering Managed Ponds at the USFWS Refuge

The Phase I Order says that to determine how former salt ponds should be modified in the long term, FWS has implemented applied studies at Ponds A3W, A14, and A16. What is the status of those studies?

The SBSP Restoration Project conducted monitoring and applied studies at multiple locations during and after the period of Phase 1 implementation. The results of those studies are available on the Project's website at:

http://www.southbayrestoration.org/documents/technical/Kuwabara_Pond%20A3W_of2013-1128_text.pdf

http://www.southbayrestoration.org/documents/technical/BOD%20Report_Brent%20Topping_OFR_2009-1180.pdf

http://www.southbayrestoration.org/pdf_files/USGS%20Report%202008%E2%80%931097.pdf

In addition, the details of water quality and pond management were also discussed in the self-monitoring reports as well as at the related annual meetings between agency staff and the RWQCB.

http://www.southbayrestoration.org/monitoring/

12. DFW – Altering Managed Ponds.

The Phase I Order says that DFW has implemented an applied study at Pond E10. What is the status of that study?

The report on the applied study at Pond E10 was provided to the RWQCB in the 2009 self-

monitoring report for Eden Landing and is available for download at:

http://www.southbayrestoration.org/monitoring/2009%20ASMR-KRAUSE031610.pdf

13. Applied Studies on Managed Ponds

The Phase I Order required that the Discharger continue to implement applied studies. These studies will focus on ponds that may be operated as managed ponds in the long term (e.g., A3W, A14, and E10) and ponds that will be reconfigured (SF2 and A16/A17) under Phase I restoration actions. The purpose of these applied studies is to guide long-term restoration efforts to determine (a) how pond geometry (surface area, depth, filling borrow ditches) should be altered to make managed ponds ecologically sustainable, (b) if the Discharger should move towards a restoration effort that will involve fewer managed ponds and more tidal marsh (especially if managed ponds cannot be reconfigured to become ecologically sustainable), and (c) how to develop a site-specific objective for dissolved oxygen in managed ponds. What is the status of those studies?

a) Pond Geometry. This is an ongoing management issue that is monitored by the Refuge and CDFW staff during regular pond operations. No specific applied study has been developed for this purpose.
b) Balance of Managed Ponds and Tidal Marsh. This is a much larger question and is the general goal of the entire AMP. All of our major studies, particularly those around bird use of the ponds, have focused on answering this question. Many studies have been focused on the efficacy of the reconfigured managed ponds. See, for example (http://www.southbayrestoration.org/documents/technical/Ackerman%20etal%202014%20Waterbird%20Nest%20Disturbance%20OFR_2014-1223.pdf)

c) Dissolved Oxygen in Managed Ponds. Please see the previously referenced reports and the self-monitoring reports for specifics relating to dissolved oxygen monitoring and studies.

Please note, however, that Pond A17 was not reconfigured into a managed pond but was instead made tidal and is progressing towards marsh through sediment accretion.

14. The South Baylands Mercury Project (SBMP)

Data collected as part of the SBMP in 2006 and 2007 are currently being reviewed, and additional sample collection occurred in April and May 2008 (with analytical data to be available in late 2008 or early 2009). When analyses of these data are complete in 2009, a plan will be recommended for monitoring the Phase I action and will be subject to Executive Officer approval. What is the status of the SBMP since 2008? Are there findings and/or new studies that should be referenced in the Phase 2 Order? Did one of the SBMP reports justify leaving the notch to Pond A8 open?

The SBMP was completed in 2010:

http://www.southbayrestoration.org/documents/south-baylands-

mercury/SBMP_Final%20Report%2010FEB2010.pdf

Since that time, more focused mercury monitoring has been on-going with regular reporting to and meetings with the RWQCB. These studies have resulted in an allowance of progressively opening the A8 notch structure, culminating in the opening of all eight gates in July 2017. There are numerous studies and reports on this work, and it has been a major topic of every Science Symposium and conference update. Please go to the below link and do a keyword search for 'mercury' to see all of the studies produced to date:

http://www.southbayrestoration.org/documents/technical/

In addition, we are currently working with our science team on a consolidated final summary report of all facets of the mercury studies that will be completed in 2018. We anticipate coming to the RWQCB later this year to provide an in-depth summary of all of this work and its implications for the full restoration of the Pond A5/7/8 complex. A preview of that synthesis was presented at the 2017 State of the Estuary conference. That presentation is available at the below link:

http://www.southbayrestoration.org/science/SOE2017presentations-posters/index.html

15. Ponds Managed in Phase I to Improve Dissolved Oxygen (DO) levels.

The three Phase I managed ponds (A16, SF2, and E12/13) will all be operated with shallower water depths than other ISP managed ponds, which should result in greater wind driven mixing and re-aeration of those ponds in Phase I. What were the results of this Phase I study?

While the results of the E12/13 study are still being written up by the U.S. Geological Survey, the general result of all of the studies was that water in the South Bay coming into the ponds is often already challenged from a DO perspective, and the best course of management is to provide as much water exchange as possible into and out of the ponds. Although often shallower than the ISP ponds, the reconfigured ponds also provided a greater degree of management flexibility which proved prudent. Please also see the answers and reports referenced in questions 11, 12 and 13 above.

16. Ravenswood Ponds

The Phase I order says that prior to discharging saline waters from the Ravenswood Ponds (with the exception of SF2), the Discharger shall submit a technical report that evaluates the potential for (a) discharges to increase the concentration of salinity and/or metals in receiving waters during the initial release and continuous circulation period, and (b) salinity to cause significant impacts to Ravenswood Slough during the continuous circulation period. Additionally, the Discharger's technical report shall include a proposal to add these ponds to the Self-Monitoring Program. What is the status of this technical report?

No restoration actions, nor discharges under ISP changes have taken place at these ponds yet. Examining the effects outlined here would be carried forward in the Phase 2 monitoring.

17. Landscape, Habitat, and Biological Species Monitoring Plan

The Phase I Order says that to show progress toward achieving target habitats, monitoring will be required. Specific methods, locations, and sampling procedures for all the Phase I SBSPRP projects are provided in the draft Phase I Landscape, Habitat, and Biological Species Monitoring Plan (Attachment E – Draft) and the Adaptive Management Plan (Attachment C), both of which can be amended with written Executive Officer approval, subsequent to the issuance of the Biological Opinions. The already completed Adaptive Management Plan presents possible future studies and some general methods. The final Monitoring Plan will list:

a) target habitat goals for the 9 Phase I areas (A6, A8, A16, A17, SF2, E8A, E8X, E9, E12, and E13); and

b) all parameters to be monitored including detailed procedures and locations for assuring that the beneficial uses of water and habitat will be protected and/or improved.

Should Phase 2 include a third sub bullet that covers target habitat goals for Phase 2 Areas?

The RWQCB approved the final version of the Phase I Landscape, Habitat, and Biological Species Monitoring Plan. It is available on the Project website at:

http://www.southbayrestoration.org/pdf_files/SBSP%20Phase%201%20Monitoring%20Plan_10.14.08.pdf

The SBSP Restoration Project agrees that it is appropriate to add the Phase 2 pond numbers and target habitats to bullet (c), a draft of which is provided here for RWQCB's review and comment:

c) (c) target habitat goals for the nine Phase 2 areas of USFWS property: A1–tidal marsh habitat, A2W–tidal marsh habitat, A8/A8S-enhanced managed pond habitat (deep water muted tidal ponds, A19–tidal marsh habitat, A20–tidal marsh habitat, R3-enhanced managed pond habitat (dried seasonally for western snowy plover), R4–tidal marsh habitat, R5-enhanced managed pond habitat (shallow water pond for dabbling ducks and small shorebirds), S5-enhanced managed pond habitat (shallow water pond for dabbling ducks and small shorebirds).

18. Technical Advisory Committee

The Phase I Order says that a SBSPRP Technical Advisory Committee (TAC) shall be organized and convened through a public process by the Discharger and shall, at a minimum, invite representatives from the Water Board, BCDC, California Coastal Conservancy, the Corps, and the National Marine Fisheries Service. Is the same TAC going to provide oversight for Phase 2?

The Technical Advisory Committee met in 2017 with a list of invitees from the aforementioned agencies as well as other technical experts. It will continue to do so throughout Phase 2 implementation and into the initiation of planning for Phase 3 actions. If

you would like to see the attendance list and/or notes from that meeting, please let us know.

19. Provision 27 in the Phase I Order

This provision stated that in addition to the initial work described above, the new/improved levees in E9/E14, E10, and E13/E14 shall likely require a second phase of construction after about 5 years of settlement have occurred. Did the second phase of construction occur? Will there be similar follow up construction in Phase 2?

No additional construction has taken place on the improved levees in those listed ponds. It has not yet been necessary, though that rough estimate of a 5-year window for post-construction settlement has only recently passed (Phase 1 levee work on different ponds at Eden Landing was completed in 2011 and 2013). So, it is possible that ongoing settlement may require that second pass at construction. The Project Management team and CDFW's Eden Landing staff continue to monitor these levees and will keep the RWQCB informed about the need for and timing of any necessary levee improvements that are not already covered by existing permits for levee operations and maintenance. For Phase 2, a similar process will be used to monitor that settlement and add material or otherwise adjust the levees.

20. Summary Tables

Take a look at the Phase 1, Attachment B. Do you have similar tables for Phase 2 that can be assembled into an Attachment for the Phase 2 Order?

The tables pointed to in this request include summary tables for construction actions by pond cluster, cut and fill volumes by pond cluster, the AMP, and monitoring. An updated addendum to the AMP was provided in a letter to the RWQCB on July 20, 2017, for Phase 2 actions for acceptance by the RWQCB. Provided below are tables summarizing Phase 2 construction actions in Table 4 and Phase 2 fill and cut volumes in Tables 5 to 8. Table 5 through Table 8 provide Map ID numbers associated with the Refuge's original supplemental information package, Figure 8. Those same figures are enclosed again here for ease of reference.

Table 4 South Bay Salt Pond Restoration Project Phase 2 Proposed Construction Activities

ITEM	ACTION	POND COMPLEX AND CLUSTER			
		ALVISO - ISLAND PONDS (A19 AND A20)	ALVISO - A8 PONDS (A8 AND A8S)	ALVISO - MOUNTAIN VIEW PONDS (A1 AND A2W)	RAVENSWOOD PONDS (R3, R4, R5, AND S5)
1	Lower Existing Levees	X		X	X
2	Widen Existing Breach	X			
3	Create New Breach(es) and Channel(s) Connecting to Adjacent Slough	X		X	X
4	Install Internal Ditch Blocks	X		X	X
5	Place in-situ Levee Material in Existing Borrow Ditch	X		X	X
6	Install Habitat Transition Zone(s) and Establish Vegetation		X	X	X
7	Raise and Improve Existing Levee			X	X
8	Raise Existing Structures on Levees			X	X
9	Add New Public Access, Signage and Trails			X	X
10	Improve Existing Public Access and Trails			X	X
11	Raise PG&E Tower Foundations			X	
12	Replace Existing PG&E Boardwalks			X	
13	Construct New PG&E Boardwalks			X	
14	Construct Habitat Islands Inside Ponds			X	
15	Construct Bridges and Armoring at Breach(es)			X	
16	Pile Driving For Permanent Piles			X	X
17	Install New Water Control Structures				X
18	Remove Existing Water Control Structures			X	X
19	Cap or Close Existing Siphon			X	

ITEM	ACTION	POND COMPLEX AND CLUSTER			
		ALVISO - ISLAND PONDS (A19 AND A20)	ALVISO - A8 PONDS (A8 AND A8S)	ALVISO - MOUNTAIN VIEW PONDS (A1 AND A2W)	RAVENSWOOD PONDS (R3, R4, R5, AND S5)
20	Fill Internal Canal				X
21	Remove Internal Levee(s)				X
22	Convert Internal Levee into Habitat Island				X
23	Excavate Internal Pilot Channel				X
24	Install Fencing			X	X
25	Install Gate			X	X
26	Construction Access from Existing Levee	X	X	X	X
27	Use Amphibious Construction Vehicles and Mats	X		X	X
28	Construction Access from Barge	X		X	
29	Stockpile Clean Fill in Project Area		X	X	X
30	Conventional Construction Equipment	X	X	X	X
31	Install and Dewater Cofferdams			X	X
32	Implement Effective BMPs for Soil Stabilization, Sediment, Tracking, Dust and Non-stormwater Discharge Control Measures	X	X	X	X
33	Pond Dewatering				X
34	Temporary mats and gravel in Pond(s) for Equipment Access			X	X
35	Clear and Grub Debris and Vegetation from Construction Area Before Work	X	X	X	X
36	Conduct Work Within Appropriate Work Windows for Sensitive Species as Feasible	X	X	X	X
37	Maintain and Repair Existing Levees	X	X	X	X

ITEM	ACTION	POND COMPLEX AND CLUSTER			
		ALVISO - ISLAND PONDS (A19 AND A20)	ALVISO - A8 PONDS (A8 AND A8S)	ALVISO - MOUNTAIN VIEW PONDS (A1 AND A2W)	RAVENSWOOD PONDS (R3, R4, R5, AND S5)
38	Maintain and Operate Water Control Structures		X	X	X
39	Manage Water Levels in Select Ponds for Bird Habitat				X
40	Implement Effective Containment Plans and Avoidance and Minimization Measures for Hazardous Spills	X	X	X	X
41	Provide Worker Environmental Awareness Training before Construction for all Construction Personnel Working on Site	X	X	X	X
42	Implement Appropriate Avoidance and Minimization Measures for Listed and Sensitive Species During Construction	X	X	X	X
43	Manage Vegetation for Invasive Plant Species	X	X	X	X
44	Concrete Delivery			X	X

Table 5 Island Ponds Phase 2 Action Cut and Fill Volumes Below HTL/MHHW

MAP ID	FEATURE	CUT VOLUMES (CY)	FILL VOLUMES (CY)
1	Pond A19 Northwest Levee Lowering	1,000	0
2	Pond A19 North Levee Lowering (Middle)	450	0
3	Pond A19 Northeast Levee Lowering	520	0
4	Pond A19 Southwest Levee Lowering	280	0
5	Pond A19 Southeast Levee Lowering	380	0
6	Pond A19 Southwest Levee Removal	467	0
7	Pond A19 Northwest Levee Removal	1,067	0
8	Pond A20 Northeast Levee Removal	467	0
9	Pond A20 Southeast Levee Removal	967	0
10	Pond A19 Northwest Breach and channel	800	0
11	Pond A19 Northeast Breach and channel	230	0
12	Pond A19 South Breach Widening	560	0
13	Pond A19 - Northwest Breach – Ditch block 1	0	1,800
14	Pond A19 - Northwest Breach – Ditch block 2	0	1,900
15	Pond A19 - Northeast Breach – Ditch block 1	0	1,500
16	Pond A19 - Northeast Breach – Ditch block 2	0	1,400
17	Pond A19 - South Breach Widening – Ditch block 1	0	2,200
18	Pond A19 - South Breach Widening – Ditch block 2	0	2,200
19	Other Placed Levee Material	0	14,500
Totals		**7,188**	**25,500**
Island Ponds Subtotals by Action Type			
1 to 5	Levee Lowering Subtotal	2,630	0
6 to 9	Levee Removal Subtotal	2,968	0
10 to 12	Breach and Breach Widening Subtotal	1,590	0
13 to 18	Ditchblock Subtotal	0	11,000
19	Other Placed Levee Material	0	14,500

Table 6 A8 Ponds Phase 2 Action Cut and Fill Volumes Below HTL/MHHW

MAP ID	FEATURE	CUT VOLUMES (CY)	FILL VOLUMES (CY)
20	Western habitat transition zone	0	91,500
21	Eastern habitat transition zone	0	82,500
Totals		**0**	**174,000**

Table 7 Mountain View Ponds Phase 2 Action Cut and Fill Volumes Below HTL/MHHW

MAP ID	FEATURE	CUT VOLUMES (CY)	FILL VOLUMES (CY)
22	Pond A1 Northwest Breach	990	0
23	Pond A1 Southeast Breach	660	0
24	Pond A2W Northwest Breach	660	0
25	Pond A2W Southwest Breach	880	0
26	Pond A2W Northeast Breach	330	0
27	Pond A2W Southeast Breach	1,650	0
28	Pond A1 Shear Key Excavation	3,100	0
29	Coast Casey Forebay Levee Improvement	0	12,050
30	Pond A1 West Levee Improvement	0	40,320
31	10 Habitat Islands	0	40,600
32	Bridge piles, abutments	0	100
33	Pond A1 Habitat Transition Zone	0	73,480
34	Pond A2W Habitat Transition Zone	0	77,120
Totals		**8,270**	**243,670**
Mountain View Ponds Subtotals by Action Type			
22 to 27	*Levee Breaches*	*5,170*	*0*
29 to 30	*Levee Improvements*	*3,100*	*52,370*
31	*Habitat Islands*	*0*	*40,600*
32	*Structures*	*0*	*100*
33 to 34	*Habitat Transition Zones*	*0*	*150,600*

Table 8 Ravenswood Ponds Phase 2 Action Cut and Fill Volumes Below HTL/MHHW

Map ID	Feature	Cut Volumes (cy)	Fill Volumes (cy)
35	Pond S5 Internal Levee Removal	1,000	0
36	Pond R5/S5 North internal levee removal	3,900	0
37	Ponds R5/S5 South Internal Levee Removal	2,800	0
38	Pond R4 Northwest Levee lowering	0	0
39	Pond R4 Northeast Breach	10,600	0
40	Pond R4 Pilot Channel	16,000	0
41	Pond R3 Water Control Channel	1,000	0
42	All American Canal and R5/S5 levee improvement	0	46,090
43	All-American Canal habitat transition zone	0	69,460
44	Bedwell Bayfront Park habitat transition zone	0	47,240
45	Ditch Block west of R4 Breach	0	1,000
46	Water Control Structures	0	400
Totals		**35,300**	**164,190**
Ravenswood Ponds Subtotals by Action Type			
35 to 37	*Levee Removal*	*7,700*	*0*
38	*Levee Lowering*	*0*	*0*
39	*Levee Breaches*	*10,600*	*0*
40 TO 41	*Channel Cuts*	*17,000*	*0*
42	*Levee Improvements*	*0*	*46,090*
43 to 44	*Habitat Transition Zones*	*0*	*116,700*
45	*Ditch Blocks*	*0*	*1,000*
46	*Water Control Structures*	*0*	*400*

With this letter, the USFWS believes that it has provided all necessary information from the applicant to the RWQCB to file its application as complete. Should you have any questions as you continue your review of this application, please feel free to contact me at (510) 792-0222 or my project representatives John Bourgeois, SBSP Restoration Project Executive Project Manager, at (408) 314-8859 or Dillon Lennebacker, AECOM, at (510) 874-3035. The Refuge appreciates your time and effort during this process and thanks you for working to move forward our shared goals of restoring the San Francisco Bay's beneficial uses.

Thanks,

Christopher J. Barr

Chris Barr
Deputy Complex Manager
San Francisco Bay National Wildlife Refuge Complex
United States Fish and Wildlife Service

Enclosure: Figures

cc: Dale Bowyer/ Keith Lichten/ Christina Toms/ Naomi Feger/ Robert Schlipf, RWQCB
Anne Morkill/ Jared Underwood, USFWS
John Krause, CDFW
John Bourgeois/ Brenda Buxton, SCC
Seth Gentzler/ Dillon Lennebacker, AECOM

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
IMAGERY *Esri*

N

A21
150 ACRES

A20
65 ACRES

A19
265 ACRES

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Dixon Landing Rd

LEGEND

- 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
- Cut Impacts
- Fill Impacts

AECOM

South Bay Salt Pond Restoration Project

Figure 8a

Impacts to Wetlands and Waters of the State

Alviso Island Ponds

3/17/2017 f:\ser_ell\capwi\ | Map location: L:\Projects\GIS\Projects\South_Bay_Salt_Ponds_2016\02_Maps\02_Map_Production_and_Reports\Reports\RefugePonds\Biology\Section_401\Fig8_WatersWetlands_Impacts.mxd

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
IMAGERY *Esri*

N

A8
410 ACRES

A8S
160 ACRES

20

21

Mills St
Elizabeth St
Hope St
Catherine St
Dorado St
Gold St
Liberty Ct
E Taylor St
El Liberty St
Hoppe
Moffat St
Sun Rise Dr
Archer St
Michigan St
Wabash Ave
Essex St
Blvd
Grand St
Wilson Way
Trinity Park Dr
Archangel Dr
N 1st St
School St
Nortech Pky
Disk Dr
Sprockles Ave
Pacific St
State St
Ave
Los Esteros Rd
Carl Rd
237
Great America Pky

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 8b
Impacts to Wetlands and Waters of the State
Alviso A8 Ponds

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
IMAGERY *Esri*

N

C1 115 ACRES

A1
275 ACRES

A2W
435 ACRES

22
24
30
31 (Typical)
26
32
23
25
27
32
33
29
28
34

Terminal Blvd
San Antonio Rd
N Shoreline Blvd

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 8c
Impacts to Wetlands and Waters of the State
Alviso Mt. View Ponds

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
IMAGERY *Esri*

N

R4
295 ACRES

R5
30 ACRES

S5
30 ACRES

R3
270 ACRES

Marsh Rd
Haven Ave
Independence Dr
Constitution Dr
Chrysler Dr
Jefferson Dr
Scott Dr
Bohannon Dr
Commonwealth Dr
Chilco St
Network Cir
University Ave
84
101
114

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 8d
Impacts to Wetlands and Waters of the State
Ravenswood Ponds

South Bay Salt Ponds Restoration Project, Phase 2 Application for 401 Water Quality Certification and/or Report of Waste Discharge

Supplemental Information

March 2017

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List of Acronyms

A8 Ponds	Alviso-A8 Ponds
AAC	All-American Canal
ABA	Architectural Barriers Act
ADA	Americans with Disabilities Act
AMP	Adaptive Management Plan
Bay	San Francisco Bay
BMPs	Best Management Practicies
Cargill	Cargill Incorporated
Cy	Cubic yards
EIS/R	Environmental Impact Statement/Environmental Impact Report
FEMA	Federal Emergency Management Area
HTL	high tide line
h:v	Horizontal to vertical
HCP/NCCP	Santa Clara Valley Habitat Conservation Plan/Natural Community Conservation Plan
I-880	Interstate 880
Island Ponds	Alviso-Island Ponds
ISP	Initial Stewardship Plan
LF	linear feet (foot)
1Mountain View Ponds	Alviso-Mountain View Ponds
NAVD88	North American Vertical Datum of 1988
NERC	North American Electric Reliability Corporation
NMFS	National Marine Fisheries Service
O&M	Operation and Maintenance
PG&E	Pacific Gas and Electric Company
QAPP	Quality Assurance Program Plan
Refuge	Don Edwards San Francisco Bay National Wildlife Refuge
Regional Board	San Francisco Bay Regional Water Quality Control Board
ROW	Rights-of-Way
South Bay	South San Francisco Bay
SBSP	South Bay Salt Ponds Restoration Project
SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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2 Boxes 9 (Name of Affected Waterbody), 10 (Project Street Address), and 11 (Location of Project)

2.1 Introduction

The South Bay Salt Ponds (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, began implementation of the Initial Stewardship Plan (ISP) (USFWS and CDFG 2003[1]), 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 Final 2007 Program Environmental Impact Statement/Environmental Impact Report (EIS/R). That longer-term planning was facilitated by the California State Coastal Conservancy 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 Program 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

[1] 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.

designs for habitat restoration, flood management, and wildlife-oriented public access. The former salt ponds are part of the U.S. Fish and Wildlife Service (USFWS)-owned and managed Don Edwards San Francisco Bay National Wildlife Refuge (Refuge), and cover approximately 9,600 acres in the South San Francisco Bay (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 and the Refuge's Pond Management Plan until further implementation planning and the appropriate adaptive management studies are completed. They may be included in future project phases as well.

2.2 Project Location

The SBSP Restoration Project is in the South Bay in Northern California (see **Figure 1**) under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (Regional Board, Region 2). Phase 2 of the SBSP Restoration Project includes parts from two complexes of former salt ponds and adjacent habitats in the South Bay that the USFWS acquired from Cargill in 2003. The 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 Refuge (see **Figures 2a through 2d**).

Figure 1. SBSP Phase 2 Project Sites

Figure 2a. SBSP Phase 2 Project Sites – Alviso Island Ponds

Figure 2b. SBSP Phase 2 Project Sites – Alviso A8 Ponds

Figure 2c. SBSP Phase 2 Project Sites – Alviso Mountain View Ponds

Figure 2d. SBSP Phase 2 Project Sites – Ravenswood Ponds

2.3 Pond Clusters

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 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 ISP.

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 the 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 SR 84 is 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.

Further discussions on each pond cluster are provided in the subsections below.

Figure 3. Alviso Island Ponds

Figure 4. Alviso A8 Ponds

Figure 5. Alviso-Mountain View Ponds

Figure 6. Ravenswood Ponds

2.3.1 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 are geographically isolated from urbanized and built-out areas by other waterbodies, other 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 Final Program 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 breached at one location. 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.

2.3.2 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 Refuge to vary the size of the notched opening.

Ambient levels of mercury are elevated in Pond A8 due to sediment inputs from the upstream, long-closed New Almaden Quicksilver Mine. Therefore, there are concerns about mercury exposure in the A8 pond complex. Prior to any restoration actions, bioavailability and bioaccumulation of mercury were found to be greater in Pond A8 than in either Alviso Slough or its fringing tidal marsh. Methylmercury concentrations in water and sediment were greater in Pond A8 than in Alviso Slough or its fringing tidal marsh channels, and biosentinels representing benthic and shoreline habitats indicated more mercury bioaccumulation in Pond A8 than in the tidal marshes along Alviso Slough (Grenier et al. 2010).

As a result, a Phase 1 action was undertaken to better understand the level of the risk and any implications of taking actions to restore tidal flows to the pond. A variable crest weir with numerous gates (also referred to as the 'notch') was installed to incrementally allow tidal waters and to study the resulting effects. Adaptive management measures have been and will continue to be used to monitor

effects from the A8 Ponds. Adaptive management monitoring has included methylmercury concentrations in water and sediments; special studies of sediment scour and transport; and changes in food web indicators and sentinel species. Adaptive management actions would be triggered when mercury concentrations of sentinel species increase substantially, compared to the reference site, regardless of whether they are over or under desirable levels. If triggers are exceeded, then adaptive management actions would be implemented. Examples of such actions include changing hydraulic residence times or manipulating other factors.

Findings to date include that the initial Phase 1 construction activities temporarily increased mercury levels that were observed in Forster's tern (a piscavore) eggs in this pond immediately following Phase 1 construction activities and opening of the notch at A8. However, these levels reduced and stabilized to those found at nearby reference sites by the next nesting season (Ackerman et al. 2014). A similar trend was observed in fish, but the return to ambient levels was much quicker (~3 months) and has been consistent with reference sites ever since (Bourgeois, pers. comm.). Construction at this location for Phase 2 will not include excavation of pond bottom, only the addition of clean fill material on top of existing pond bottom, therefore re-suspension of existing mercury at this location is believed to be a minimal risk. Additionally, the approved QAPP for upland fill material will ensure that any fill used in the creation of habitat transition zones or habitat islands is free of contaminants that may enter the water.

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 hunter-use small boat launch area along the northwestern edge of A8S.

2.3.3 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.

2.3.4 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.

2.4 Affected Waterbodies and City/County of Ponds

Affected waterbodies primarily occur to managed salt ponds and marshes associated with the various pond complex/clusters. Depending on the complex/cluster location, affected waterbodies will also include adjacent creeks, sloughs and canals. These areas are undeveloped salt ponds and open water, there is no specific site address for each complex/cluster. The city and county of each complex/cluster are provided below. All areas are part of the Don Edwards National Wildlife Refuge. The names of the affected waterbodies for each complex/cluster and the associated municipality are provided in **Table 1**, below.

Table 1. Name of Affected Waterbody and City/County of Ponds

COMPLEX	CLUSTER	AFFECTED NAMED BODIES OF WATER	CITY LOCATION	COUNTY LOCATION
Alviso	Island Ponds (A19, A20, A21)	San Francisco Bay, Salt Ponds, Mud Slough, Coyote Creek	Fremont	Alameda
Alviso	A8 Ponds (A8, A8S)	San Francisco Bay, Salt Ponds, Alviso Slough/ Guadalupe River, Guadalupe Slough	Sunnyvale	Santa Clara
Alviso	Mountain View Ponds (A1, A2W)	San Francisco Bay, Salt Ponds, Charlestown Slough, Mountain View Slough/Permanente Creek, Whisman Slough/Stevens Creek,	Mountain View	Santa Clara
Ravenswood	Ravenswood Ponds (R3, R4, R5, S5)	San Francisco Bay, Salt Ponds, Flood Slough, Ravenswood Slough, San Francisco Creek, West Point Slough, All-American Canal	Menlo Park	Santa Mateo

3 Box 12 (Other Location Descriptions)

At a broad scale across the project activities, the project will affect open waters and wetlands in the Coyote Watershed (Hydrological Unit Code - 8: 1805003), and San Francisco Bay (Hydrological Unit Code -8: 18050004). The United States Geologic Survey 8 digit Hydrological Unit Code and the San Francisco Bay Basin Plan Surface Water Plan Area for each complex/cluster are provided in **Table 2** and depicted in **Figure 7**. **Table 2** also includes the latitude/longitude (in decimal degrees) of the centroid point for each pond.

Table 2. Other Location Descriptions: Watershed, Surface Water Plan Area, and Latitude/Longitude

POND CLUSTER	POND	WATERSHED NAME (HUC 8)	*AREA (ACRES)	BASIN PLAN SURFACE WATER PLAN AREA AFFECTED	LATITUDE	LONGITUDE
ALVISO-ISLAND PONDS	A19	Coyote watershed (1805003)	265	Santa Clara Basin	37.467092	-121.957692
	A20		65		37.464876	-121.970986
	A21		150		37.465142	-121.979427
ALVISO - A8 PONDS	A8	Coyote Watershed (1805003)	410	Santa Clara Basin	37.428778	-121.991558
	A8S		160		37.420860	-121.989553
ALVISO - MOUNTAIN VIEW PONDS	A1	Coyote Watershed (1805003)	275	Santa Clara Basin	37.442525	-122.086577
	A2W		435		37.441989	-122.074607
RAVENSWOOD PONDS	R3	San Francisco bay (18050004)	270	South Bay Basin (Lower Bay)	37.486675	-122.155291
	R4		295		37.493048	-122.161933
	R5		30		37.488054	-122.170371
	S5		30		37.485913	-122.170712
Note: *Pond areas excerpted from the 2007 SBSP FEIS/R AECOM 2016						

Figure 7. HUC-8 Watershed Boundaries

4 Box 13 (Directions to Site)

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 Refuge offices located in Fremont, California.

4.1 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 2 Marshlands Road, Fremont, CA 94555.

4.2 Alviso-A8 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.

4.3 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.

4.4 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.

4.5 Other Don Edwards National Wildlife Refuge Headquarters Locations

To reach the Don Edwards National Wildlife Refuge Headquarters (in Fremont, CA):

> From Highway 84 (at the east end of the Dumbarton Bridge), exit at Thornton Avenue. Travel south on Thornton Avenue for 0.8 miles to the Refuge entrance on the right. Turn right into the

Refuge and turn left at the stop sign into the second parking lot. The auditorium is located at the top of hill in the Refuge Administrative Headquarters building.

To reach the Visitor Center (in Fremont, CA):

From Highway 84 (at the east end of the Dumbarton Bridge), exit at Thornton Avenue. Travel south on Thornton Avenue for 0.8 miles to the Refuge entrance on the right. Turn right into the Refuge and follow signs to the parking lot. The Visitor Center is located by the first parking lot to the right.

To reach the Environmental Education Center (in Alviso, CA)

From Interstate 880 (I-880) or Highway 101, exit on Highway 237 toward Alviso. Turn north onto Zanker Road which becomes Los Esteros, to the Environmental Education Center entrance road, which is a sharp right turn off Los Esteros at Grand Boulevard. The distance from Highway 237 to the entrance road is 2.1 miles.

5 Box 14 (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 – formerly California clapper rail –, and salt marsh harvest mouse);
- 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 sea level rise adaptation; and
- Limited opportunities in the South 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 habitats in the South Bay 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 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).

6 Box 15 Proposed Activities (Description of Activity and Environmental Impacts)

The SBSP Restoration Project's proposed activities 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. **Figure 3** through **Figure 6** illustrates 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. For the purpose of this application, mean higher high water line (MHHW) was used as a proxy for the high tide line (HTL) at all ponds. A visual assessment of the mapped wetland delineation of habitats and the MHHW elevation contour line showed very close agreement between the two in almost all cases.

Descriptions of the proposed activities; means, methods, and equipment; construction schedule; and operations and maintenance activities are provided in this section.

6.1 Proposed Activities

6.1.1 Alviso-Island Pond Cluster

The proposed project would increase habitat connectivity, tidal flow 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.**

6.1.1.1 Lower Portions of Pond A19 Northern Levee

Lower much of Pond A19's northern levee to high tide elevation (approximately 7 feet NAVD88), but leave portions of that levee at existing elevations to provide more high-tide refugia and roosting or nesting areas. Levee lowering would be grubbed and cleared before construction and would be hydroseeded with native plant seed mix after lowering is complete. The levee lowering would further increase habitat complexity and connectivity, while unchanged sections of this levee would become island-like high-tide refugia.

6.1.1.2 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 (horizontal to vertical [h:v]) side slopes. The length of the cut would be approximately 90 feet.

6.1.1.3 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 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.

6.1.1.4 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 (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.

6.1.1.5 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 placed into the ponds' borrow ditches. Placing fill into borrow ditches and constructing ditch blocks would speed the transition to tidal marsh. Phase 2 operations would build approximately 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. All fill for ditch blocks and material placed on pond bottoms to enhance topographic variation would be below the HTL elevation. All proposed fill at the Island Ponds would be sourced on-site from the Island pond levees. Therefore, there would be no imported fill at the Island Ponds.

6.1.2 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 adjacent levees, 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 HTL line at the southwest and southeast corners would be approximately 2,075 feet each. The habitat transition zones would be separated in the middle so that potential future connections with San Tomas Aquino Creek to the south are not to be precluded.

Establishing these habitat transition zones would require import and placement of submerged fill above and below HTL elevation. 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). Fill placed to build transition zones below HTL tidal elevation would convert ponds to tidal wetlands, but fill placed above that elevation would convert waters to uplands. Detailed estimated quantities are provided in Box 18.

6.1.3 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**.

6.1.3.1 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). For levee height, 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. Only the south portion of the A1 west levee has proposed public access that will need to be improved and built to an elevation that matches the public access trail at the Coast Casey levee, as described below. North of the proposed viewing area is not proposed for public access and building this levee up to the greater elevation is not necessary to improve that levee to match existing level of flood protection at Pond A1. The target elevation for A1 West levee is 11 feet NAVD88 to match the existing level of flood protection provided by the outboard levees that will be breached. Considering overbuild for settlement, the recommended design elevation is 15 feet (i.e., initial elevation at completion will be 15 feet NAVD88, with the expectation that the levee will settle to +11 feet NAVD88 over time).

Initial overbuild of the portion of the A1 West levee south of the viewing area is at 17 feet NAVD88 with the expectation it would settle and match the Coast Casey Forebay elevation of 14.7 feet NAVD88 to the viewing area.

Recommended design elevations and slopes are based on geotechnical analyses for settlement and slope stability.

Recommended design elevations and slopes are based on geotechnical analyses for settlement and slope stability. Detailed estimated fill volumes, lengths and areas for A1 levee improvements are provided in Box 18.

6.1.3.2 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 raise 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[2]), 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, 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. 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 Americans with Disabilities Act (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. Estimated fill volumes, lengths and areas for all of these levee improvements and associated structural improvements at the Coast Casey Forebay are provided in Block 18.

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 is a volume of strengthened material that extends into the existing material to increase the stability and resistance to sliding for the improved levee. All cut and fill work for the shear key excavation would occur below HTL, 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.

6.1.3.3 Add Recreation and Public Access

Three recreation and public access features would be added. Estimated dimensions for these features are provided in **Tables 3** and **4**.

- In the first, a viewing area including a platform, informational signage, and benches would be constructed within the City of Mountain View's Shoreline Park or near the existing trail on the southern border of Pond A1 near the eastern end of the pond. The viewing platform area would be graded and its surface would be improved, but no elevated structures would be built.
- In the second, a spur trail would be constructed along the improved western levee of Pond A1 to a viewing platform similar to the one described above. It would be placed near the point where the habitat transition zone meets the Pond A1 west levee. The viewing platform would be established on a somewhat widened section of the existing levee where the benches and interpretive panels can be placed. The height of the levee-top trail from its split with the Bay Trail atop the Coast Casey Forebay levee would be at 14.7 feet elevation NAVD88 to match the elevation of the Bay Trail spine. (Beyond the viewing platform area, the levee top elevation would be at approximately 11 feet NAVD88, as discussed above.) This would provide viewing access to Charleston Slough and Pond A1. Benches and interpretive signage are proposed on both sides of the trail at the A1 western levee viewing platform.
- In the third, a trail along the levee on the eastern and northeastern side of Pond A2W. The trail on the eastern and north-eastern levees of Pond A2W would be approximately 6,440 feet (1.2 miles)

[2] Environmental Science Associates, Philip Williams and Associates. 2012. Shorelines Regional Park Community Sea Level Rise Study Feasibility Report and Capital Improvement Program. Final Draft. Prepared for the City of Mountain view. CIP 12-48. December 18. Available online at: http://laserfiche.mountainview.gov/Weblink/ElectronicFile.aspx?docid=64135&&&&dbid=0

long. The surfaces and side slopes of those levees would be maintained for PG&E access and would also open that route for public recreational access, add signage, and include more-frequent maintenance for safety. A viewing platform, similar to the ones described above, would be added at the end of the trail. This area would provide access to views of Pond A2W and the Bay.

Table 3. Mountain View Ponds – Recreational Features: Viewing Platforms Footprints

FEATURE	AREA (SQUARE FEET)
A1 West Levee Viewing platform	830
Shoreline Park Viewing platform	440
Pond A2W Northeast Viewing platform	1,900
Total	**3,170**

Table 4. Mountain View Ponds – Recreational Features: Trail Lengths and Areas

FEATURE	LENGTH (FEET)	AREA (SQUARE FEET)
Pond A1 West Levee Trail	480	6,720
Pond A2W East Trail	6,440	103,040
New Trails: Subtotal	***6,920***	***109,760***
Coast Casey Levee Trail Replacement	1,460	23,360
Total	**8,380**	**133,120**

6.1.3.4 Raise Concrete Foundations of PG&E Towers in Pond A2W

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 total combined area of the new concrete foundation is estimated to be 540 square feet (about 0.013 acre), and the total combined volume of that concrete is 2,160 cubic feet (80 cubic yards). Construction details for PG&E operations can be found in Appendix A.

6.1.3.5 PG&E Boardwalk Improvement and Addition

Phase 2 would elevate the existing PG&E access boardwalks in Pond A2W and construct 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 approximately 6,700 feet long, two to three feet wide, and only 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. The replacement would increase the width of

the boardwalk by approximately two feet and thus increase the shaded area of the Bay. The exact amount of added surface area would not exceed 13,500 square feet (approximately 0.3 acre).

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 additional boardwalk would be approximately 2,350 feet long and 3 feet wide (7,050 square feet or 0.16 acre). This area would be new shade added to the bay. The total cross-sectional area of the piles to support this new boardwalk is less than 700 square feet (under 0.15 acre).

The total volume of the piles to support the new boardwalk would be approximately 280 cubic yards, of which approximately 84 cubic yards would be below MHHW (12 feet of each pile would be below mudline). The various 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.. A summary of the fill volumes and areas are included in Box 18.

6.1.3.6 Construct and Vegetate 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 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). In Pond A2W, the slope would be approximately 30:1 (h:v). Estimated fill volumes, lengths and areas for the habitat transition zones at the Mountain View Ponds are provided in detail in Box 18.

6.1.3.7 Construct Habitat Islands in Ponds A1 and A2W for Birds

Nesting and roosting habitat for shorebirds, terns, and dabbling ducks would be created through the construction of islands in Ponds A1 and A2W. This would include building up to ten islands, with 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 area of roughly 10,100 square feet, a top elevation of 12.5 feet NAVD88 (roughly 3 feet above HTL, which is approximately 7.49 feet NAVD88 at the Island Ponds) and side slopes would be approximately 3:1 (h:v). As the ponds transition to marsh, the island habitat would eventually become marsh mounds (possibly requiring active revegetation), which have various ecological benefits as high-tide refugia and as focal points for further sediment aggregation and vegetation formation. Estimated fill volumes, lengths and areas for habitat islands at Mountain View Ponds are provided in detail in Box 18.

6.1.3.8 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 Permanente Creek/Mountain View 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 connecting A2W to Stevens Creek/Whisman Slough 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.

6.1.3.9 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 highest observed water level at this location is 9.25 ft NAVD88. The soffit elevations of 9 feet NAVD88 were chosen to ensure that the bridge abutments would be rarely inundated by high tides. If the soffits were inundated, the bridges will still convey tidal water, similar to a culvert under pressured flow. The top of the bridges would be greater than three feet above the soffits at 12.25 feet NAVD88, so that even during high tides these bridges would provide the rare maintenance vehicle the access that they are designed for.

The dimensions of the fill for abutments and piles are presented in **Table 5**. A trail approximately 15 feet wide with 2-foot wide shoulders on each side with would traverse the top of the bridges.

Table 5. Mountain View Ponds – A2W Bridge Details

LOCATION	BRIDGE SUPERSTRUCTURE FOOTPRINT (SQARE FEET)	PILE QUANITITY	PILE LENGTH (FEET)	PILE DIAMETER (INCHES)
Pond A2W Northeast Breach	1,131	16	45	14
Pond A2W Southeast Breach	1,131	16	45	14
AECOM 2016				

6.1.4 Ravenswood Pond Cluster

The restoration goals for the Ravenswood Ponds are to restore Pond R4 to 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 nivosus nivosus*), 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**. Estimated cut volumes and areas estimated fill volumes and areas are summarized in Box 18.

6.1.4.1 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, 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 various guilds of birds by allowing different bottom depths and elevations.

The water control structures would be circular high density polyethylene 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 6**. 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 for safety.

Table 6. 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	183	2	8	3,790
Pond R5/S5 to Pond R4	2	48	78	3.5	8	1,650
Pond R5/S5 to Pond R3	1	48	67	4.5	8	690
Pond R3 to Ravenswood Slough	1	48	62	2	8	640
Total	**6**	**N/A**	**390**	**N/A**	**32**	**6,770**

Notes:

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

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

6.1.4.2 Improve Levees and Fill in the All-American Canal (AAC)

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 de facto flood risk 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 target elevation for the AAC levee is 11 feet to match the existing level of flood protection provided by the outboard levee that will be breached, along Ravenswood Slough. Considering overbuild for settlement, the recommended design elevation of 15 feet NAVD88. Recommended design elevation, design crest, and slopes are based on geotechnical analyses for settlement and slope stability. Additionally, there will be a habitat transition zone placed on the north face of this levee that will provide increased adaptability to sea level rise over time, as described below. The ultimate flood control levee is anticipated to be constructed as part of a future project by others (see Table 26), therefore this levee is only constructed to match the existing level of flood protection.

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. The AAC would not have a trail on top, but would allow access by vehicles for maintenance and monitoring activities. A gate would be placed at the viewing platform area to restrict access.

6.1.4.3 Construct Two Habitat Transition Zones in Pond R4

Construct and vegetate 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 and vegetate 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.

6.1.4.4 Remove Internal Levees in Ponds R5 and S5

As part of converting Ponds R5 and S5 to managed ponds, four water control structures 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 and nesting.

6.1.4.5 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 HTL 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.

6.1.4.6 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.

6.1.4.7 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.

6.1.4.8 Add Recreation and Public Access Features

A trail along the improved eastern levees of Ponds R5 and S5 would be constructed and linked to the existing trails outside of these ponds. As shown in **Figure 6**, the northern end would connect to the existing trail in Bedwell Bayfront Park; the southern end would connect to the Bay Trail spine. This trail would be approximately 2,750 feet long and 10 feet wide with 2 feet of shoulder on each side. Surfacing materials would be decomposed granite with timber or concrete edging. The proposed water control structures between Ponds R4 and R5 and between Ponds R3 and S5 would be set low enough to allow

trail construction over them. This trail would necessitate a break in the new fence that borders the northern side of the Bay Trail, a gate, and appropriate signage along the southern border of Ponds R5 and S5 where it leaves the Refuge and connects to the Bay Trail. The trail would be bordered on both sides with low symbolic deterrent fencing (2- or 3-foot high posts connected by chains, cables, or rails) to provide a visual reminder to trail users to stay on the trail and not enter the restoration areas. Total length of fencing to be installed would be approximately 5,160 feet. See **Table 6** for area details.

A viewing platform would be constructed near the central point of this trail, at the junction with the improved AAC levee. The viewing platform would have benches and interpretive signage on pedestals and/or information panels. This would improve public access and supplement the visual benefits the trail and the restoration project would make available. As shown in **Figure 6**, benches would be located near the exhibit's signage. This action would allow the public to enhance the recreational experiences at the relatively high-use Bedwell Bayfront Park in Menlo Park by incorporating the interpretive opportunities and providing a view of all three of the Refuge's restoration pond types at these ponds. See **Table 7** for length and area details.

Table 7. Ravenswood Ponds – Recreational Features: Viewing Platforms Footprints

FEATURE	AREA (SQUARE FEET)
Ponds R5 and S5 eastern levee viewing platform	9,960
Total	**9,960**

Table 8. Ravenswood Ponds – Recreational Features: Trail Lengths and Areas

FEATURE	LENGTH (FEET)	AREA (SQUARE FEET)
Ponds R5 and S5 eastern levee	2,750	38,500
Total	**2,750**	**38,500**

6.1.4.9 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 HTL. 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 goal for this lowered levee is to allow it to overtop during high tide events and to naturally erode to marsh plain elevation over time. The intent of this lowering is to provide a contiguous marsh plan for more direct connectivity with Greco Island to facilitate movement of species such as the salt marsh harvest mouse. High tide refugia will be adjacent to this area on the upland transition zone situated along the landfill edge. 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.

6.1.4.10 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 through the existing fringe tidal marsh would be approximately 470 feet.

6.1.4.11 Fence the Southern Border of Ponds R3 and S5

A low (3-foot-high) chain-link fence approximately 8,000 feet in length would be installed inside the Refuge property and adjacent to the existing Cargill pipeline property, north of the Bay Trail. The purpose of the fence is to deter people and their pets from leaving the trail and entering the restored habitat there. The fence would also help keep trash from blowing into the ponds and keep chicks from straying from Pond R3 onto the paved trail and roadway to the south.

6.2 South Bay Salt Pond Restoration Project Phase 2 Impact Summary Tables

Tables 9 to 12 summarize the lengths, areas, and volumes of the proposed actions for the SBSP Phase 2 project that will result in dredge or fill of material. For ease of reference, the fill and cut 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 represents the same volumes and areas presented two different ways, likewise for the fill volumes and areas. Details for each dredge and fill action by location and purpose are included in Box 18. 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 amounts above and below HTL. This split of the totals is intended to help the regulatory agencies understand the portion of these totals that would be placed into waters versus that placed into uplands.

Table 9. Estimated Cut (Dredge) Volumes and Areas by Location

LOCATION	NET CUT (CUBIC YARDS)	CUT VOLUME BELOW HTL	TOTAL AREA (ACRES)	AREA BELOW HTL (ACRES)
Island Ponds	25,500	7,187	6.4	2.4
A8 Ponds	0	0	0	0
Mountain View Ponds	15,200	8,270	2.2	1.3
Ravenswood Ponds	43,100	35,300	10.4	8.2
Total	**83,800**	**50,757**	**19.0**	**12.0**

Note: 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.
AECOM 2016

Table 10. Estimated Cut (Dredge) Volumes by Purpose

PURPOSE	NET CUT (CUBIC YARDS)	CUT VOLUMES BELOW HTL	TOTAL AREA (ACRES)	AREA BELOW HTL (ACRES)
Levee Removal	19,600	10,667	5.7	2.7
Levee Lowering	14,800	2,630	4.2	1.3
Levee Breaches and Excavations and Pilot Channels	49,400	37,460	9.1	8.0
Total	**83,800**	**50,757**	**19.0**	**12.0**

Note: 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.

AECOM 2016

Table 11. Estimated Fill Volumes and Areas by Location

LOCATION	VOLUME (CUBIC YARDS)	VOLUME BELOW HTL (CUBIC YARDS)	TOTAL FOOTPRINT AREA (ACRES)	FOOTPRINT AREA BELOW HTL (ACRES)
Island Ponds	25,500	25,500	6.6	6.6
A8 Ponds	179,000	174,000	24.6	23.9
Mountain View Ponds	327,640	243,670	52.8	46.4
Ravenswood Ponds	310,300	164,190	41.9	27.8
Totals	**842,440**	**607,360**	**125.9**	**104.8**

Note: 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.

AECOM 2016

Table 12. Estimated Fill Volumes and Areas by Purpose

PURPOSE	VOLUME (CUBIC YARDS)	VOLUME BELOW HTL (CUBIC YARDS)	TOTAL FOOTPRINT AREA (ACRES)	FOOTPRINT AREA BELOW HTL (ACRES)
Levee Improvement	298,900	98,460	32.5	16.8
Habitat Island	53,500	40,600	5.1	5.1
Habitat Transition Zone	462,600	441,300	81.1	75.9
Ditch Blocks & Placement of Re-used Levee Material	26,500	26,500	6.9	6.9
Structures (Water Control and Bridges)	940	500	0.2	0.2
Totals	**842,440**	**607,360**	**125.9**	**104.9**

Note: 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.

AECOM 2016

The total areas and volumes presented in **Tables 9 through 12** do not include these PG&E totals (see **Table 23**). They have been kept separate for the purposes of the project description, **Tables 13** and **14** present the lengths and areas of new public access features by pond cluster location. As all of these

features would be placed onto existing ground or onto levees that would be enhanced regardless, these features add negligible amounts of new cut or fill areas or volumes. **Table 15** includes a summary of the area of the structures, including the water control structures and the bridge details.

Table 13. SBSP Phase 2 - Recreational Features: Trails

LOCATION	LENGTH (FEET)	AREA (SQUARE FEET)
Island Ponds	NA	NA
A8 Ponds	NA	NA
Mountain View Ponds*	8,380	133,120
Ravenswood Ponds	2,750	38,500
Total	**11,130**	**171,620**

*Note: Mountain View Pond totals include installing new trails and replacing existing trails
AECOM 2016

Table 14. SBSP Phase 2 - Recreational Features: Viewing Platform Footprints

LOCATION	AREA (SQUARE FEET)
Island Ponds	NA
A8 Ponds	NA
Mountain View Ponds	3,170
Ravenswood Ponds	9,960
Totals	**13,130**

AECOM 2016

Table 15. SBSP Phase 2 Structures Areas by Type

STRUCTURE	AREA (SQUARE FEET)
Water Control Structures	6,770
Bridges	2,270
Total	**9,040**

AECOM 2016

6.3 Beneficial Uses

The waterbodies affected by the project have various beneficial uses as identified in the San Francisco Basin Water Quality Control Plan, or Basin Plan. The primary beneficial uses that the project may impact include estuarine habitat, fish migration, preservation of rare and endangered species, wildlife habitat, water contact recreation and noncontact water recreation.

Impacts associated with the dredge and fill activities of the project may affect fish and wildlife species that are listed as threatened or endangered under the federal Endangered Species Act or California Endangered Species Act including steelhead, green sturgeon, longfin smelt, salt marsh harvest mouse, California Ridgway's rail, western snowy plover, and California least tern. Project activities are not expected to jeopardize the continued existence of the federally or state-listed species and thus would not impact the overall beneficial use of the water bodies. Through Avoidance and Minimization Measures, outlined in Box 19, short term impacts to wildlife habitat, fish migration and protected species, would be minimized to the maximum extent practicable. The long-term increase in tidal marsh habitat would create a net benefit to most listed species and their habitat. There will be a permanent loss of western snowy plover habitat from Phase 2 operations at the Ravenswood ponds. However, while western snowy plover nesting habitat would no longer be available in Ponds R4, R5 and S5, other ponds within the SBSP Restoration Project such as Eden Landing, Warm Springs, and Ravenswood Pond R3 would be managed intensively for the species. Overall the SBSP project would result in greater beneficial improvements to the landscape given the conversion of lower quality habitat to higher quality aquatic and wetland habitat that can support greater biodiversity.

The recreational beneficial uses of the affected water bodies would greatly benefit from the project as several project components include improving public access. Construction of viewing platforms and trail connections will provide greater access to the project area and allow the public to benefit from having a natural wetland habitat to view local flora and fauna. Interpretive signage would provide information to enhance the public's viewing experience of the natural landscape.

6.4 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 Bay Regional Board 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 Regional Board.

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

6.4.1 Alviso-Island Pond Cluster

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

6.4.1.1 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 Coyote Creek Lagoon Trail that connects to the northeast corner of Pond A19 via a small footbridge. Construction crews would typically consist of fewer than a dozen people.

6.4.1.2 Construction Staging Areas

No staging areas are necessary for stockpiling at the Island Ponds. Most equipment used for construction would stay within the project footprint, and no fill material would be brought into the Island Ponds. However, a small staging area northeast of Pond A19 would be provided during construction for vehicles and equipment.

6.4.1.3 Levee Breach and Channel Excavation

All levee modifications – including adding new breaches, widening an existing breach, 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.

6.4.1.4 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 initial compaction and a vibratory hand tamper or a roller would be used for compaction.

6.4.1.5 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.

6.4.2 Alviso-A8 Pond Cluster

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

6.4.2.1 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 Santa Clara Valley Water District uses these access roads to import material dredged from creek channels in Santa Clara County.

6.4.2.2 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 construction area along the southern border of Pond A8S.

6.4.2.3 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.

6.4.2.4 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.

6.4.3 Alviso-Mountain View Pond Cluster

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

6.4.3.1 Construction Access

Primary access to the project site would be from U.S. 101 via exits for major arterials. The first of those would be to the Pond A1 portion of the project using the North San Antonio Road exit, continuing north to Terminal Boulevard and then heading east onto the levee road between the Shoreline Park sailing lake and the Coast Casey Forebay. From there, the work areas along the Coast Casey Forebay, Charleston Slough, and Pond A1 would be accessible. A secondary route is available along the levee road that forms the western boundary of the Coast Casey Forebay. To reach the work areas at Pond A2W, the Rengstorff Avenue North exit would be used to leave U.S. 101 and head north, after which, Amphitheater Parkway, North Shoreline Boulevard, and Crittenden Lane would be used to reach the large levees and existing access roads around west of Stevens Creek and the northeastern corner of Shoreline Park.

The exact route(s) and timing used for material delivery are subject to modification due to City of Mountain View requirements for traffic control, Shoreline Park activities, and burrowing owl protection. The SBSP Restoration Project will develop the final haul routes in consultation with the City of Mountain View's traffic engineers to minimize potential traffic impacts.

Construction crews would typically consist of five to ten people. The pond cluster would likely be accessed by construction crews from U.S. 101, after which various arterial, collectors, and local streets provide access to Mountain View Shoreline Park and the ponds beyond it. Heavy vehicles would avoid crossing structures in the levees if the vehicle exceeds the weight-bearing capacity. If this is not possible, engineer-approved precautions would be taken to avoid damaging the structure.

6.4.3.2 Construction Staging Areas

Construction staging areas will be established within Mountain View Shoreline Park in coordination with City of Mountain View. The staging areas will be adjacent to the southern border of Pond A1 north of the sailing lake and east of the Coast Casey Forebay and adjacent to the southern border of Pond A2W west of Stevens Creek Marsh in upland areas alongside existing roads and trails, as shown on project plan sheets.

6.4.3.3 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 approximately 6-inch-thick lifts and compacted either through a vibratory hand tamper or a roller to achieve approximately 90 percent compaction for the A1 west levee and 95 percent compaction for the Coast Casey Forebay levee. 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. After levee improvement operations, the A1 levee north of the viewing platform would be hydroseeded with a native plant mix.

Levee crests destined for trail access would be finished with an approximately 12-inch-thick layer of aggregate base 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. 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. There are sixteen (16) transmission towers within Pond A2W that will need to be raised to account for the tidal influx from converting the pond to tidal marsh habitat. Multiple towers will be worked on at the same time from each side of the boardwalks. All structures would require adding concrete to existing concrete foundations to a greater height of up to 4 feet above the existing structure footing. Cofferdams will be constructed around each foundation at low tide and then dewatered. Concrete will be poured into forms within the dewatered cofferdams and then all temporary structures will be removed once construction is complete. Construction details for this work are provided in Appendix A.

6.4.3.4 Habitat Islands

The material for the habitat islands would be placed by long-reach excavators working from the existing levees or by using an excavator and small barges in the pond to move and place material. Material would be delivered by haul trucks to the working locations. A water truck will be used for dust control of delivered material, if necessary. An excavator would place and moderately compact 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, or similar appropriate material, to provide a barren land sight that is typically preferred by some nesting birds.

6.4.3.5 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.

6.4.3.6 Levee Breach and Channel Excavation

Breaching would be accomplished from the levee crests using excavators and hauling material to locations receiving fill for beneficial re-use in the project area. 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.

6.4.3.7 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 approximately 12.25 feet NAVD88. These bridges would include a 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/or 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. Eight 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 a vibratory and/or impact hammer.

6.4.3.8 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 Final Program EIS/R and 2016 SBSP Phase 2 Mitigation Measure 3.4-5a. The language from this Mitigation Measure follows.

6.4.3.9 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 Regional Board 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.

6.4.3.10 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 with decomposed granite.

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 the A1 west levee platform 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 metal and wood and placed on cast-in-place concrete footings. 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.

6.4.3.11 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.

6.4.4 Ravenswood Pond Cluster

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

6.4.4.1 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.

6.4.4.2 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. The Pond S5 forebay would be used for stockpiling before Pond S5 is hydraulically connected to Flood Slough. Material staging areas would not be located within the City of Menlo Park's Bedwell Bayfront Park.

6.4.4.3 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 Final Program EIS/R and 2016 SBSP Phase 2 EIS/R Mitigation Measure 3.4-5a.

6.4.4.4 Demolition of Existing Water Control Structures

Six existing water control structures in the Ravenswood Ponds would be removed. These remnant features of the former salt production infrastructure would be removed during construction. All associated support structures would be demolished and disposed off-site or recycled as appropriate.

6.4.4.5 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 high density polyethylene 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. Pile installation methods would include auguring, casting in place, and vibratory or impact driving, depending on seasonality of sensitive wildlife species nearby.

The water control structure connecting 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.

6.4.4.6 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 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.

6.4.4.7 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 approximately 6 inch-thick lifts and compacted either through a vibratory hand tamper or a roller to achieve approximately 90 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.

6.4.4.8 Levee Removal

Earth moving machinery including an excavator and loader would be used to remove most of the levees within and between Ponds R5 and S5. Removed material would be re-used on site to improve levees, fill borrow ditches, construct ditch blocks, or to construct habitat transition zones.

Portions of the internal levees between and within Ponds R5 and S5, with lengths of approximately 880 feet at the northern segment of the levee separating R5 from S5, 530 feet at the southern segment of that same levee, and at the S5 internal levee approximately 370 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 re-used to on site to improve levees, fill borrow ditches in Pond R4, or to construct habitat transition zones.

6.4.4.9 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..

6.4.4.10 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 initial compaction of material and a vibratory hand tamper or a roller would be used for compaction.

6.4.4.11 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 HTL 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.

6.4.4.12 Habitat Island

Habitat islands would be cleared, grubbed and fine graded before surface enhancements are installed. 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, or similar appropriate material, 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.

6.4.4.13 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 metal and wood and placed on cast-in-place concrete footings. 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.

6.4.4.14 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 beneficial re-use.

6.4.4.15 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.

6.5 Species-specific Construction Timing Considerations

At all four pond clusters, there are certain special-status species regulated by USFWS, NMFS, or CDFW that may be affected by construction activities. The presence of these species may limit construction activities or require certain avoidance and minimization measures. The pond-cluster-specific special-status species, as well as the limits and requirements for each species and their habitats, are addressed in the Conservation Measures of the SBSP Restoration Project's Final Program and Phase 1 EIS/R and permitting documents. These include the Biological Opinions from the National Marine Fisheries Service (NMFS) and the USFWS, the Clean Water Act Section 404 and 401 permits from the U.S. Army Corps of Engineers (USACE) and the Regional Board respectively, and the San Francisco Bay Conservation and Development Commission permit). This overview information is provided here as part of the project designs to help frame the construction sequences that follow. The timing considerations below will be incorporated into detailed designs and project planning to reduce the overall potential for adverse impacts and the need for mitigation.

- Bird nesting: Regulatory work windows for bird nesting typically run from February 1 through September 15. Work occurring within this window would implement approved avoidance and minimization measures including the presence of an approved biological monitor and preconstruction surveys.
- Steelhead migration: Activities that may potentially affect upstream migration of adults or downstream migration of juveniles would be avoided. This means avoiding work from December through February (adult upstream migration period) and from April through June (juvenile downstream migration period). If applicable, the NMFS acceptable work windows for steelhead are June through November; avoidance and minimization measures including the presence of an approved biological monitor may be required during this period.

- Longfin smelt and green sturgeon: There is potential for these species to be present year-round in the San Francisco Bay, therefore seasonal avoidance is not possible. Construction Schedule and Sequence

6.6 Construction Sequence and Schedule

6.6.1 Alviso-Island Pond Cluster

6.6.1.1 Construction Sequence

In each pond, the construction scenario would likely initiate levee removal from the farthest end of the construction access point along the perimeter levees and proceed toward the starting point of the access. The likely order of construction at the Island Ponds would be as follows:

1. Site preparation including clearing and grubbing of debris and vegetation from construction areas.
2. Lower Pond A19 south perimeter levee and widen the existing western breach.
3. Remove Pond A20 east perimeter levee, leaving some high portions.
4. Remove Pond A19 west perimeter levee, leaving some high portions.
5. Lower and make two breaches in Pond A19's north perimeter levee, leaving some high portions.

6.6.1.2 Construction Schedule

The construction schedule would be affected by species windows, weather conditions, earthwork quantities, and land disturbance. Construction is expected to begin in the second half of 2017. A preliminary estimate shows that construction would likely be completed in approximately 4 months over a single construction season. This estimate assumes that USFWS would permit heavy construction activities to occur during the bird-nesting window using avoidance and minimization measures including the presence and direction of a biological monitor.

6.6.2 Alviso-A8 Pond Cluster

6.6.2.1 Construction Sequence

This part of the project would include:

1. Site preparation including clearing and grubbing of debris and vegetation from construction areas.
2. Placement of imported fill material into the southern corners of the A8 Ponds (Figure 4). This placement may involve brief stockpiling of material along the existing levee roads and bare ground prior to placement and subsequent compaction.
3. Hydroseeding habitat transition zones to establish native vegetation.

6.6.2.2 Construction Schedule

The project is anticipated to begin the second half of 2017, depending on the material available for use in the Alviso-A8 Ponds or in other Phase 2 project ponds. If sufficient quantities of material are available, construction of habitat transition zones would take approximately 12 months over 2 construction seasons.

6.6.3 Alviso-Mountain View Pond Cluster

6.6.3.1 Construction Sequence

Construction operations would occur either simultaneously at both ponds, or would proceed in tandem. Earthwork activities would be sequenced such that operations which are more efficient and feasible to

perform during the dry season, such as working on levee tops, would be completed first. Levee lowering and breaching along the outer bounds of the ponds that are designed to establish hydraulic connection with adjacent sloughs would be performed after all the internal pond activities are completed. Construction of habitat islands and habitat transition zones would be performed prior to breaching the perimeter levees. Breaching would not occur until all necessary flood control components and in-water habitat enhancement features are completed.

The likely order of construction at the Mountain View Ponds would be as follows, though availability of upland material for various actions could alter the sequence:

1. Site preparation including clearing and grubbing of debris and vegetation from construction areas.
2. Raise and improve Pond A1 western levee.
3. Construct trail on Pond A1 western levee to viewing platform.
4. Raise the Coast Casey Forebay levee to 17 feet; make other required improvements to existing Mountain View infrastructure (pump station access, etc.).
5. Rebuild the portion of trail (part of the Bay Trail spine) that is currently on top of the Coast Casey Forebay levee.
6. Modify the access to the existing viewing platform at the southern end of Charleston Slough.
7. Construct PG&E tower and boardwalk improvements around Pond A2W (must be completed prior to levee breaching).
8. Construct habitat transition zones and habitat islands (must be completed prior to levee breaching).
9. Breach perimeter levees at Ponds A1 and A2W.
10. Install cofferdams and construct bridges on eastern levee of Pond A2W.
11. Construct public access trail and viewing platform on eastern levee of Pond A2W.
12. Install viewing platform in Mountain View Shoreline Park and viewing platform on Pond A1 west levee.
13. Install gates at necessary locations along levees.

6.6.3.2 Construction Schedule

The construction schedule would be affected by seasonal work restrictions to avoid impacts to protected species, weather conditions, earthwork quantities, and land disturbance. Construction is expected to begin in the summer or fall of 2017.

Construction would likely be completed in approximately 29 months over 4 construction seasons. This estimate is based on the assumption that some heavy construction activities would be permitted to occur during the restricted work window for nesting bird habitat under implemented avoidance and minimization measures including the presence of a biological monitor.

6.6.4 Ravenswood Pond Cluster

6.6.4.1 Construction Sequence

Earthwork activities would be sequenced such that activities which would be efficient to perform in dry conditions would be completed first. These activities include levee improvements, installation of hydraulic controls, pilot channel excavation, and internal levee lowering. Levee lowering and breaching along the outer bounds of the ponds designed to establish hydraulic connection with adjacent sloughs would be performed after the internal pond activities are completed. Once sufficient upland fill material to complete initial construction plans for habitat transition zones and levee improvements is in place, additional material would be accepted as available to expand the habitat transition zones or to raise or

improve flood risk management further. Breaching would not occur until all necessary flood control components and in-water habitat enhancement features are completed.

The likely order of construction at the Ravenswood Ponds would be as follows, though availability of upland material for various actions could alter the sequence:

1. Mobilize to site, conduct clearing and grubbing (vegetation removal), and demolish existing derelict water control structure.
2. Import material and improve levees along the All-American Canal and along the eastern levees of Ponds R5 and S5.
3. Construct and hydroseed habitat transition zones along (1) the western edge of Pond R4 levee; and (2) the northern side of the All-American Canal.
4. Modify central portion of levee between Ponds R5 and S5 with gravel, sand, and shells in preparation for its use as a habitat island.
5. Remove unmodified parts of internal levees between Ponds R5 and S5 and within Pond S5, as described above.
6. Install external water control structures (i.e., between R3 and Ravenswood Slough; between S5 forebay and Flood Slough).
7. Excavate pilot channels in Pond R4.
8. Build ditch blocks in Pond R4's borrow ditches
9. Install internal water control structures (i.e., between Pond R3 and Pond S5; between Pond R4 and Pond R5).
10. Build public access trail along improved R5/S5 eastern levees.
11. Install viewing platform on new public access trail.
12. Lower Pond R4 levee near Greco Island.
13. Breach Pond R4 levee at its northeastern corner.
14. Install fencing along southern border of pond cluster and gates at necessary locations.

6.6.4.2 Construction Schedule

The construction schedule would be affected by seasonal work restrictions to avoid impacts to protected species, weather conditions, and volume of earthwork quantities to be moved. Several hundred thousand cubic yards of material would need to be imported and either placed immediately or stockpiled at the site.

Although, it is assumed that the ponds would be sufficiently dry during the beginning of the construction season and that active draining or dewatering of pond bottoms would be unnecessary, limited installation of cofferdams and dewatering of small portions of the pond would be necessary for installing water control structures.

Construction is expected to begin in the summer or fall of 2017. Some of the construction activities could take place concurrently or in tandem, with multiple crews to achieve project goals. A preliminary estimate shows that construction would be completed over approximately a 16-month period over 2 construction seasons, assuming fill upland material would be available. This estimate is based on the assumption that some heavy construction activities would be permitted to occur during the restricted work window for nesting bird habitat under implemented avoidance and minimization measures including the presence of a biological monitor

6.7 Operations and Maintenance

6.7.1 Alviso-Island Pond Cluster

Aside from the monitoring and management activities of the SBSP Restoration Project Adaptive Management Plan (AMP) (available as Appendix D of the 2007 Final Program EIS/R) and continued maintenance of the existing UPRR track, no other O&M activities would occur at the Island Ponds. The existing and newly proposed breaches would scour from hydraulic action and would gradually widen until equilibrium with the tidal flux is reached. Most levees would be allowed to degrade naturally; however, the levee containing the existing railroad track would be maintained by the UPRR to allow the continued use of the tracks. Ongoing monitoring and studies to track the progress of these ponds toward restoration as tidal marsh would be a component of the continued implementation of the AMP.

6.7.2 Alviso-A8 Pond Cluster

The USFWS would continue to operate and maintain the ponds in accordance with various Refuge O&M permits, the AMP and other ongoing management practices that have been in place since the implementation of Phase 1 actions. Phase 2 would not involve changing these ongoing management practices during or after the construction activities described above. The habitat transition zones that would be placed in Phase 2 may occasionally need maintenance such as removing invasive plant species, which would be performed in accordance with existing Refuge policies and practices for doing so.

6.7.3 Alviso-Mountain View Pond Cluster

Operations and maintenance activities would continue to follow and be determined by various Refuge O&M permits, applicable county operations, and the AMP. PG&E would continue to operate and maintain its infrastructure, which would occur in coordination with the Refuge managers to ensure consistency with the operations and maintenance of the pond cluster. The City of Mountain View would continue to operate and maintain its properties that are adjacent to the pond cluster, and these activities would also occur in coordination with the Refuge managers.

Periodic maintenance of the pond infrastructure would be required following construction. Maintenance activities would require a maintenance staff person to travel to the pond cluster one or two times a week to perform activities such as predator control, invasive plant control, and vandalism repairs. AMP monitoring activities would also occur, which would require additional workers (e.g., staff, consultants) to access the pond clusters. The frequency of visits to the pond cluster to conduct AMP monitoring activities would depend on the actual activities and would vary by season (e.g., during the bird breeding season there may be more trips to the site than during the non-breeding season).

The improved western levee of Pond A1 would require ongoing levee maintenance because it would provide flood risk management, and the north and east levees of Pond A2W would be maintained for PG&E and trail access. This ongoing levee maintenance would continue in consistency with USACE permit #2008-00103S. These levee maintenance activities could include occasional placement of additional earth on top of, or on the sides of, the levees as the levees erode or subside, with the level of settlement dependent on geotechnical considerations. In general, pond levees that are improved to provide flood risk management would likely exhibit the greatest degree of settlement. Levees that require erosion control measures would also require routine inspections and maintenance.

The northern perimeter levee, eastern levee, northern portion of the western perimeter levee at Pond A1, and the western levee of Pond A2W would not be maintained and would be allowed to degrade naturally. The eastern and northern levees of Pond A2W would be maintained for PG&E access. The eastern levee of Pond A2W would also be maintained for recreational public access on the trail atop it.

Improved levees would be inspected and maintained for slope stability, erosion control, seepage, slides, and settlement on an annual basis. Maintenance is expected to occur every 5 years to add additional fill material in areas where settlement occurs. Most of the maintenance would be accomplished during low tides and from the levee crest.

Maintenance of the habitat islands may require weed/vegetation removal as often as quarterly and the placing of fill material (sand, gravel, and/or oyster shells) before the onset of the nesting period in some years. Habitat islands would also be periodically examined for erosion.

Maintenance of habitat transition zones would include inspections and maintenance for slope stability, erosion control, seepage, slides, and settlement on an annual basis. As necessary, vegetation removal would occur to prevent colonization by invasive species. Fill material would be placed, when needed, to respond to areas where erosion is observed. Additional maintenance activities may also be a need to address an AMP-specified management trigger.

Public access and recreation features would be maintained as needed to keep trail surfaces safe and accessible. There would be a need for trash removal along trails and more intensely at staging areas and trailheads. The viewing areas would be designed to minimize maintenance by utilizing durable and sustainable materials as much as possible to prevent degradation and the need for repeated maintenance. These would need to be checked periodically for defacement of interpretive boards and other forms of vandalism.

Access bridges placed in publicly accessible areas such as city streets and highways must be visually inspected every 2 years and a report on their condition may be required every 5 years. Because there would be a public access trail along the eastern levee of Pond A2W, the two bridges over the breaches there would need to be visually inspected and reported on as described.

The proposed bridges and the concrete abutments with wing walls at both ends of the bridge would be basically maintenance free for the design life cycle of 50 to 75 years. The bridges' superstructures include main span girders, a lateral bracing system, deck slab systems, and a safety railing would need basic erosion protection maintenance work every few years. These activities may include sanding, cleaning, and re-painting as needed, which are common activities for all steel structures permanently exposed to weather.

The PG&E towers, boardwalks, and power lines would be maintained in accordance with PG&E's current practices, which are described in the April 2016 SBSP Restoration Project Phase 2 Final Program EIS/R, Appendix D. The maintenance of Pond A2W's eastern and northern levees and the construction of new and improved boardwalks for PG&E's use would continue to provide the necessary access at the current levels.

6.7.4 Ravenswood Pond Cluster

Operations and maintenance activities for the components of the pond clusters within the Refuge would continue and be determined by various Refuge O&M permits, applicable county operations, and the AMP. The City of Menlo Park would continue to operate and maintain its properties that are adjacent to the pond cluster, in coordination with the Refuge managers.

Periodic maintenance of the pond infrastructure would be required following construction. Maintenance would require a staff person to travel to the pond cluster one or two times a week to perform activities such as water structure control operation, invasive plant control, and vandalism repairs. In addition, AMP monitoring activities would occur, which would require additional workers (e.g., staff, consultants) to access the pond clusters. The frequency of visits to the pond clusters to conduct AMP monitoring

activities would depend on the actual activities and would vary by season (e.g., during the bird-breeding season, there would be more trips to the site than during the non-breeding season).

Ongoing levee maintenance would continue for existing levees that provide flood risk management (as part of the O&M activities described above and in consistency with USACE permit #2008-00103S). Levee maintenance activities would include the placement of additional earth on top of or on the pond side of the levees as the levees subside, with the level of settlement dependent on geotechnical considerations. In general, pond levees that are improved to provide flood risk management would likely exhibit the greatest degree of settlement. Levees that require erosion control measures would also require routine inspections and maintenance. The northern perimeter levee at Pond R4 would not be maintained and would be allowed to degrade naturally.

Improved levees would be inspected and maintained for slope stability, erosion control, seepage, slides and settlement on an annual basis. Maintenance is expected every 5 years to add additional fill material in areas where settlement occurs. Most of the maintenance work can be accomplished during low tides and from the levee crests.

Water control structures would require inspection for structural integrity of gates, pipes, and approach way; obstruction to flow passage and preventative maintenance such as visual functionality of gates, seals; and removal of debris. Inspection would be required every month through the first year and semi-annually thereafter. Maintenance would be required on an annual basis. O&M activities would be conducted during low tides in Pond R4 and sloughs and by maintaining low storage conditions in the managed ponds.

Maintenance of habitat transition zones would include inspections and maintenance for slope stability, erosion control, seepage, slides, and settlement on an annual basis. As necessary, vegetation removal would occur to prevent colonization of invasive species. Fill material would be placed, when needed, to respond to areas where erosion has been observed. Maintenance activities would also be dictated by the AMP if an AMP management trigger is reached, especially a trigger related to a biological resource (e.g., salt marsh harvest mouse) that would utilize habitat transition zones as habitat.

Maintenance of public access and recreation features would address both viewing platforms and trail maintenance. The viewing areas would be designed to minimize maintenance utilizing durable and sustainable materials as much as possible to prevent degradation and the need for repeated maintenance. All features would be checked periodically for defacement of interpretive boards and other forms of vandalism. The eastern levees of Ponds R5 and S5 would also be maintained for recreational public access on the trail atop it. Trash removal would take place as needed along trails and at staging areas and trailheads.

Operations and maintenance of water levels in Ponds R3, R5, and S5 would be managed as follows:

- The water levels in Ponds R5 and S5 would be actively managed year-round by opening and closing the water control structures as needed to maintain desired surface elevations, flows, and water quality. The salinity of these ponds would also be somewhat controlled through the use of the water control structures. USFWS Refuge staff would operate the water control structures and provide maintenance and cleaning as needed.
- The water levels of Pond R3 would be actively managed using one new water control structure to provide for the improvement of the existing western snowy plover habitat in Pond R3. USFWS Refuge staff would operate all of the water control structures and provide maintenance and cleaning as needed.

7 Box 16 (Avoidance of Impacts)

7.1 Benefits of the Proposed Action

In addition to the following text, please see the response to Box 14, as the project's purpose and need also outline the project's benefits.

The SBSP Restoration Project, of which the Phase 2 Project is a component, is the result of extensive planning and screening of potential options. The long-term goal of the project is to produce a natural, self-sustaining habitat that can adjust to naturally occurring changes in physical processes with minimum ongoing intervention. This goal would be met by designing and engineering a restoration project that would restore tidal marsh in a way that would maximize wildlife habitat diversity while maintaining flood protection and adding public access features.

The proposed fill and discharge necessary to achieve these goals have been designed to maximize beneficial environmental effects and increase the quality and amount of aquatic habitat on the site compared to existing conditions. The proposed fill and discharge would result in a very small impact in terms of lost total Waters of the State (i.e., where the uppermost portions of the habitat transition zones, islands, and raised levees would be above HTL). These impacts would occur primarily to areas that are relatively poor quality, have little topographic variation, diversity in vegetation (horizontal or vertical) and are (at least in some cases) significantly hydrologically altered from ideal tidal conditions. However, the overall quality and ecological value of the aquatic habitat in SBSP Restoration Project Phase 2 area would increase substantially because the overwhelming majority of the change would be from open waters to tidal marsh wetlands and/or from seasonally dry salt pannes (currently unavailable to aquatic species) to tidal marsh wetlands and enhanced managed ponds. These changes are further designed and expected to increase the South Bay's resilience to sea-level rise and the higher tides expected in the coming decades.

Therefore, implementation of the project would result in a less adverse impact on the aquatic ecosystem than the No-Project Alternative. It would also result in a more beneficial and sustainable shoreline than other project alternatives that did not include such extensive transition zones and levee improvements.

7.2 Construction Minimization Measures

The following 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 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 California Department of Fish and Wildlife.
- Salt Marsh Harvest Mouse: Avoidance and minimization measures for potential impacts to ESA listed salt marsh harvest mouse 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.

7.3 Alternatives

A number of alternatives were initially developed and included in a screening process to refine a set of alternatives for inclusion in the Draft EIS/R and in the conceptual designs. The Alternative Development, Screening, and Analysis Report explains these initial alternatives, the components that constitute them, and the intentions or purposes behind them. The Alternative Development, Screening, and Analysis Report also explains the screening criteria and processes by which these alternatives were considered but eliminated from further review.

Since the development of the Phase II at the Refuge EIS/R, an Alternatives Analysis Report in compliance with Section 404(B)(1) of the Clean Water Act was prepared and provided to the USACE. The Alternative Analysis Report was prepared consistent with the specifications of the *Guidelines for Specification of Disposal Sites for Dredge and Fill Material.* The proposed project's preferred alternative was determined to be the Least Environmentally Damaging Practicable Alternative. The report is provided as **Appendix B.**

8 Box 17 (Environmental Documents)

Permits, including the *Waste Discharge Requirements* and amendment adopted by the San Francisco Bay Regional Board, acquired for SBSP Programmatic, Phase 1, and Operations and Maintenance work were acquired and are available for review at the SBSP Restoration Project website (www.southbayrestoration.org/documents/permit-related).

For the Phase 2 at the Refuge, various technical information that may be helpful to staff in evaluating the project are available on the internet and contained in this document. Specifically a Wetland Delineation Report, Geotechnical Investigation Report and a Restoration Design Memo for each site have been prepared for the project. The Wetland Delineation Report and the USACE jurisdictional determination are available in **Appendix C**. Many of the other technical reports are available on the South Bay Salt Pond website at: http://www.southbayrestoration.org/documents/technical/.

9 Box 18 (Dredge and Fill Information)

9.1 Dredge and Fill Actions – Volumes and Areas

The project will result in impacts to wetlands, and open water bodies (including un-vegetated pannes). Depending on the project activity, the nature and material to be placed in the Waters of the State varies. Descriptions of the various activities and material that will be used have been provided above in Box 15. A summary of the project impacts by complex/cluster is provided in **Box 15** above. Design details and map of each of the proposed dredge and fill activities are provided as **Figures 8a through 8d**. The figures also show jurisdictional wetlands, Other Waters of the State as well as uplands. The impacts are summarized by location and purpose in this Box and discussed further in Boxes 15 and 19.

Tables 16 through 22 provide details about the specific dredge and fill actions associated with the project and includes volumes and areas within Section 401 jurisdiction below the HTL. These tables include the amount and type of material that will be discharged / dredged at each impact location. A Map ID number is assigned to each dredge or fill action and can be referenced in **Figures 8a through 8d**. Impacts to linear features such as streams or waterways are presented in terms of the linear feet (LF) affected and area (acres). Dredging impacts are quantified in terms of both cubic yards (cy) and surface area (acres) and included in the applicable Estimated Cut Volumes, Lengths and Acres (by location). Fill impacts are quantified in cubic yards (cy) and surface area (acres) and are included in the applicable Estimated Fill Volumes and Areas.

All impacts from dredge and fill activities are considered permanent; however, as discussed further in **Box 19**, the permanent impacts primarily include conversion of Waters of the State from one type of system to another (generally from open water to tidal marsh) and would improve the overall health of the Bay by ultimately restoring, converting or creating intertidal and marsh habitat with the additional benefit of protection against sea level rise.

Table 16. Island Ponds - Estimated Cut (Dredge) Volumes, Lengths and Areas

CUT LOCATION	MAP ID	CUT PURPOSE	TOTAL CUT VOLUME (CUBIC YARDS)	NET CUT VOLUME BELOW HTL (CUBIC YARDS)	TOTAL AREA (ACRES)	AREA BELOW HTL (ACRES)
Pond A19	1	Northwest Levee Lowering	5,000	1,000	1.4	0.4
Pond A19	2	North Levee Lowering (Middle)	1,800	450	0.5	0.1
Pond A19	3	Northeast Levee Lowering	2,600	520	0.6	0.2
Pond A19	4	Southwest Levee Lowering	1,400	280	0.5	0.2
Pond A19	5	Southeast Levee Lowering	1,900	380	0.5	0.2
Subtotal		**Levee Lowering**	**12,700**	**2,630**	**3.3**	**1.0**
Pond A19	6	Southwest Levee Removal	1,400	467	0.4	0.2
Pond A19	7	Northwest Levee Removal	3,200	1,067	0.8	0.2
Pond A20	8	Northeast Levee Removal	1,400	467	0.4	0.2
Pond A20	9	Southeast Levee Removal	2,900	967	0.9	0.4
Subtotal		**Levee Removal**	**8,900**	**2,967**	**2.5**	**1.0**
Pond A19	10	Northwest Breach and channel	1,400	800	0.2	0.2
Pond A19	11	Northeast Breach and channel	1,000	230	0.1	0.1
Pond A19	12	South Breach Widening	1,500	560	0.2	0.2
Subtotal		**Levee Breaches**	**3,900**	**1,590**	**0.6**	**0.4**
Totals		**Existing Levee Fill Removed**	**25,500**	**7,187**	**6.4**	**2.4**

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 17. Island Ponds - Estimated Fill Volumes and Areas by Purpose

FILL LOCATION AND PURPOSE	MAP ID	VOLUME (CUBIC YARDS)	VOLUME BELOW HTL (CUBIC YARDS)	AREA BELOW HTL (ACRES)
Pond A19 - Northwest Breach – Ditch block 1	13	1,800	1,800	0.3
Pond A19 - Northwest Breach – Ditch block 2	14	1,900	1,900	0.3
Pond A19 - Northeast Breach – Ditch block 1	15	1,500	1,500	0.3
Pond A19 - Northeast Breach – Ditch block 2	16	1,400	1,400	0.3

Pond A19 - South Breach Widening – Ditch block 1	17	2,200	2,200	0.3
Pond A19 - South Breach Widening – Ditch block 2	18	2,200	2,200	0.4
Other Placed Levee Material	19	14,500	14,500	4.7
Total Fill		**25,500**	**25,500**	**6.6**

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 18. A8 Ponds - Estimated Fill Volumes and Areas by Purpose

FILL PURPOSE	MAP ID	TOTAL VOLUME (CUBIC YARDS)	VOLUME BELOW HTL (CUBIC YARDS)	TOTAL AREA (ACRES)	AREA BELOW HTL (ACRES)
Western habitat transition zone	20	94,100	91,500	12.1	11.7
Eastern habitat transition zone	21	84,900	82,500	12.5	12.2
Total		**179,000**	**174,000**	**24.6**	**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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Table 19. Mountain View Ponds - Estimated Cut (Dredge) Volumes and Areas

CUT LOCATION	CUT PURPOSE	MAP ID	TOTAL CUT (CUBIC YARDS)	VOLUME BELOW HTL (CUBIC YARDS)	AREA BELOW HTL (ACRES)
Pond A1	Northwest Breach	22	1,700	990	0.1
Pond A1	Southeast Breach	23	1,700	660	0.1
Pond A2W	Northwest Breach	24	2,400	660	0.1
Pond A2W	Southwest Breach	25	3,000	880	0.1
Pond A2W	Northeast Breach	26	1,100	330	<0.1

Pond A2W	Southeast Breach	27	2,200	1650	0.2
Subtotal	**Mountain View Pond Breaches**		**12,100**	**5,170**	**0.7**
Pond A1 (Coast Casey Forebay)	Shear Key Excavation	28	3,100	3,100	0.7
Totals			**15,200**	**8,270**	**1.3**

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

FILL PURPOSE	MAP ID	TOTAL VOLUME (CUBIC YARDS)	VOLUME BELOW HTL (CUBIC YARDS)	TOTAL FOOTPRINT AREA (ACRES)	FOOTPRINT AREA BELOW HTL (ACRES)
Coast Casey Forebay Levee Improvement	29	27,400	12,050	2.3	1.5
Pond A1 West Levee Improvement	30	89,100	40,320	12.7	8.3
10 Habitat Islands	31	53,500	40,600	5.1	5.1
Bridge piles, abutments	32	540	100	0.1	0.0
Pond A1 Habitat Transition Zone	33	77,100	73,480	16.9	15.9
Pond A2W Habitat Transition Zone	34	80,000	77,120	15.7	15.7
Totals		**327,640**	**243,670**	**52.8**	**46.4**

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 21. Ravenswood Ponds - Estimated Cut (Dredge) Volumes, Lengths and Areas

CUT LOCATION	MAP ID	CUT PURPOSE	NET CUT (CUBIC YARDS)	VOLUME BELOW HTL (CUBIC YARDS)	TOTAL AREA (ACRES)	AREA BELOW HTL (ACRES)
Pond S5	35	Internal Levee Removal	2,500	1,000	0.5	0.2
Ponds R5/S5	36	North internal levee removal	4,100	3,900	1.5	0.9
Ponds R5/S5	37	South Internal Levee Removal	4,100	2,800	1.2	0.6
Subtotal		***Levee Removal***	***10,700***	***7,700***	***3.2***	***1.7***

Pond R4	38	Northwest Levee lowering	2,100	0	0.9	0.3
Pond R4	39	Northeast Breach	13,300	10,600	2.1	2.0
Pond R4	40	Pilot Channel	16,000	16,000	4.1	4.1
Pond R3	41	Water Control Channel	1,000	1,000	0.2	0.2
Totals			**43,100**	**35,300**	**10.4**	**8.2**

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 22. Ravenswood Ponds - Estimated Fill Volumes and Areas by Purpose

FILL PURPOSE	MAP ID	TOTAL VOLUME (CUBIC YARDS)	VOLUME BELOW HTL (CUBIC YARDS)	TOTAL AREA (ACRES)	AREA BELOW HTL (ACRES)
All American Canal and R5/S5 levee improvement	42	182,400	46,090	17.5	7.0
All-American Canal habitat transition zone	43	76,300	69,460	14.9	12.0
Bedwell Bayfront Park habitat transition zone	44	50,200	47,240	9.1	8.3
Ditch Block west of R4 Breach	45	1,000	1,000	0.3	0.3
Water Control Structures	46	400	400	0.2	0.2
Total		**310,300**	**164,190**	**41.9**	**27.8**

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.

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Table 23. Areas and Volumes of PG&E Infrastructure Actions

ITEM	TOTAL AREA (ACRES)	TOTAL VOLUME (CUBIC YARDS)	AREA BELOW HTL (ACRES)	VOLUME BELOW HTL (CUBIC YARDS)
Replace boardwalks in Pond A2W	0.3	187	0.1	37
Add new boardwalk outside of Pond A1	0.2	93	0.1	47
Enlarge concrete tower footings	<0.1	80	<0.1	40
Total	**0.5**	**360**	**0.2**	**124**

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

Figures 8a. Impacts to Wetlands and Waters of the State – Alviso-Island Ponds

Figures 8b. Impacts to Wetlands and Waters of the State – Alviso-A8 Ponds

Figures 8c. Impacts to Wetlands and Waters of the State – Alviso-Mountain View Ponds

Figures 8d. Impacts to Wetlands and Waters of the State – Ravenswood Ponds

9.2 Description of Dredge and Fill Actions

This section discusses the project activities that will result in dredge and fill activities in wetlands at each of the Phase 2 locations. **Block 15 – Proposed Activities** provides extensive discussion of the proposed activities, means and methods and construction sequencing and timing and should be referenced for additional information.

The project activities leading to impacts on Waters of the State are summarized in this section.

9.2.1 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.

Levee Breaches/Expanded Levee Breach/Armored Levee Breaches: 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. Two locations at Pond A2W on the western levee would have armored breaches to support bridges where access by levee roads would be maintained. Material from breaches would be used for levee enhancements, placed into the ponds and used to create ditch blocks or pond bottom to speed the return to marsh plain elevation.

While most of the breach activities would occur above the HTL, a portion of the breach would remove fill below HTL. In some instances, the breach would require excavation through outboard fringe marsh to connect a pond to active tidal channels (e.g., Coyote Creek or Mud Slough, Permanent Creek/Mountain View Slough, Charleston Slough, and Steven's Creek). Levee breaches would mostly result in the excavation of disturbed upland habitats, and would create new Waters of the State (within the existing levee). Impacts from the levee breaching operations to relatively small areas of high quality fringe marsh would occur during construction. However, in the long-term, these breaches would provide net benefits to aquatic and marsh ecosystem. The impacts associated with the breaching levees and expanding the existing levee breach would primarily occur to Waters of the State that currently provide limited function, are considered altered and are in poor condition. The project's net benefits from opening these areas to tidal influence at breach locations would outweigh the impacts to fringe marsh. These benefits include the restoration, or enhancement of tidal flows to the various ponds, and establishment of tidal marsh vegetation that would provide habitat for a number of wildlife species.

Removed Levees: At the Island Ponds and Ravenswood Ponds, levees would be lowered by scraping their tops down to the HTL elevation. Levee lowering would enhance habitat connectivity and provide transition of some locations to tidal marsh. Levee material would be used for levee enhancements, placed into the ponds and used to create ditch blocks or pond bottom to speed the return to marsh plain elevation.

At Island Ponds, the majority of the two internal levees including the western levee of Pond A19 and the eastern levee of Pond A20 would be removed. The levees would be excavated to match the elevation of the surrounding marsh that exists between the two ponds. Remaining levees in this area would provide high-tide refuge for bird species.

At the Alviso Ravenswood ponds internal levees would be removed between Ponds R5 and S5 and within Pond S5. A portion of the levee between Pond R5 and S5 would be enhanced for bird nesting and would remain as an island within these connected ponds.

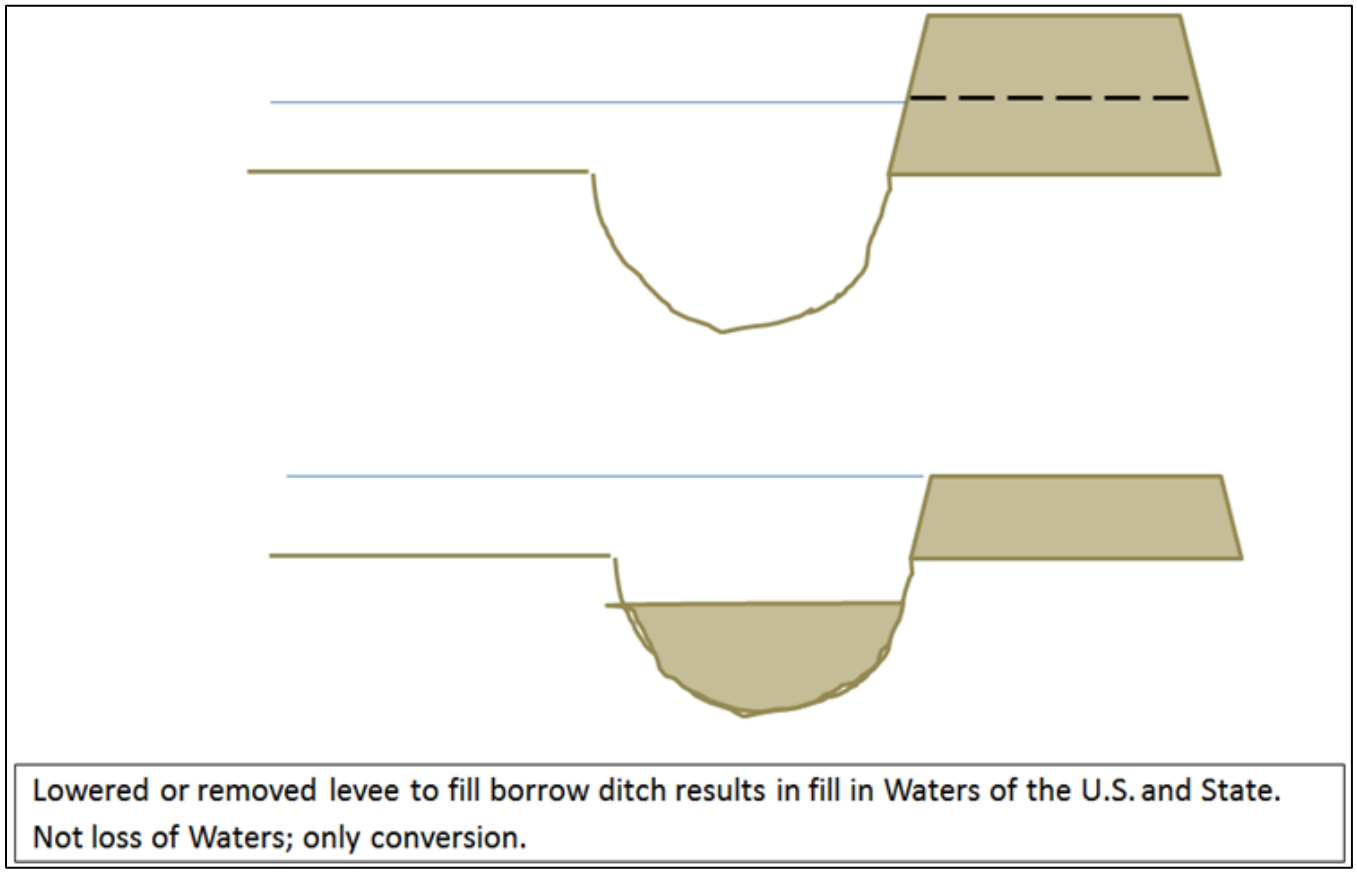
These activities would result in the excavation in Waters of the State. Ultimately, the excavated material would be deposited on-site to create ditch blocks (described below under Ditch Block), improve existing levees, enhance pond bottom topography or construct habitat transition zones.

Ultimately, levee removal impacts would result in the creation of Waters of the State - by removing fill material, and would convert Waters of the State, or modify open water depth such that it may result in a conversion of the type of system. Overall, these activities would result in net benefits to Waters of the State. The benefits at the Alviso-Island Ponds include the creation of aquatic and marsh habitats from upland levees, provide high-quality habitat for wildlife, and significantly increase habitat connectively between Ponds A19 and A20. At the Ravenswood Ponds, the levee removal would enhance conditions for most listed species.

Ditch Blocks. To create the existing salt production evaporation ponds, earth was piled in a mound around each pond's perimeter to establish a 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 inside 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 proposes the use of ditch blocks within the borrow ditches 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 (Figure 9). Fill material would be sourced from levee lowering, removal and breaching operations at each pond as well as from off-site sources.

Figure 9. Lowered or Removed Levees Used for Ditch Blocks



***Lowering Levees*:** At select locations, levees would be lowered by scraping their tops down to the local HTL elevation. Levee lowering would enhance habitat connectivity and provide transition of some locations to tidal marsh. Levee material would be re-used on-site for levee enhancements, placed into the ponds and used to create ditch blocks or pond bottom to speed the return to marsh plain elevation.

Areas where levees are lowered would provide flood storage and high tide refugia and roosting and nesting bird habitat. Levees would be lowered to or above the HTL and no impacts to Waters of the State associated with these activities are anticipated. In the long term, the lowered levees would be subject to natural forces, including wind, tidal action, erosion, and rising sea level. Ultimately, the lowered levees would naturally erode to marsh plain elevation and considered high functioning Waters of the State.

9.2.2 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 (USFWS 2013) and the recent Science Update to the Baylands Ecosystem Habitat Goals Project Report (Goals Project 2010). 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 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.

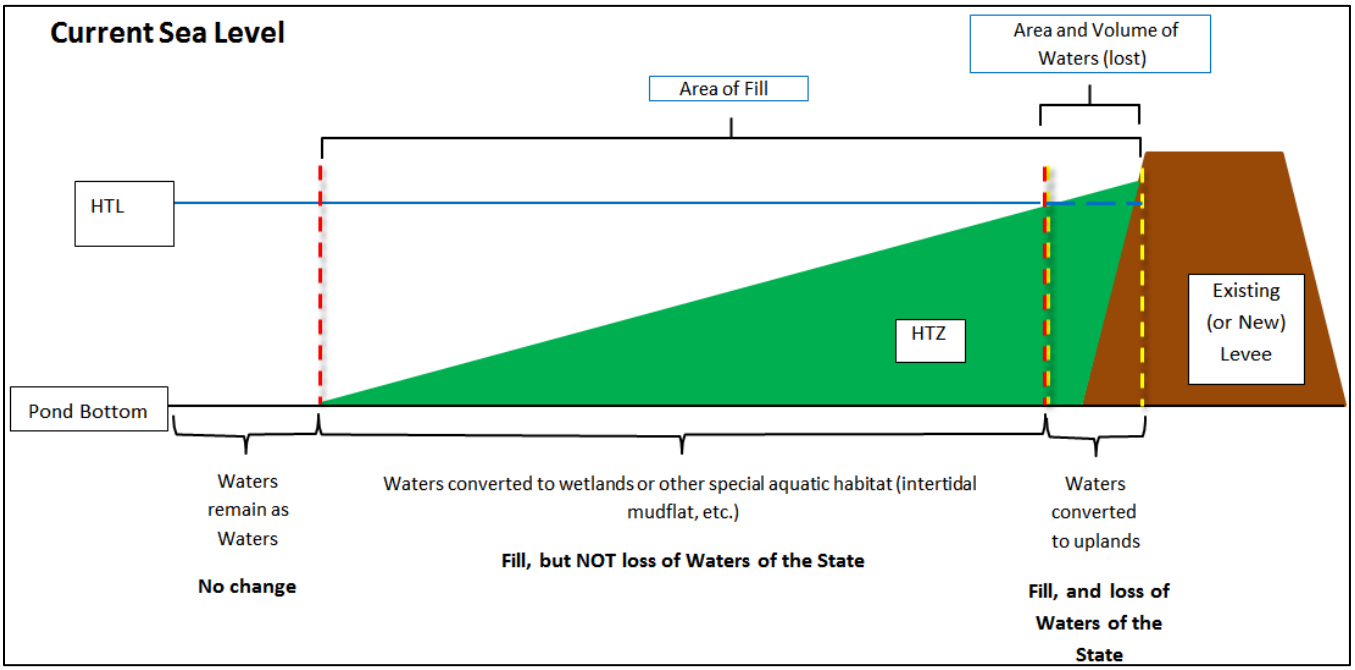
Habitat transition zones would be created at six locations including two at each of the following: Alviso-A8, Alviso-Mountain View and Ravenswood Pond Clusters.

The habitat transition zones would be constructed by placing fill material at the edge of existing levees and gently sloping down into the internal pond and compacting to approximately 70percent density to enable vegetation establishment. Establishing these habitat transition zones would require the placement of fill below and above the HTL. The slope of the habitat transition zones varies by location to provide a range of different slopes. 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.

The impacts associated with the habitat transition zone are mostly associated with the conversion of poor quality open waters to wetlands that will ultimately provide a wide range of intertidal and high marsh habitat (**Figure 10**). The source material used for the fill material would mostly be from off-site sources and would meet the standards found in the SBSP Restoration Projects Quality Assurance Project Plan (QAPP) as accepted by the Regional Board. Some fill material may be sourced on site from levee removal and lowering operations.

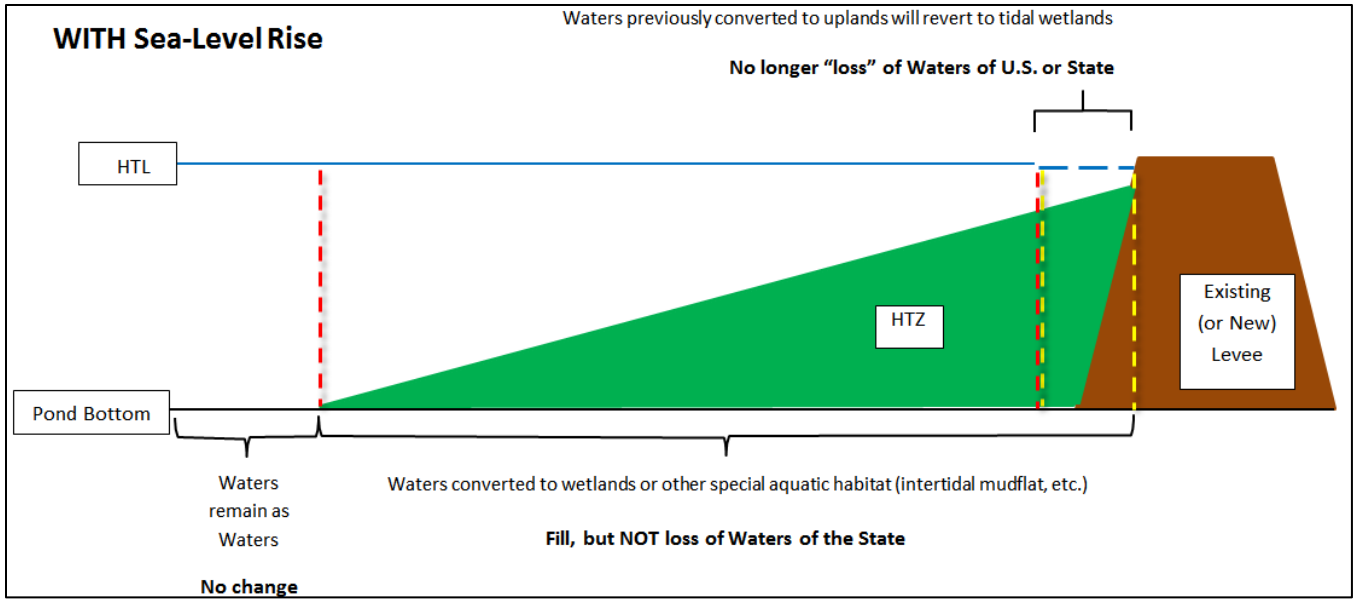
In the short term, these areas will be mudflat habitat until recruitment or planted vegetation is established. These conversion impacts will not result in any loss of Waters of the State, rather they would result in an increase to the quality of Waters of the State. These benefits include habitat complexity and diversity, erosion protection for the landfill and levees behind them, and 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 habitat transition zones would also provide a wide range of tidal marsh ecotone for a wide variety of common and listed species.

Figure 10. Habitat Transition Zone – Current Seal Level



Initially the upper extent of the habitat transition zone (e.g., high-water marsh) would convert open waters areas to uplands. With the anticipated sea level rise these “upland” areas will become intertidal marshes/Waters of the State (**Figure 11**). The impacts associated with these habitat transition zones would be adaptive to sea level rise and are necessary components to the potential long-term restoration goals. In the short term, they will provide additional benefits as high water refuge for a wide range of wildlife species.

Figure 11. Habitat Transition Zone – Sea Level Rise



Levee Improvement.

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.

At the Mountain View Ponds, levee improvements would occur in two distinct locations: along the west side of Ponds A1 and along the Coast Casey Forebay levee.

Levee improvements would require clearing of vegetation, debris, and grooving. Fill would be placed within both uplands and wetlands, with about half the total volume occurring within wetlands below the HTL adjacent to the existing levees. These activities would result in the loss of Waters of the State. Fill would be placed in 6-inch-thick lifts and compacted either through a vibratory hand tamper or a roller to achieve 90 percent compaction. Most material would be sourced from off-site excavation projects and would meet standards in the project's QAPP. On-site sources would include excavated material from levee lowering, channel excavation and breaching activities.

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. As the ponds transition to marsh, the island habitat would eventually become marsh mounds (possibly requiring active vegetation management), which have various ecological benefits as high-tide refugia and as focal points for further sediment aggregation and vegetation formation.

Impacts associated with the placement of fill material for the habitat islands, are similar to those described for the habitat transition zones. A portion of the fill below the HTL would convert open water to tidal marsh and provide wide range of habitat and ecological benefits. The portion of the habitat islands above the HTL would result in the loss of Waters of the State, with some portion being reclaimed by natural forces over time. For this project activity, the portion of the upland habitat islands

above the HTL are considered permanently filled, although in the long term these areas would likely become marsh mounds.

Bridges/Piles/Abutments. As briefly discussed under Levee Armored Breaches, at the western levee of Pond A2W, two single-span precast/prestressed I-girder bridges would be placed on top of cast-in-place concrete abutments across the armoured breaches. These would occur along the eastern levee of Pond A2W and would provide access to the existing PG&E utilities and well as the recreational to the viewing platform.

The installation of the two railcar bridges would occur after this levee is breached at these locations (creating new Waters of the State) and will result in permanent fill in those recently created Waters of the State. These impacts include fill from the abutment, piles, and other bridge infrastructure below the HTL.

PG&E Improvements

Because the project would restore tidal action to the Ponds, a number of upgrades to existing PG&E infrastructure within the Alviso-Mountain View Pond Cluster would be required. These improvements would provide upgrades to the existing tower footings, raise existing boardwalks and construct a new boardwalk. As part of the upgrades to existing facilities, some infrastructure would be replaced, resulting in the removal of existing fill and replacement with new fill materials. The footprint for the new boardwalk will result in new impacts on Waters of the State (Table 23). These project activities will be completed by a PG&E contractor in compliance with the regulatory permits issued to the Refuge.

Boardwalk Addition: The new boardwalks would be placed within the existing PG&E right-of-way (ROW), adjacent to the towers.

PG&E crews would manually drive the support footings into the Bay floor to an approximate depth of 12 feet. A small amount of mud would be displaced by the support footings. PG&E is proposing to use only plastic lumber or untreated wood for boardwalk installation. All work would be conducted by hand, and equipment used to install the boardwalks, including generators and chainsaws, will be mobilized to the boardwalk locations on foot.

The new boardwalk infrastructure below the HTL would result in the loss of Waters of the State. In addition, the new boardwalk will add shade the Bay but would not result in the net loss of Waters of the State.

Boardwalk Replacement: Within the Alviso-Mountain View Pond Cluster there are two existing PG&E boardwalks that would be replaced. PG&E crews would manually drive the support footings into the Bay floor to an approximate depth of 12 feet. A small amount of mud would be displaced by the support footings. PG&E is proposing to use only plastic lumber or untreated wood for boardwalk installation. All work would be conducted by hand, and equipment used to install the boardwalks, including generators and chainsaws, will be mobilized to the boardwalk locations on foot.

Existing footings would be removed (excavated) and new material would place fill in Waters of the State. Overall, these actions would result in a minimal net loss of Waters of the State.

Tower Foundation Improvements. Following the completion of boardwalk replacement and construction, foundation work would be performed on the footings of the towers in Pond A2W. All structures would require adding additional concrete to existing concrete foundations to a height of up to 4 feet above existing structure footing.

To upgrade the concrete foundations of the four legs of each tower, the following general steps would be taken: PG&E would construct a cofferdam around each of the footings, dewater the space between the cofferdam and the existing foundations, build a form for pouring additional concrete, pour the concrete, and remove the cofferdam. These activities would result in the temporary and permanent fill in the Waters of the State. Temporary impacts would occur from construction related actions including the construction of the cofferdam, and dewatering. The cofferdam and mats used for construction access would result in the temporary fill in Waters of the State. The dewatering and minor excavation around the edge of the existing footing would not result in net change Waters of the State, but it would result in a temporary loss of function to Waters of the State. The only permanent impacts would result from the added foundation material up to the HTL and boardwalk replacement and improvement; these impacts are quantified in Table 23.

Demolition of Existing Water Control Structures. Six existing water control structures in the Ravenswood Ponds would be removed. These remnant features of the former salt production infrastructure would be removed during construction. All associated support structures would be demolished and disposed off-site or recycled as appropriate. A small portion of the excavation would occur below HTL and within Waters of the State.

Pilot Channel Excavation. **Before levees at the Ravenswood Ponds are breached,** a pilot channel would be excavated to create and extend the former slough traces within Pond R4. The pilot channel would direct new tidal flows (introduced by the levee breach) into the interior of the pond. The impacts associated with the excavated pilot tide channel would be temporary and would not result in the net loss of Waters of the State or conversion of type. The pilot channel would be excavated within Waters of the State and would improve hydraulic connections would increase the potential for accretion of sediment both within Pond R4 and water for enhanced managed ponds R5 and S5. As a result, the temporary impacts that occur during construction would be offset by the long-term benefits of creation of large tidal marsh.

The moved material would be used to enhance levees, fill borrow ditches, and construct ditch blocks. 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.

Dewatering. Construction of the various project components may require use of cofferdam and dewatering. Specifically, dewatering may be required for the construction activities associated with the installation of armoured breaches, bridges, or water control structures (Alviso Complex and Ravenswood). Construction could occur in wet or dry conditions. 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 and may require the use of cofferdams. Pumped water would be discharged per the 2007 SBSP Program FEIS/R and 2016 SBSP Phase 2 FEIS/R Mitigation Measure 3.4-5a (provided in Section 6.4.3.10 of this application).

The installation of the cofferdams would result in the placement of temporary fill in Waters of the State. The cofferdam and associated dewatering activities would result in the temporary loss of beneficial uses and functions of Waters of the State. The cofferdam and dewatering activities would temporarily prevent water from entering the construction area. Water would be drawn down using a pump and any seepage will be removed on a regular basis. These activities would be done in accordance with the site SWPPP and established BMPs. Once construction is complete, the cofferdam will be removed, water will return to the area, and beneficial uses will be restored.

10 Box 19 (Mitigation)

10.1 Project Mitigation

The project would include minor impacts to Waters of the State by removing small amounts of Waters of the State or converting Waters of the State from one type (generally of poorer quality) to another type (of higher quality). The net change in the functions and values of the Waters of the State would be in some cases a small loss, while in other cases there would be a large net gain. The overall project would self-mitigate as the gain in a large amount of higher quality Waters of State would outweigh the small loss of poorer quality waters. A summary of impacts to Waters of the State are included in **Table 24 and 25** and are separated out by area and by volume, respectively. Waters of the State are broken down between jurisdictional wetlands (as identified by the USACE) and Other Waters of the State.

Table 24. 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 re-used levee material	2.35	-	2.35	-
A8 Ponds (A8 and A8S)				
Construct habitat transition zones	0.91	-	23	-
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	-	-	-	-
Breaching levees	-	0.55	-	0.14
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	-	19.03	-
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**

PHASE 2 ACTIVITIES	WETLANDS (ACRES)[1]		OTHER WATERS OF THE U.S. (ACRES)[2]	
	FILL	CUT	FILL	CUT

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.

Table 25. 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	-	6,000	-
Levee lowering/removal	-	5,037	-	560
Breaching levees	-	900	-	130
Widen breaches of southern levee	4,000	500	400	60
Other re-used levee 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	-	-	38,280	-
Raise and improve levees	17,457	3,100	34,913	-
Bridge piles/abutments	100	-	-	-
Breaching levees	-	4,136	-	1,034
Ravenswood Ponds (R3, R4, R5, S5)				
Excavate pilot channels	-	1,000	-	15,000
Levee improvement	7,682	3,850	38,408	3,850
Build ditch blocks	100	-	900	-
Construct habitat transition zones	11,670	-	105,030	-
Install water control structures	200	500	200	500
Breaching levees	-	3,533	-	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.

10.1.1 Loss of Waters of the State

A loss of Waters of the State would result from the construction of habitat transition zones at the Alviso and Ravenswood Ponds. As shown in **Figures 9** and **10** the habitat transition zones would be placed within open Waters of the State. While the majority of the impacts associated with habitat transition zones are associated with conversion (discussed below) as they gradually slope from the pond bottom to the levees, a small amount of open water habitat would be lost near the base of a levee. The total fill includes the amount of material that would be placed above the HTL and would result in a minimal loss of open water overall.

Taking sea level rise into consideration, the newly created uplands would, over time, likely exist below the HTL line and would be converted to wetland habitat. The small loss of open water associated with the habitat transition zones would also be a small loss of habitat for certain species. However, over time the extensive benefits would outweigh the loss by the overall improvements to the habitat conditions. This small loss of open water results in the creation and enhancement of beneficial uses including high tide refugia habitat, sea level rise adaptation and protection against levee failure.

Construction within active tidal waters may cause temporary habitat degradation due to increased turbidity and impaired water quality. Small areas of fish habitat would be lost due to fill, but much larger areas would be opened to tidal flow or enhanced by re-establishing full tidal action to some ponds and increasing habitat diversity. This will provide a larger net benefit to fish habitat overall.

10.1.2 Conversion of Waters of State

One of the main objectives of the SBSP project is to restore and enhance a mix of wetland habitats. Large swaths of the former industrial salt ponds meet the Regional Board's criteria for Waters of the State, 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, impacts to Waters of the State are required. However, the result of restoration activities would be the conversion of the current 128 acres of wetlands and 1,610 acres of open waters (not including the seasonal ponds and salt pannes at Ravenswood Ponds) 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 26**). The conversion of significant areas of open water salt ponds to new and enhanced tidal marsh wetlands is a conversion from one type of systems to another type of system, both of which are Waters of the State. This conversion is a major habitat gain, as there is a net increase in the amount and function and values provided. The increase in high quality tidal marsh wetlands (special aquatic sites) and enhanced managed pond habitat, from the conversion of a small amount of low functioning former industrial salt ponds, more than offsets the small amount of impacts required by the project. As a result, the overall project impacts should be considered self-mitigating through the project activities. Additionally sea level rise would likely convert the small losses of open waters to wetlands over time. These conversions,

while permanent in nature, would occur over time and under natural processes that ultimately will result in vegetated salt marsh, and increased biodiversity. Tidal influences within these converted types of systems would occur almost immediately following breaches of the levees. No off-site mitigation will be needed to offset the temporary and permanent impacts associated with the project.

Table 26. Project Impacts versus Project Benefits: Wetlands and Other Waters of the State Created by Project Activities

POND CLUSTER	POND	NOMINAL POND AREA (ACRES)[1]	CURRENT STATUS	EXISTING WETLANDS (ACRES)	IMPACTS TO WATERS OF THE STATE		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 RESTORA-TION (ACRES)	ENHANCED TIDAL MARSH RESTORA-TION (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	47	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	0	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			20	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			7	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	**2,235**	**n/a**	**128.0**	**105**	**12**	**929**	**321**	**900**		**2,019**	**16**	**1,122**

[1] This table presents standard pond areas excerpted from the 2007 SBSP Final EIS/R. 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 Waters of the State 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.

Areas may include wetlands that are located above HTL and so would not be reflected in Summary Tables above

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11 Box 22 (Public Notice, Adjacent Landowners)

Table 25 presents the Assessor's Parcel Numbers, owners' names, and mailing addresses of adjacent properties within 100 feet of the Phase 2 pond clusters. The USACE and the BCDC will provide notification to the landowners in the vicinity of the project.

Table 25. Adjacent Landowners within 100 Feet of SBSP Phase 2 Pond Clusters

ASSESSOR'S PARCEL NUMBER	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

Table 25. Adjacent Landowners within 100 Feet of SBSP Phase 2 Pond Clusters

ASSESSOR'S PARCEL NUMBER	OWNER	ADDRESS
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
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

Table 25. Adjacent Landowners within 100 Feet of SBSP Phase 2 Pond Clusters

ASSESSOR'S PARCEL NUMBER	OWNER	ADDRESS
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
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	Cargill Point LLC	Attention: Pat Mapelli Cargill Salt 7220 Central Ave Newark, CA, 945601

Table 25. Adjacent Landowners within 100 Feet of SBSP Phase 2 Pond Clusters

ASSESSOR'S PARCEL NUMBER	OWNER	ADDRESS
55400590	Cargill (formerly Leslie Salt Company)	Attention: Pat Mapelli Cargill Salt 7220 Central Ave Newark, CA, 945601

12 Box 24 (Other Projects)

The SBSP Restoration Project Final Environmental Impact Statement/Report for Phase 2 (Section 4.2.2 Cumulative Projects) (AECOM 2016) disclosed a detailed list of recently completed past projects, projects currently under construction, and probable future projects that would overlap with project construction and/or operation and that could impact the same resources and is provided here again for ease of reference (**Table 26).**. This table provides a brief description of the projects included in the cumulative impact analysis, their locations, their estimated construction schedules, related major roadways and waterways, and the potential cumulative impacts that could occur in combination with those of the proposed project. For future projects, the analysis was based on estimated construction schedules. Where construction schedules were unavailable, it was conservatively assumed that construction periods would overlap with the project, which would be constructed during the dry season over 3 years from 2016 to 2019.

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Ongoing Mosquito Abatement Projects							
Santa Clara County Mosquito Control	Aerial treatment to control for the breeding of salt marsh mosquitoes in the Alviso marshes and other nearby areas.	Santa Clara County, Mountain View Ponds and A8 Ponds	Ongoing	Interstate 880 (I-880), State Route (SR) 237	Guadalupe River, Alviso and Artesian Sloughs	Public health and vector management	No considerable contribution; project is considered in baseline analysis
Alameda County Mosquito Control	The county's mosquito control agency treats tidal pools and salt marshes with a larvacide to reduce mosquito populations.	Alameda County, Island Ponds	Ongoing	I-880	Coyote Creek, Alviso Slough	Public health and vector management	No considerable contribution; project is considered in baseline analysis
San Mateo County Mosquito Control	Technicians inspect marshes throughout the county on a weekly basis. When mosquito larvae are found, they are treated with biorational materials.	San Mateo County, Ravenswood Ponds	Ongoing	U.S. Highway 101 (U.S. 101)	Ravenswood Slough	Public health and vector management	No considerable contribution; project is considered in baseline analysis
Restoration Projects							
San Francisco Estuary Invasive Spartina Project	The Invasive Spartina Project has been implementing a coordinated, region-wide program comprising a number of on-the-ground treatment techniques to eradicate non-native invasive cordgrasses (*Spartina alterniflora* and its hybrids and S. densiflora, S. patens, and S. anglica). The project is focused within the nearly 40,000 acres of tidal marsh and 29,000 acres of tidal flats that constitute the shoreline areas of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma, and Sacramento Counties.	Bay Area, all ponds	Ongoing	Not applicable (NA)	San Francisco Bay	Hydrology, flood management, and infrastructure; water quality and sediment; biological resources; cultural resources	No considerable contribution; project is considered in baseline analysis

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Shoreline Study	The study assesses the need for flood protection in the South Bay, extends along South San Francisco Bay and includes the three pond complexes within the SBSP Restoration Project area as well as shoreline and floodplain areas in Alameda, San Mateo, and Santa Clara Counties.	South Bay, all Alviso ponds	Ongoing	I-880, SR 237, U.S. 101	Coyote Creek; Mud, Alviso, and Guadalupe Sloughs	Hydrology, flood management, and infrastructure; water quality and sediment; geology, soils, and seismicity; biological resources; recreation resources; cultural resources	No considerable contribution; project is considered in baseline analysis
Stanford Steelhead Habitat Enhancement Project	Stanford University is proposing to modify its existing water diversion and storage facilities at three locations: Felt Lake Reservoir, the diversion facility on Los Trancos Creek, and the diversion facility on San Francisquito Creek.	City of Palo Alto, Mountain View Ponds	Ongoing	NA	Felt Lake Reservoir, Los Trancos Creek, San Francisquito Creek	Hydrology, flood management, and infrastructure; water quality and sediment; biological resource; cultural resources	No considerable contribution; project is too far from project area
South Bay Salt Pond Restoration Project – Phase 2 at Eden Landing Ecological Reserve; Future project phases at all three pond complexes	Future SBSP Restoration Project phases at Eden Landing Ecological Reserve and other locations of this long-term, multi-phase project (the subject of this EIS/R) include a mix of tidal marsh and enhanced managed pond restoration activities, increased public access and recreation, and flood protection.	Bay Area, all ponds	Ongoing/ Planned	I-880, SR 237, SR 92, SR 84, U.S. 101	South SF Bay; Alameda County Federal Flood Control Channel; Old Alameda Creek; Coyote Creek; Stevens Creek; Mt. Eden Creek; Mud, Alviso, and Guadalupe Sloughs	Biological resources; hydrology; flood management; recreation resources; water quality	No considerable contribution; project will be implemented using the SBSP Restoration Project's AMP (as described in the 2007 Final Program EIS/R and subsequent documents) to avoid, minimize, and mitigate potential cumulative impacts and contributions to them; project is thus considered in baseline analysis.

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Redwood City Inner Harbor Studies and Plans	The U.S. Army Corps of Engineers (USACE) is studying deepening the Redwood City Harbor.	City of Redwood City, Ravenswood Ponds	Ongoing	U.S. 101	None	Hydrology, flood management, and infrastructure; water quality and sediment; ; biological resources; cultural resources; air quality	Project could contribute to cumulative impacts
San Jose/Santa Clara Water Pollution Control Plant (WPCP) Master Plan	The master plan covers a variety of long-range improvements to the WPCP's facilities and operations over the next 30 years (through 2040). The master plan also covers the phased development of the surrounding lands, including the creation and restoration of habitats and natural corridors to support wildlife, parks, and amenities to foster a greater connection between the community and the coastal environment.	City of San Jose, A8 Ponds	Ongoing	SR 237	San Francisco Bay, Coyote Creek, Guadalupe River	Hydrology, flood management, and infrastructure; water quality and sediment; biological resources; recreation resources	Project could contribute to cumulative impacts
Final Damage Assessment and Restoration Plan for the November 7, 2007 Cosco Busan Oil Spill	Under the Oil Pollution Act of 1990, the Natural Resource Trustees prepared the Damage Assessment and Restoration Plan/Environmental Assessment to assess injuries and evaluate restoration alternatives for natural resources injured by the Cosco Busan Oil Spill. The restoration plan and environmental assessment describes multiple restoration actions to benefit natural resources and compensate for loss of recreation services, including wildlife habitat projects, eelgrass restoration, sandy beach and salt marsh/mudflat habitat restoration, and recreation/human use projects.	San Francisco Bay Area, all ponds	Ongoing	NA	San Francisco Bay Area, all ponds	Hydrology, flood management, and infrastructure; water quality and sediment; biological resources; recreation resources	Project could contribute to cumulative impacts

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Bonde Weir Fish Passage and Channel Stabilization Project	The project includes removing an 11-foot-long by 45-foot-wide concrete sill known as the Bonde weir, re-grading and excavating the creek bed, and installing a roughened channel in its place. The Bonde Weir spans the entire creek width and is a barrier for fish passage under low and high flows. The roughened channel will be engineered to remain relatively stable using a framework of large boulders with a matrix of heterogeneous mix of cobbles, gravel, sand, and silt.	City of Palo Alto, Ravenswood Ponds	Completed	El Camino Real (SR 82)	San Francisquito Creek	Hydrology, flood management, and infrastructure; geology, soils, and seismicity; biological resources; cultural resources	No considerable contribution; project is completed
Bair Island Restoration Project	The project involves import and placement of over 1 million cubic yards of fill to raise the elevations of Outer, Middle, and Inner Bair Islands to create a more natural tidal wetland, observation platforms, a rebuilt trail, and other amenities. Project was completed and new public access features were opened to public in 2015.	City of Redwood City, Ravenswood Ponds	In progress	U.S. 101	Redwood Creek, Corkscrew Slough, Smith Slough, Steinberger Slough	Biological resources, traffic, air quality, greenhouse gas emissions	No considerable contribution; restoration project nearly complete
Kaiser Fish Screen Project	The project involves construction of a new diversion pipeline and cylindrical fish screen to abandon the existing unscreened pipeline. The replacement facility will be constructed about 530 feet downstream of the existing diversion pipe and 2,400 feet upstream of Alameda County Water District's Rubber Dam 1, where the Union Pacific Railroad (UPRR) and San Francisco Bay Area Rapid Transit District bridges cross over Alameda Creek.	City of Fremont, Island Ponds	Completed	I-880	Alameda Creek	Hydrology, flood management, and infrastructure; water quality and sediment; biological resources; cultural resources	No considerable contribution; project is completed

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Santa Clara Valley Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP)	A multi-species HCP/NCCP for most of Santa Clara County, encompassing covered activities that include urban and rural development, in-stream and rural operation and maintenance (O&M) projects, and implementation of a conservation strategy that envisions a reserve system of up to 46,920 acres. The HCP/NCCP provides take authorization for 18 listed and non-listed species (covered species). The former salt ponds and intertidal areas are explicitly excluded from that HCP/NCCP.	Santa Clara County, Island Ponds and A8 Ponds	Ongoing (i.e., approved and being implemented)	NA	All waterways in county	Hydrology, flood management, and infrastructure; water quality and sediment; biological resources; cultural resources	Project could contribute to cumulative impacts
Flood Protection Projects							
Lower Guadalupe River Flood Protection Project	This flood protection project was constructed to prepare the channels to handle stormwater runoff in the event of a 100-year flood, protect endangered species, preserve fish and migratory bird habitat, and allow for open-space recreation. The Santa Clara Valley Water District installed flood protection improvements along 6.5 miles of the Guadalupe River from the I-880 bridge north to the UPRR bridge in Alviso.	City of San Jose, A8 Ponds	Completed	I-880	Guadalupe River	Hydrology, flood management, and infrastructure; water quality and sediment; geology, soils, and seismicity; biological resources; recreation resources; cultural resources; traffic	No considerable contribution; project is completed
Sailing Lake Access Road	Design, permit, and construct drainage and slope stability improvements to the access road to limit seepage and improve the levee's structural capacity.	City of Mountain View, Mountain View Ponds	Planning	U.S. 101	Sailing lake, Mountain View Slough	Hydrology, flood management, and infrastructure; water quality and sediment; geology, soils, and seismicity	Project could contribute to cumulative impacts
Strategy to Advance Flood protection, Ecosystems and Recreation along the Bay (SAFER Bay)	The SAFER Bay project will provide tidal flood protection to communities in East Palo Alto and Menlo Park as well as private businesses, public lands, and facilities of the State of California that are currently in the FEMA 100-year floodplain, with the objective of integrating measures to protect these communities against tidal surges and the impacts of projected sea-level rise.	Cities of East Palo Alto and Menlo Park, Mountain View Ponds	Planning	U.S. 101	San Francisco Bay, San Francisquito Creek	Water quality and sediment; geology, soils, and seismicity; biological resources; recreation resources; cultural resources; air quality; visual resources; greenhouse gas emissions	No considerable contribution; project is considered in baseline analysis

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
San Francisquito Creek Flood Reduction, Ecosystem Restoration, and Recreation Project San Francisco Bay to Highway 101	The project is constructing flood reduction facilities along an approximately 1.5-mile stretch of San Francisquito Creek from East Bayshore Road to San Francisco Bay.	Cities of East Palo Alto, Palo Alto, and Menlo Park; Mountain View Ponds	Ongoing	U.S. 101	San Francisco Bay, San Francisquito Creek	Hydrology, flood management, and infrastructure; biological resources; recreation resources	Project could contribute to cumulative impacts
Sunnyvale East and West Channel Flood Protection Project	The Sunnyvale East and West Channel Flood Protection Project would provide flood protection for residents, businesses, and infrastructure along a 9.5-mile length of the Sunnyvale East and West Channels in the cities of Sunnyvale and Cupertino. The project consists of developing new flood protection infrastructure necessary to provide 100-year riverine flood protection, developing water quality improvements where possible, and making recommendations for recreation improvements.	City of Sunnyvale, A8 Ponds	Ongoing	SR 237	Guadalupe Slough	Water quality and sediment; geology, soils, and seismicity; biological resources; recreation resources; cultural resources; air quality; visual resources; greenhouse gas emissions	Project could contribute to cumulative impacts
Santa Clara Valley Water District Stream Maintenance Program	The Santa Clara Valley Water District's Stream Maintenance Program is an ongoing program to address routine maintenance activities in Santa Clara County streams, creeks, and flood control channels. Routine maintenance activities include sediment removal, vegetation management, bank stabilization, minor maintenance, and management of animal conflicts.	Santa Clara County, A8 Ponds	Ongoing	SR 237	Several streams and sloughs in Santa Clara County, including the Guadalupe River, San Tomas Aquino Creek, and others	Water quality and sediment; geology, soils, and seismicity; biological resources; recreation resources; cultural resources; air quality; visual resources; greenhouse gas emissions	Project could contribute to cumulative impacts
Charleston Slough and Palo Alto Flood Basin Levee Improvement	Design, permit, and construct improvements to a 6,600-foot section of levee that separates Charleston Slough and the Palo Alto Flood Basin. The levee improvements include raising the crest elevation and providing erosion protection. Because of the shared risk across local government boundaries at the Palo Alto Flood Basin, this aspect of the City of Mountain View's flood exposure is best managed through city participation in a regional planning effort and cost sharing.	City of Mountain View, Mountain View Ponds	Planning	U.S. 101	Palo Alto Flood Basin, Charleston Slough	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	No considerable contribution; project is considered in baseline analysis

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Coast Casey North Levee Improvement	Design, permit, and construct coastal flood levee improvement to help protect property in the City of Mountain View's northwest corner from flooding caused by San Francisco Bay. The levee will extend 1,300 feet from the high ground of the city's Shoreline Park landfill to the city's boundary with Palo Alto.	City of Mountain View, Mountain View Ponds	Planning	U.S. 101	Coast Casey Forebay	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	No considerable contribution; project is considered in baseline analysis
Landfill Erosion Protection	Design, permit, and construct erosion protection for the levees on the north side of the East and West Landfill.	City of Mountain View, Mountain View Ponds	Planning	U.S. 101	Pond A1, Pond A2W	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts
Lower Permanente Creek Levee and Floodwall Improvements	Design, permit, and construct flood protection measures to protect property along lower Permanente Creek. The measures will consist of raising crest elevations for multiple levee sections, constructing one new floodwall, and raising the crest elevation of three other floodwall sections.	City of Mountain View, Mountain View Ponds	Planning	U.S. 101	Permanente Creek	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts
Golf Course Facilities High Ground Augmentation	Design, permit, and construct engineered fill to the north of the City of Mountain View–owned golf course facilities and North Shoreline Boulevard and south of the Mountain View Tidal Marsh to provide flood protection for golf course facilities, including buildings, sanitary sewer lift station, parking lots, and roadway.	City of Mountain View, Mountain View Ponds	Planning	U.S. 101	Mountain View Tidal Marsh	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Lower Stevens Creek Levee Improvements	Design, permit, and construct levee improvements along lower Stevens Creek, north of Crittenden Lane. The improvements consist of improvements to existing levees, a short section of new levee with drainage culverts, and levee access and maintenance elements.	City of Mountain View, Mountain View Ponds	Ongoing	U.S. 101	Stevens Creek	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts
Coast Casey Pump Station Improvement	Design and construct a project to improve pump station capacity at the Coast Casey Stormwater Pump Station to counter sea-level rise impacts on pump station hydraulics.	City of Mountain View, Mountain View Ponds	Ongoing	U.S. 101	Coast Casey Forebay	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	No considerable contribution; project is considered in baseline analysis
Lower Permanente Creek Storm Drain Improvements	Design and construct the realignment of storm drain systems and the installation of three pump stations to evacuate interior drainage from the storm drains to lower Permanente Creek.	City of Mountain View, Mountain View Ponds	Ongoing	U.S. 101	Permanente Creek	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts
Sailing Lake Intake Pump Station Modification	Design, permit, and implement alterations to the Sailing Lake Pump Station to adapt the pump station, intake, and suction and discharge piping.	City of Mountain View, Mountain View Ponds	Ongoing	U.S. 101	Charleston Slough, Pond A1, Sailing Lake	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Charleston Slough Tide Gates Improvement	Revise Inner Charleston Slough tide gate operations to maintain water levels within targeted range.	City of Mountain View, Mountain View Ponds	Ongoing	U.S. 101	Charleston Slough	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	No considerable contribution; project is considered in baseline analysis
Safe, Clean Water & Natural Flood Protection Program	The Safe, Clean Water & Natural Flood Protection Program is a 15-year program to help secure the present and future water resources of Santa Clara County. Includes component to bring sediments removed from creeks to maintain flood flow capacity to salt ponds to aid restoration.	Santa Clara County, A8 Ponds	Ongoing	SR 237	San Francisco Bay, Francisquito Creek, Guadalupe River	Hydrology, flood management, and infrastructure; water quality and sediment; geology, soils, and seismicity; biological resources; cultural resources	Project could contribute to cumulative impacts
Bayfront Canal and Atherton Channel Project	The City of Redwood City is partnering with the California State Coastal Conservancy to integrate the Salt Pond Restoration Project with the Bayfront Canal and Atherton Channel Project. The South Bay Salt Pond Restoration Project is the largest tidal wetland restoration project on the West Coast. When complete, the project will restore 15,100 acres of industrial salt ponds to tidal wetlands and other habitats. This integrated project will direct stormwater to Ponds S5 & R5 to enhance the habitat and serve as stormwater detention for the Bayfront Canal and Atherton Channel drainage areas.	City of Redwood City, Ravenswood Ponds	Ongoing	U.S. 101	Bayfront Canal, Atherton Channel, Flood Slough, San Francisco Bay	Hydrology, flood management, and infrastructure; water quality and sediment; biological resources; recreation resources	Project could contribute to cumulative impacts
Development Projects							
Newby Island Sanitary Landfill	Increase the permitted top elevation of the landfill from 150 to 245 feet mean sea level to allow an increase in the capacity of the landfill by approximately 15.12 million cubic yards, excluding cover materials.	City of San Jose, Island Ponds	Unknown	I-880	Coyote Creek	Biological resources, public health and vector management, air quality	Project could contribute to cumulative impacts

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay, Fiscal Years 2015–2024	Operation and maintenance dredging to remove sediment to authorized depths to fulfill the USACE's Navigation Mission to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs, and recreation.	San Francisco Bay Area, all ponds	Ongoing	NA	San Francisco Bay	Hydrology, flood management, and infrastructure; water quality and sediment; biological resources; recreation resources	Project could contribute to cumulative impacts
Zanker Materials Recycling Facility	Allow changes to development and operations on the project site: increase the maximum height of the landfill from 50 to 80 feet; increase the remaining landfill capacity from 62,000 to 700,000 cubic yards; modify the phasing plan of daily waste tonnage accepted; and plan to develop a 200,000-square-foot materials recovery facility on a 52.5-acre site.	City of San Jose, Island Ponds	Ongoing	SR 237 and Los Esteros Road	Guadalupe River	Water quality and sediment, biological resources, cultural resources, public health and vector management, traffic, noise, air quality (and odors), visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts
San Jose/Santa Clara Water Pollution Control Plan	The City of San Jose prepared a master plan to address aging infrastructure, reduce odors, accommodate projected population growth in the service area, comply with changing regulations, and develop a comprehensive land use plan for the entire project site.	City of San Jose, A8 Ponds	Ongoing	SR 237	Guadalupe Slough	Water quality and sediment, biological resources, cultural resources, traffic, noise air quality (and odors), greenhouse gas emissions	Project could contribute to cumulative impacts
Palo Alto Municipal Golf Course Reconfiguration Project and the Baylands Athletic Center Expansion Project	The City of Palo Alto plans to begin the renovation and reconfiguration of the existing Palo Alto Municipal Golf Course and expand the Baylands Athletic Center.	City of Palo Alto, Mountain View Ponds	Completed	U.S. 101	San Francisquito Creek, Charleston Slough	Water quality and sediment, biological resources, recreation resources, cultural resources, traffic, noise, air quality, greenhouse gas emissions	No considerable contribution; project is completed
Facebook Campus Project	Facebook proposes to move its operations to two sites north of U.S. 101 near the intersection of Bayfront Expressway and Willow Road. The project site consists of a 56.9-acre East Campus and a 22-acre West Campus.	City of Menlo Park, Ravenswood Ponds	Completed	SR 84	Ravenswood Slough	Water quality and sediment, biological resources, recreation resources, cultural resources, traffic, noise, air quality, visual resources, greenhouse gas emissions	No considerable contribution; project is completed

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Menlo Gateway Project	The development would take place on two sites totaling 15.9 acres near the U.S. 101/Marsh Road interchange. Project would include a cafe/restaurant (4,245 square feet), a health club (68,519 square feet), a hotel (171,563 square feet; 230 rooms), neighborhood-serving retail and community facilities (10,420 square feet), three office and research and development buildings (694,669 square feet), and three parking structures.	City of Menlo Park, Ravenswood Ponds	Ongoing	SR 84 and U.S. 101	None	Biological resources, cultural resources, traffic, noise, air quality, visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts
Warm Springs South Fremont Community Plan	The plan includes approximately 879 acres around the Warm Springs BART station; about 11.5 million square feet of light industrial, research and development, office, retail, and hotel uses; and 4,000 residential units and an elementary school.	City of Fremont, Island Ponds	Planning	I-880, I-680, Mission Boulevard and Warm Springs Boulevard	None	Traffic, noise, air quality, greenhouse gas emissions	Project could contribute to cumulative impacts
San Francisco Public Utilities Commission's Water System Improvement Project	The San Francisco Public Utilities Commission proposes to adopt and implement WSIP to increase the reliability of the regional water system, which provides drinking water to 2.4 million people in San Francisco, San Mateo, Santa Clara, Alameda, and Tuolumne Counties. The Water System Improvement Project is a program to implement the service goals and system performance objectives established by the commission for the regional water system in the areas of water quality, seismic reliability, delivery reliability, and water supply through the year 2030.	San Francisco Bay, all ponds	Ongoing	NA	San Francisco Bay	Water quality and sediment; geology, soils, and seismicity; utilities	Project could contribute to cumulative impacts
South Bay Advanced Recycled Water Treatment Facility (ARWTF) Project	The ARWTF treats up to 10 million gallons per day of secondary effluent from the San Jose/Santa Clara WPCP with advanced tertiary treatment and blends the high-purity effluent with tertiary effluent from the San Jose/Santa Clara WPCP for use in the South Bay Water Recycling system.	City of San Jose, A8 Ponds	Ongoing	SR 237	San Francisco Bay, Coyote Creek, Guadalupe Creek	Hydrology, flood management, and infrastructure; water quality and sediment; biological resources; utilities	Project could contribute to cumulative impacts

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
2600 Marine Way Office Project	The project is the redevelopment of existing office/light industrial properties with new office uses. The proposed 364,000 square feet of new office space would be an increase of approximately 231,213 square feet over the existing development on the site.	City of Mountain View, Mountain View Ponds	Completed	San Antonio Road	Charleston Slough, Mountain View Slough	Water quality and sediment, biological resources, recreation resources, cultural resources, traffic, noise, air quality, visual resources, greenhouse gas emissions	No considerable contribution; project is completed
Palo Alto Landfill Phase 11C Closure Project	Landfill closure is final land use.	City of Palo Alto, Mountain View Ponds	Completed	U.S. 101	Mayfield Slough	Water quality and sediment, air quality	No considerable contribution; project is completed
North Bayshore Precise Plan	The project is the preparation of a City of Mountain View–initiated Precise Plan and Program Environmental Impact Report for the area identified in the Mountain View 2030 General Plan as the North Bayshore Change Area.	City of Mountain View, Mountain View Ponds	Ongoing	San Antonio Road	Charleston Slough, Mountain View Slough	Recreation resources, traffic, air quality, greenhouse gas emissions	Project could contribute to cumulative impacts
Cooley Landing Park	The proposed project is the implementation of the Cooley Landing Vision Plan for land in eastern East Palo Alto and Menlo Park.	City of East Palo Alto, and City of Menlo Park Ravenswood Ponds	Ongoing	SR 84	None	Biological resources, recreation	Project could contribute to cumulative impacts
The Preserve at Redwood Shores Precise Plan	The Preserve at Redwood Shores is a 124-acre mixed-use development project, approved by the City of Redwood City that involves site acquisition and the construction of a new elementary school known as Redwood Shores Elementary School on a 7-acre site within the larger parcel. The project includes the construction of a new levee system and realignment of and improvements to the Bay Trail	City of Redwood City, Ravenswood Ponds	Ongoing	U.S. 101	San Francisco Bay, Belmont Slough, Redwood Shores Lagoon, Steinberger Slough	Water quality and sediment; geology, soils, and seismicity; biological resources; recreation resources; cultural resources; air quality; visual resources; greenhouse gas emissions	Project could contribute to cumulative impacts

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
SRI International Campus Modernization Project	SRI International is proposing to modernize its campus with phased development over the next 25 years.	City of Menlo Park, Ravenswood Ponds	Ongoing	U.S. 101	None	Traffic, air quality, greenhouse gas emissions	Project could contribute to cumulative impacts
Shoreline Athletic Fields, Project 11-33	The Shoreline Athletic Fields Project involves construction of multi-use athletic fields over a closed landfill site, which is now used for storage of equipment and materials; soil stockpiles for maintenance of the landfill, golf course, and park; a storage building for athletic equipment; a children's play area; a burrowing owl foraging area; and parking.	City of Mountain View, Ravenswood Ponds	Completed	U.S. 101	Permanente Creek	Water quality and sediment; geology, soils, and seismicity; biological resources; recreation resources; cultural resources; air quality; visual resources; greenhouse gas emissions	No considerable contribution; project is completed
Stanford University Medical Center Facilities Renewal and Replacement	The Stanford University Medical Center Facilities Renewal and Replacement Project involves demolition, replacement, and expansion at the Stanford Hospitals and Clinics, the Lucile Packard Children's Hospital, and the Stanford University School of Medicine.	City of Palo Alto, Ravenswood Ponds	Ongoing	I-280, U.S. 101	San Francisquito Creek	Water quality and sediment, biological resources, recreation resources, cultural resources, visual resources, traffic, noise, air quality, greenhouse gas emissions	Project could contribute to cumulative impacts
Great America Expansion Project	Project to construct up to 718,000 square feet of new office space in up to three new buildings for a maximum build-out of 1,018,000 square feet of office development, up to two five-level parking structures and surface parking lots with a maximum of 3,360 total parking spaces, potential demolition of an existing 118,000-square-foot office building, and landscaping and site improvements.	City of Sunnyvale, A8 Ponds	Ongoing	Great America Parkway	NA	Traffic, air quality, greenhouse gas emissions	Project could contribute to cumulative impacts

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Moffett Place	The Moffett Place campus project is a proposed development of a 55.394-acre office complex that will consist of six eight-story office buildings, one two-story amenities building, surface parking, and one three-level parking structure, for a total of 1.7 million square feet of total building area. The project's buildings will also surround two large green common spaces to accommodate active and passive recreation on-site.	City of Sunnyvale, A8 Ponds	Ongoing	SR 237	NA	Traffic, air quality, greenhouse gas emissions, recreation resources	Project could contribute to cumulative impacts
Yahoo! Santa Clara Campus	The proposed project is the phased development of a 3,060,000-square-foot office/research and development campus consisting of 13 six-story buildings, three two-story commons buildings, surface parking lots, two-levels of below-grade parking, site circulation, and landscaping following demolition of the existing buildings on the site. The project includes the use of the Hetch Hetchy right-of-way for construction staging and project parking.	City of Sunnyvale, A8 Ponds	Planning	SR 237	Calabasas Creek, San Tomas Aquino Creek, Guadalupe River	Water quality and sediment, biological resources, recreation resources, cultural resources, traffic, noise, air quality, visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts
49ers Stadium Project	The project includes four specific components: Stadium, Substation Relocation, Off-Site Surface Parking, and Parking Garage (Shared Use). The stadium has a permanent seating capacity of up to 68,500 seats and is designed to expand to approximately 75,000 seats for special events.	City of Sunnyvale, A8 Ponds	Completed	SR 237	NA	Traffic, air quality, greenhouse gas emissions	Project could contribute to cumulative impacts
Google campus expansion	Google expansion onto and throughout the former Moffett Airfield.	City of Mountain View, Mountain View Ponds	Planning	U.S. 101	None	Water quality and sediment, biological resources, recreation resources, cultural resources, traffic, noise, air quality, visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Creekside Landing Project	The proposed project consists of the development of 524,000 square feet of commercial retail uses (Creekside Landing) and the extension of Fremont Boulevard and the San Francisco Bay Trail from Flood Channel B to Dixon Landing Road.	City of Fremont, Island Ponds	Ongoing	I-880	Coyote Creek	Water quality and sediment, biological resources, recreation resources, cultural resources, traffic, noise, air quality, visual resources, greenhouse gas emissions	Project could contribute to cumulative impacts
Transportation Projects							
Shoreline Boulevard 101 Off-Ramp Modification Feasibility Study	Study alternative configurations of the Highway 101 off- and on-ramps at Shoreline Boulevard to serve as a foundation for a subsequent California Department of Transportation Project Study Report.	City of Mountain View, Mountain View Ponds	Completed	U.S. 101	None	Traffic, noise, air quality, greenhouse gas emissions	No considerable contribution; project is completed
Transportation 2035 Plan for the San Francisco Bay Area	The proposed Transportation 2035 Plan is the Bay Area's long-range regional transportation plan; it lays out the transportation policies and projects to address the mobility, accessibility, and performance needs of the region through the 2035 planning horizon.	San Francisco Bay Area, all ponds	Ongoing	NA	None	Recreation resources, traffic, air quality, greenhouse gas emissions	Project could contribute to cumulative impacts
U.S. 101/Willow Road Interchange Reconstruction Project	The project proposes to reconstruct the U.S. 101/Willow Road (also known as SR 114) Interchange on its existing alignment to a partial cloverleaf interchange.	City of Menlo Park, Ravenswood Ponds	Ongoing	U.S. 101, SR 84	NA	Traffic, air quality, greenhouse gas emissions	Project would contribute to cumulative impacts
Route 101 San Francisquito Creek Bridge Replacement Project	The project proposes to replace the San Francisquito Creek Bridge (Bridge # 35-0013), which is between the University Avenue interchange and the Embarcadero Road interchange on U.S. 101.	City of Palo Alto, Ravenswood Ponds	Ongoing	U.S. 101	San Francisquito Creek	Hydrology, flood management, and infrastructure; recreation resources; traffic, air quality; greenhouse gas emissions	Project could contribute to cumulative impacts

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Route 101 Auxiliary Lanes Project, between the Embarcadero Road interchange in the City of Palo Alto and the Marsh Road interchange in the City of Menlo Park.	The project provides auxiliary lanes in both directions by widening U.S. 101 between the Embarcadero Road to the Marsh Road interchange. The proposed project also includes extending the support foundation over the Hetch Hetchy aqueduct, widening the on-ramps, and relocating the existing stormwater lift station adjacent to the Henderson railroad overcrossing.	Cities of Menlo Park, East Palo Alto, and Palo Alto; Ravenswood Ponds	Completed	U.S. 101	NA	Traffic, air quality, greenhouse gas emissions	No considerable contribution; project is completed
U.S. 101 Auxiliary Lanes form State Route 85 to Embarcadero Road	Construct roadway improvements, including auxiliary lanes, and lengthen existing high-occupancy vehicle lanes on U.S. 101 in the city of Palo Alto.	Cities of Mountain View and Palo Alto, Ravenswood Ponds	Completed	U.S. 101	NA	Traffic, air quality, greenhouse gas emissions	No considerable contribution; project is completed
Stevens Creek Crossings Project	The project is to create two new two-lane restricted access vehicular bridge crossings extending over Charleston Road and Crittenden Lane, across Stevens Creek, and into the Planetary Ventures leasehold within the Bay View Area of the National Aeronautics and Space Administration Ames Research Center, in Mountain View.	City of Mountain View, Ravenswood Ponds	Ongoing (in planning phase)	U.S. 101	Stevens Creek	Traffic; air quality; greenhouse gas emissions; hydrology, flood management, and infrastructure; biological resources; recreation resources	Project could contribute to cumulative impacts
Route 262/Warren Avenue/I-880 Interchange Reconstruction and I-880 Widening	Improve the interchange at SR 84 and Palomares Road, and realign the intersection. Roadway improvements, including bridge replacement and high-occupancy vehicle lanes in each direction on a portion of I-880 and SR 262 in and near the cities of Milpitas and Fremont.	City of Fremont, Island Ponds	Ongoing	I-880	Coyote Creek	Traffic, air quality, greenhouse gas emissions	Project could contribute to cumulative impacts
Los Gatos Creek Bridge Replacement/South Terminal Phase III Project	The proposed project replaces the structurally deficient two-track railroad bridge that crosses Los Gatos Creek and provides a tail track south of San Jose Diridon Station.	City of San Jose, A8 Ponds	Ongoing	San Carlos Street	Los Gatos Creek	Hydrology, flood management, and infrastructure; water quality and sediment; biological resources	Project could contribute to cumulative impacts

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Pacific Gas and Electric Company (PG&E) NERC Compliance Efforts	The Federal Energy Regulatory Commission grants the North American Electric Reliability Corporation (NERC) the legal authority to establish and enforce reliability standards for the bulk-power system. PG&E's efforts to comply with NERC have included the upgrading of many of PG&E's overhead transmission systems to meet the requirements of NERC.	San Francisco Bay, all ponds	Ongoing	NA	NA	Hydrology, flood management, and infrastructure; water quality and sediment; geology, soils, and seismicity; biological resources; cultural resources; visual resources	Project could contribute to cumulative impacts
Recreation Projects							
Permanente Creek Trail – Amphitheatre Parkway Crossing, Construction	Construct improvements to the existing trail under-crossing at Amphitheatre Parkway.	City of Mountain View, Mountain View Ponds	Ongoing	U.S. 101	Permanente Creek	Recreation resources	Project could contribute to cumulative impacts
San Francisco Bay Area Water Trail Plan	The plan provides recommendations and guidance for a network of landing and launching sites at various locations on the margins of San Francisco Bay and its tributaries. Water Trail access is being considered for at least 112 locations. The plan would also increase use of San Francisco Bay by non-motorized small boats.	San Francisco Bay, all ponds	Ongoing	NA	None	Recreation resources	Project could contribute to cumulative impacts
Facebook Campus State Route 84 Overpass Trail	This Facebook-sponsored project would build a pedestrian/bicycle bridge over SR 84 near the Ravenswood pond complex. It would serve the general public in providing a new public access and recreation facility and would also connect two Facebook campuses on either side of the highway.	Ravenswood pond complex	Planning	SR 84	Ravenswood Slough	Recreation resources; Biological Resources (through recreation's disturbance of sensitive wildlife species)	Project could contribute to cumulative impacts on biological resources

Table 26. Projects Considered in Cumulative Impacts Analysis for the South Bay Salt Pond Restoration Project

PROJECT	PROJECT DESCRIPTION	LOCATION, NEAREST PROJECT POND	PROJECT PHASE	RELATED MAJOR ACCESS ROADS	RELATED WATERWAYS	POTENTIAL CUMULATIVE IMPACT ISSUES	CUMULATIVE IMPACT CONTRIBUTION
Coyote Creek Trail Project: Story Road to Phelan Avenue	Coyote Creek Trail is a multi-use, Class I pedestrian and bicycle trail along Coyote Creek through San Jose. When completed, the trail will extend approximately 30 miles from its northern end at the San Francisco Bay Trail (SR 237 Bikeway) in north San Jose to its southern end near Anderson Lake County Park.	City of San Jose, Island Ponds	Ongoing	SR 237	Coyote Creek	Biological resources, recreation resources, cultural resources, noise	Project could contribute to cumulative impacts

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Appendix A.
Construction Details for PG&E Activities

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Appendix B.
404(B)(1) Alternatives Analysis

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Appendix C.
Wetland Delineation Report, USACE Jurisdictional Determination

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STATE OF CALIFORNIA – CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD
1515 CLAY STREET, SUITE 1400
OAKLAND, CALIFORNIA 94612

APPLICATION FOR 401 WATER QUALITY CERTIFICATION AND/OR REPORT OF WASTE DISCHARGE

(FORM R2C502-E)

1. APPLICANT'S NAME	4. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
Christopher Barr; Usfws, Don Edwards National Wildlife Refuge	Dillon Lennebacker
2. APPLICANT'S ADDRESS	**5. AGENT'S ADDRESS**
Don Edwards National Wildlife Refuge 1 Marshlands Road Newark, CA, 94555	Aecom 300 Lakeside Avenue, Suite 400 Oakland, CA 94612
3. APPLICANT'S PHONE & FAX NOS. (email optional)	**6. AGENT'S PHONE & FAX NOS.** (email optional)
(510) 792-0222 chris_barr@fws.gov	(510) 282-3835 (Mobile) (510) 874-3035 (Direct) (510) 874 3268 (Fax)

7. STATEMENT OF AUTHORIZATION

I hereby authorize Dillon Lennebacker to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE (This must be signed by the Applicant, not the authorized agent) — DATE: April 14, 2017

PROJECT OR ACTIVITY INFORMATION

8. PROJECT NAME OR TITLE (See Instructions.)
South Bay Salt Pond Restoration Project, Phase 2, Refuge Ponds

9. NAME OF AFFECTED WATERBODY(IES) (See instructions.)	10. PROJECT STREET ADDRESS (if applicable)
See Supplemental Information.	See Supplemental Information.

11. LOCATION OF PROJECT

-Choose One-	See Supplemental Information,	Region 2 – San Francisco Bay
COUNTY	CITY/TOWN (or unincorporated)	REGIONAL WATER BOARD REGION

12. OTHER LOCATION DESCRIPTIONS (watershed, latitude & longitude, river mile, etc. Attach map. See instructions.)
See Supplemental Information.

13. DIRECTIONS TO THE SITE
See Supplemental Information.

14. PROJECT PURPOSE (Describe the reason or purpose for the overall project. See instructions.)
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; and 3) provide for flood management in the South Bay. See supplemental information.

15. DESCRIPTION OF ACTIVITY AND ENVIRONMENTAL IMPACTS (Provide a full, technically accurate description of the entire activity and associated environmental impacts. See instructions.)
See Supplemental Information.

16. AVOIDANCE OF IMPACTS (Describe efforts to avoid and minimize impacts to waters of the State. See instructions.)
See Supplemental Information.

17. **ENVIRONMENTAL DOCUMENTS** (list any non-CEQA environmental documents that have been prepared for the project and/or the project site. Provide the date of the document and the name of the individual, firm, or agency that prepared it. Provide a copy of delineations and endangered species surveys. See instructions.)

See Supplemental Information and SBSP Restoration Project website, www.southbayrestoration.org/documents/permit-related

DREDGE & FILL INFORMATION

18. The following items must be completed for each action where fill or other material will be temporarily (T) or permanently (P) discharged to a wetland or other waterbody, and where material will be dredged from a waterway (add additional pages as necessary). Provide a map showing the location of each action (See instructions):

Map Location Number	LOCATION (show on plan & indicate waterbody)	REASON FOR ACTION (See instructions)	AMOUNT AND TYPE OF MATERIAL (in cubic yards, see instructions)	SURFACE AREA OF FILL (in acres and/or linear feet; specify (T) or (P); see instructions)
	See Supplemental Information		See Supplemental Information	

MITIGATION

19. **MITIGATION** (Describe the size, type, and functions, and values of the proposed mitigation. Describe success criteria, monitoring, and long-term funding, management, and protection of the mitigation site. Attach a Mitigation Plan if needed. See instructions and contact Regional Board staff for additional assistance.)

See Supplemental Information.

CEQA

20. **CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) Documents: Indicate the status of CEQA documents prepared for the project (see instructions).**

TYPE OF DOCUMENT	STATUS	DATE COMPLETED (or expected to be complete)	TYPE OF DOCUMENT	STATUS	DATE COMPLETED (or expected to be complete)
Initial Study	Not Applicable		Notice of Preparation	Complete	9/2013
Draft Environmental Impact Report	Complete	07/1/15	Final Environmental Impact Report	Complete	4/1/16
Negative Declaration	Not Applicable		Mitigated Negative Declaration	Not Applicable	
Notice of Categorical Exemption Exemption Number:	Not Applicable		Notice of Statutory Exemption Exemption Number:	Not Applicable	
Other (describe)	Not Applicable				
Notice of Determination*	Complete	5/27/16	*Note: A Notice of Determination or Notice of Exemption from the Lead Agency is required before a certification or waiver can be issued.		

Lead Agency: California State Coastal Conservancy **Contact:** Brenda Buxton **Telephone:** 510-286-0753

State Clearing House Number: 20130922010_

ADDITIONAL INFORMATION

21. **HAS ANY PORTION OF THE WORK BEEN INITIATED?** YES ☐ NO ☒

IF YES, DESCRIBE THE INITIATED WORK, and explain why it was initiated prior to obtaining a permit. Indicate whether any enforcement action has been taken against the project.

22. **HAS A FEDERAL AGENCY OR THE APPLICANT PROVIDED PUBLIC NOTICE OF THIS APPLICATION FOR WATER QUALITY CERTIFICATION?**

Federal Agency:	YES ☐	NO ☒	**Date:**	**Type of Notification:**	**Agency Name and Contact:**
Applicant:	YES ☐	NO ☒	**Date:**	**Type of Notification:**	**Media Name and Contact:**

IF PUBLIC NOTICE HAS NOT BEEN MADE, provide the name, address, and phone number (if available) of adjacent property owners, lessees, etc., and any other parties known to be interested in the project:

See Supplemental Information

23. **OTHER PERMITS** (List other local, state or federal licenses, permits, and agreements that will be required for any construction, operation, maintenance, or other actions associated with the project. Attach copies of all draft or final documents. See instructions.)

AGENCY	CONTACT (with phone number)	TYPE OF APPROVAL	PERMIT OR ID NUMBER	DATE APPLIED	STATUS	DATE OF ACTION
US Corps of Engrs.	Frances Malamud-Roam	404, 404b1	TBD	3/02/2017	In Review	
US Fish Wildlife	Kaylee Allen	Section 7 BO	TBD	2/21/17	In Review	
Not Applicable					In Review	
Not Applicable					-Choose One-	
Not Applicable					-Choose One-	
SF BCDC	Brenda Goeden	Major Permit	TBD	3/31/17	In Review	
NOAA Fisheries	Gary Stern	Section 7 BO		3/24/17	In Review	
Other or Local Agency					-Choose One-	
Other or Local Agency					-Choose One-	

24. **OTHER PROJECTS** (List and describe other projects implemented or planned that are related to the proposed project, or that may impact the same waterbody. See instructions. Add additional sheets if necessary.)

PROJECT NAME	DESCRIPTION	WATERBODY AND WATERSHED	DATE IMPLEMENTED/PLANNED
	See Supplemental Information		

25. Application is hereby made for a permit or permits to authorize the work described in this application. I certify, under penalty of perjury, that this application is complete and accurate to the best of my knowledge. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE
	4/11/17		4/11/2017

The application must be signed by the person who desires to undertake the proposed activity (Applicant) or a duly authorized agent if the statement in Block 7 has been filled out and signed.

Attach fee deposit (see Instructions page 7) and any additional documents and submit this application to:

SFBRWQCB
Attention: 401 Water Quality Certification
1515 Clay Street, Suite 1400
Oakland, CA 94612

Note: This form, FORM R2C502-E, was designed for electronic use as a Microsoft Word document or template. For assistance using this form or to relay suggestions on how it may be improved, please call 510-622-2330. If you would like a standard, non-electronic form, please call 510-622-2300 and request 401 Application FORM R2C502 – Non-electronic version.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
San Francisco Bay National Wildlife Refuge Complex
1 Marshlands Road
Fremont, California 94555

20 July 2017

Brian Wines, Water Resource Control Engineer
Watershed Management Division
San Francisco Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

RE: CIWQS Place ID No. 833812

Subject: Application for Certification for the South Bay Salt Pond Restoration Project Phase 2 Project, Supplemental Information.

Dear Mr. Brian Wines:

Thank you for initiating your review of the United States Fish and Wildlife Service (USFWS) Don Edwards National Wildlife Refuge (Refuge) request for Clean Water Act Section 401 water quality certification and Waste Discharge requirements for the South Bay Salt Pond (SBSP) Restoration Project Phase 2 actions from the San Francisco Bay Regional Water Quality Control Board (RWQCB). Your April 20, 2017, letter to the USFWS provided comments and a determination that the application submitted on March 21, 2017, cannot be filed as complete until additional information is provided. The additional information requested includes details about the ongoing operations and maintenance at ponds managed in accordance with prior phases of the SBSP Restoration Project's Adaptive Management Plan, and a request for a monitoring plan for the habitat transition zone (or ecotone) and flood management components of the proposed Phase 2 work.

The following information in this letter constitutes USFWS's complete response to the RWQCB's request for additional information.

Introduction

The RWQCB's comment letter from April 20, 2017 contains two enumerated comments. The Board's Comment #1 was about the need for more detail regarding the ongoing management and operations of the non-Phase 2 ponds that could be affected by the Phase 2 actions. It also asked for updates to the physical layout or operation of the ponds covered in previously issued Board Orders. It asked for clarification on the ponds proposed for conversion to tidal marsh, and it asked for an update of lists of specific findings from previously issued Board Orders.

As shown in the SBSP Restoration Project's initial response to that comment letter (Table 1), the Board's Comment #1 was broken out into five items for the Board's consideration and approval. In this document, however, items 1 and 2 on that list have been combined into a single in-text discussion, presented in Section 1, below. Item 3 asked if Ponds R4, A1, and A2W were the only ones being converted to tidal marsh. That is correct, and that item needs no further discussion. Items 4 and 5 requested updates to the lists of specific findings. Table 2 (see Section 2) has rows that list each of the referenced findings, the topics they address, and an explanation of any proposed changes or updates to them. By addressing those findings in that table, they are therefore not addressed in the text below.

The Board's Comment #2 was about the need for updated sections of the SBSP Restoration Project's Adaptive Management Plan (AMP) and Monitoring Plans (MPs) that would include details about a new type of habitat feature proposed in the Phase 2 actions – habitat transition zones – and widened & raised levees that are necessary to allow restoration to proceed. These are elements not previously included in the AMP or MPs, and so the planned monitoring and adaptive management actions for them need to be presented. To address that request, the SBSP Restoration Project has prepared an addendum to the Adaptive Management Plan that is specific to habitat transition zones. The draft addendum to the AMP is presented in Section 3, and it is submitted for the Board's review and consideration. The Project Management Team (PMT) is also reviewing this draft addendum and working with other regulatory agencies to elicit their input on it. The PMT will coordinate with the Board to make any necessary changes to it.

Importantly, however, improved levees are not considered part of "adaptive management." A levee that has erosion or stability problems can be repaired and/or maintained as needed through standard practices commonly covered under levee operations and maintenance permits. With one exception noted below, the SBSP Restoration Project and the Don Edwards San Francisco Bay National Wildlife Refuge as the landowner are committed to inspecting, monitoring, and maintaining the levees within the project area as needed to maintain the current conditions. The Refuge's levee O&M permits will be modified to include the revised footprints of any levees that are improved as part of the Phase 2 actions. Examples of typical levee repairs include adding new material to fill areas of unacceptable slump, scour, or other forms of failure; regrading or re-compacting material to increase stability; or adding rip-rap or other materials with greater strength and resistance to erosion. It is important to acknowledge that both the Refuge and the overall SBSP Restoration Project are committed to using earthen fill to the maximum extent possible and utilize rip-rap, concrete, or other hardscape materials as a last resort. It is also important to note that ongoing tidal restoration actually reduces the net overall length of levee that the Refuge has to maintain.

The exception in this application is the Coast Casey Forebay levee, which is located within and owned by the City of Mountain View and will be constructed to be a FEMA-certified levee. It will follow all FEMA standards for initial settlement, slope stability, and other requirements. It will be inspected and maintained as required by FEMA. These actions will be performed by the City of Mountain View and/or the Santa Clara Valley Water District. It is notable that the only added fill in waters of the State for improvement to this levee are into

an existing stormwater detention area, the Coast Casey Forebay. The current toe of the northern side of this levee extending into Charleston Slough and Pond A1 would not be moved. The levee improvements were instead designed to extend southward into the detention basin to reduce the ecological and water quality impacts of the associated fill.

Table 1. Matrix of Comments, Proposed Resolution, and Disposition

Point #	Source	Text of Content / Point	Summary of Point	Proposed Resolution	Disposition
1	Comment #1; paragraph 1	The application materials describe in detail the Phase 2 proposed changes in configuration and operation of the Island Ponds, Ponds A8 and A8S, the Alviso-Mountain View Ponds, and the Ravenswood Ponds. However, more detail is necessary to assess the extent of any Phase 2-related changes to operation of the remaining ponds in the SBSPRP in comparison to the activities permitted at those ponds in Board Order R2-2004-0018 for the Interim Stewardship Period (ISP) of the SBSPRP and in Board Order R2-2008-0078, as modified by Board Order R2-2012-0014, for Phase 1 of the SBSPRP.	The comment requests more detail to assess the extent of any Phase 2-related changes to operation of the remaining (i.e., the non-Phase 2) ponds in the SBSPRB in comparison to the activities permitted at those ponds and provides Board Order numbers to use for that comparison.	The SBSPRP does not plan to make any changes to the operations or maintenance or management of the ponds that are not being addressed in Phase 2. But to address this point, the SBSPRP proposes to provide a point-by-point examination of the two listed Board Orders to double-check and verify that no new or different actions would occur at those ponds.	Combined into Section 1.
2	Comment #1; paragraph 1	Please describe any proposed changes to the physical layout or operation of ponds in Phase 2 of the SBSPRP that would deviate from the activities approved in Board Orders R2-2004-0018, R2-2008-0078, and Order R2-2012-0014. This information is necessary to accurately describe any management activities authorized under Board Order R2-2004-0018, issued for the ISP, which were subsequently incorporated in Board Order R2-2008-0078 for Phase 1 Restoration Activities.	The second half of this paragraph asks the SBSPRP to describe any proposed changes to physical layout or operation of Phase 2 ponds that would deviate from the activities in previous Board Orders.	The SBSPRP proposes to do an explicit comparison of the proposed Phase 2 actions to specific items in those Board Orders and explain/note any differences.	
3	Comment #1; paragraph 2	Based on the application materials, Ponds A1 and A 2W in the Alviso-Mountain View Ponds and Pond R4 in the Ravenswood Ponds are the only ponds in Phase 2 that are being converted from managed ponds to tidal ponds. Please confirm if this is correct.	This simply asks if the RWQCB has properly understood which ponds would be converted to tidal marsh. It has.	The SBSPRP proposes to include a note to that effect in a letter back to the RWQCB along with the rest of these proposed resolutions.	Answered in Introduction
4	Comment #1; paragraph 2	Please review Findings 41 through 52 of Board Order R2-2008-0078 and provide us with a description of any Phase 2-related changes in the pond management activities described in those findings.	The third sentence in this paragraph first cites specific Findings in an old Board Order and requests a comparison and a description of changes in the pond management activities at the Phase 2 ponds, particularly at the newly-converted tidal marsh areas at MV and Ravenswood.	The SBSPRP proposes to undertake a similar task as that described in response to Point #2, which would include a direct comparison and listing of those changes in pond management activities.	In Table in Section 2
5	Comment #1; paragraph 2	Monitoring of potential impacts to Bay waters associated with discharges from ponds and potential impacts to listed species were covered in Findings 53 through 67 of Board Order R2-2008-0078. Please review these findings and provide us with a description of any changes that are proposed for activities covered by these monitoring programs.	The fourth and fifth sentences in this paragraph also ask for a comparison of changes to *approved monitoring activities* in the converted ponds.	The SBSPRP proposes to undertake a similar task as that described in response to Point #2 and Point #4, which would include a direct comparison and listing of those changes in approved monitoring activities in those converted ponds.	

Point #	Source	Text of Content / Point	Summary of Point	Proposed Resolution	Disposition
6	Comment #2	The Adaptive Management Plan and Monitoring Plans developed for the ISP and Phase 1 must be revised to track the successful enhancement of habitat necessary to mitigate the fill of waters of the State associated with providing ecotones and maintaining flood management.	Taken as a whole, Comment #2 explains why and how the Board understands that fill for HTZs and levee improvements are needed yet still difficult to permit. It also explains how a 'justification' for this fill can only be made by demonstrating over time the habitat value of the HTZs, especially for the special-status species. Our understanding of this is that the text of Comment #2 is intended for the RWQCB to document its consistency with the Basin Plan. To do so, the comment calls for a revision or extension of the SBSPRP's Adaptive Management Plan and its Monitoring Plan, which were developed for the ISP and for Phase 1 and therefore do not address the monitoring of habitat establishment on HTZs.	The SBSPRP proposes to develop such extensions of the two referenced plans and submit them to the RWQCB for approval. Can the commitment to develop those extended/revised plans and get them approved by the RWQCB suffice for issuing the WQ certification? Or do they need to be developed and approved before the certification can be issued?	Added text and created new rows for the AMP Summary Table.

Section 1. Response to First Portion of Comment #1 (Matrix Items 1 and 2)

This section provides brief summaries of the three referenced Board Orders and assesses each of their contents against the questions presented in the Board's Comment #1 about the proposed Phase 2 changes to physical layout and/or operations of the Phase 2 ponds and/or whether the proposed actions would necessitate any changes to the non-Phase 2 ponds.

Board Order R2-2004-0018

Board Order R2-2004-0018 establishes and permits the initial Waste Discharge Requirements (WDR) and the permitting process for the USFWS and the CDFW for what were then the newly-acquired low-salinity ponds obtained from Cargill in 2003. These requirements enabled the Initial Stewardship Plan (ISP) to proceed by setting limits in which some manipulation of flow into and out of the ponds and otherwise modify their operations and maintenance to reduce remnant elevated salinity, improve water quality conditions, and begin preparing the ponds for subsequent stages of enhancement and restoration.

The primary section of the Order describes the proposed operation of the individual pond groups in each of three pond complexes that were included in the SBSP Restoration Project. It notes what the salinity of discharged water would be from each place and sets maximum levels of salinity, metals concentrations, and so on. It also describes how the Project would restore certain ponds to tidal marsh and allows short-term exceedances of certain water quality condition limits if those exceedances are necessarily caused by restoration to tidal marsh systems. It set out monitoring and reporting requirements for sediment conditions, mercury levels, and a range of other conditions.

Finally, several attachments provided additional important information.

- Attachment A was a single map of the three pond complexes (Baumberg, West Bay, and Alviso) at the scale of the entire South Bay area.

- Attachment B provided maps of each of the three pond complexes and also noted where the then-present inlet/outlet structures were located.

- Attachment C was the self-monitoring program.

- Attachment D was the Fact Sheet pertaining to the WDRs for the Project. This attachment provided summaries of the Project for the public and other local entities and interested parties. The summaries included the history, the proposed actions, the current water quality conditions, the proposed maximum allowable levels of salinity, metals, and other aspects of water quality, and conveyed the rationale behind those decisions. The Fact Sheet's own attachments provided yet more detail and backup information.

- Attachment E was the standard provisions and reporting requirements for the non-NPDES wastewater discharge permits.

The first part of Comment #1 from the RWQCB's comment letter asked specifically to review this Board Order for any Phase 2-related changes to other (non-Phase 2) pond operations, as outlined in the Order. The answer to that question is "no". If management of a certain pond was not already covered in Phase 1 or is not covered in the current Phase 2 application, then no changes to its operations or management are being proposed in this permit application. The next few paragraphs explain that point.

As noted other places in this response document, many of the individual ponds discussed in this Board Order were included in actions permitted under the ISP or subsequently in the Phase 1 project actions. Though those previously implemented actions have themselves caused operations to be modified, nothing proposed in the Phase 2 actions would necessitate changes to the way the other ponds would be managed or operated.

For example, Pond SF2 at the Ravenswood pond complex was dramatically reconfigured as a part of the Phase 1 implementation, and its operations have changed substantially since those presented in Board Order R2-2004-0018. However, having been implemented as permitted by the RWQCB and others, its ongoing management is covered under those permits. Nothing in the restoration of the Phase 2 Ravenswood Ponds (R3, R4, R5, and S5) would change that. The same holds true for actions at Pond A16, A17, A6, and other Phase 1 actions that will not be affected by Phase 2 actions.

Somewhat differently, the A8 ponds (Ponds A5, A7, A8, and A8S, referred to as the A7 system in this Order), which were part of Phase 1, are also proposed for a minor modification in Phase 2. The Island Ponds (A19, A20, and A21) were part of an Initial Stewardship Action (discussed in this Board Order) are also proposed for a modification in Phase 2. The management or operations changes for those pond groups are described in the Section 401 application for a Water Quality certification. That application also describes the associated operations and management of proposed Phase 2 changes to some groups of ponds that were not part of previous Project actions. These groups of ponds are the Alviso-Mountain View Ponds (A1 and A2W) and the western half of the Ravenswood pond complex (R3, R4, R5, and S5).

The second request in the opening paragraph of the RWQCB's Comment #1 is for a description of the proposed changes to the physical layout or operation of the Phase 2 ponds. Those are as follows:

- Alviso Island Ponds (Ponds A19, A20, and A21): No changes to operation; minor changes to physical layout

  These former ponds are currently opened to tidal flows through breaches on their southern levees. Phase 2 would add north-side breaches to Pond A19 only, widen one of the two existing levee breaches on A19's south side, lower long sections of the northern and southern levees of Pond A19 and A20 (leaving some high parts untouched for high-tide refugia), and completely remove the levees between A19 and A20 to form one large and connected aquatic-marsh habitat area. No changes to the operation and management of the Island Ponds are proposed for Phase 2 actions there.

The current management actions to monitor and management wildlife, control invasive plant species, and so on, would continue to be implemented as they are now.

- Alviso System A2W: Tidal restoration

  As part of Phase 2, Alviso System A2W (which includes Ponds A1 and A2W) is proposed to be breached to open it to full tidal action and begin converting to tidal marsh. The existing siphons and gates would be removed. The residence time of water in the ponds would decrease substantially. The details of operations and management of the Phase 2 ponds are fully detailed in the application for the Phase 2 water quality certification and so is not repeated here.

- Alviso System A7: No changes to operation; minor changes to physical layout

  In this Order, Ponds A5, A7, and A8 have been grouped into the Alviso System A7. These ponds were included in Phase 1 implementation, which added hydraulic connectivity between them (and also with Pond A8S) by breaching the internal levees between them. Phase 1 also added one culvert into the sloughs adjacent to Ponds A5 and A7 and also added a variable-width and reversible armored notch between Pond A8 and Alviso Slough to allow management of the muted tidal flows into or out of this pond group. Following construction, the notch was closed seasonally to avoid entraining migrating salmonids. During its 'open period‘ each year, the notch was opened different widths to enable the applied studies about the effects of different amounts of tidal circulation on residual mercury and its methylation, speciation, and uptake by fish and birds. The results of several years of those applied studies on mercury levels have indicated that the notch can safely be permanently opened fully to its maximum of 40 feet. That step has been implemented, and the notch is expected to remain open. There are no other operational changes proposed for this pond group. The proposed action for Phase 2 involves building habitat transition zones at the southwest and southeast corners of this pond group (in what had been Pond A8S). These transition zones will provide immediate benefit by protecting the levees behind them from erosion associated with wind fetch and muted tidal flows. One of these two levees abuts a closed landfill, so this protection is even more important there. They also add some amount of habitat structure and complexity in what are otherwise somewhat deeply subsided ponds. The long-term plan for this pond group is full tidal restoration, to take place in a future project phase, so these habitat transition zones lay the foundation for this future tidal elevation. Following the implementation of the Phase 2 actions to build these transition zones, operation and maintenance of this pond group would be similar to its current operations, with the exceptions that the notch would no longer be closed seasonally and that there would be some additional control of invasive plant species on the slopes of the habitat transition zones. There could also be new locations where existing mosquito abatement practices may be implemented.

- Ravenswood Ponds: Tidal Restoration and Management Changes

The details of operations and management of the Phase 2 ponds at Ravenswood (R3, R4, R5, and S5) are fully detailed in the application for the Phase 2 water quality certification and so is not repeated here. As part of Phase 2, Pond R4 is proposed to be breached to open it to full tidal action and begin converting to tidal marsh. The existing culverts and gates (internal to the ponds; there is no hydraulic connection to the bay at this pond) would be removed. The resultant tidal flows would have short residence times. Pond R3 would be fitted with two new water control structures to allow improved and more direct management of water levels in the pond and in its historic slough trace and internal borrow ditches. Derelict culverts and gates would also be removed. This is a habitat enhancement to improve Pond R3 for the use of the listed western snowy plover. Finally, Ponds R5 and S5 will become reconfigured managed ponds and fitted with three water control structures to connect them to Flood Slough, Pond R4, and Pond R3; they will also be connected to each other by removing most of the existing internal levees. They will be operated to meet water quality objectives, discharge requirements, and to provide beneficial forage or roosting/nesting habitat for birds.

Board Order R2-2008-0078

Board Order R2-2008-0078 modifies the previously issued Order No. R2-2004-0018 to cover the Phase 1 actions developed and planned for implementation following the 2004 Board Order. Its findings include the following major items.

- Spell out the Phase 1 actions as proposed by the discharger
- Update the regulatory background to include the implemented ISP actions
- List the acreages of different habitat types in a pre- and post-Phase 1 implementation cases
- Update the allowed discharges from different pond systems to allow the Phase 1 actions to proceed
- Summarize the CEQA impacts for the SBSP Restoration Project at the programmatic level and for its Phase 1 project-level implementation
- Explain the use of the Adaptive Management Plan and water quality-related management options under it
- Establish monitoring and reporting protocols
- Sets forth screening procedures for dredged material that might be beneficially reused on site

Importantly, Finding 44 spells out the ongoing operation and maintenance provisions that may be implemented in the Phase 1 ponds and outside of them. The locations of these actions may change as a result of the Phase 2 actions (as noted in the 401 Water Quality Certification

application), but the actions themselves remain largely the same.

There is nothing in the 2008 Board Order that would need further modification or clarification as a result of implementing the proposed Phase 2 actions. There is also little in the 2008 Board Order that pertains directly to the plans for design, construction, or operation of the Phase 2 actions. Part of the reason for that is because some of the items in the 2008 Board Order were subsequently amended by the 2012 Board Order (summarized below). The relevant portions of the updated Board Order are addressed below.

The proposed Phase 2 actions do not necessitate or imply any changes to the management, operations, monitoring, or overall conditions (including habitat values or water quality characteristics) of the non-Phase 2 ponds covered in this Board Order.

Lastly, the proposed changes to the physical layouts of the Phase 2 ponds were described in the bullets summarizing the 2004 Board Order. They are not repeated here.

Board Order R2-2012-0014

Board Order R2-2012-0014 modifies the previously issued Order No. R2-2008-0078 to address design changes at Ponds A16, A17, and SF2, which were among the Phase 1 ponds covered in the 2008 Board Order. Its findings concluded that the Water Board's CEQA requirements as a responsible agency were met by the process taken. The document then updates (with strikeouts of deleted text and underlines of new next) the previously issued Board Order to reflect the modified Phase 1 plans by adding/changing Pond A17 to them. It then itemizes all of the changes to the acreages of each type of habitat that would result from Phase 1 implementation. It also includes clarifications to the operations of the water intakes into certain ponds to avoid entraining juvenile salmonids.

There is nothing in the 2012 Board Order that would need further modification or clarification as a result of implementing the proposed Phase 2 actions. There is also little in the 2012 Board Order that pertains directly to the plans for design, construction, or operation of the Phase 2 actions. The exception is the requirement to include fish screens on water intakes into managed ponds located near migratory corridors for anadromous salmonids. The proposed Phase 2 actions only add two reconfigured managed ponds with connections to San Francisco Bay, both of which are at the Ravenswood Ponds, which are far from salmonid runs. The water control structures into these ponds would be passive (i.e., not pumped intakes) and are located at the far upstream ends of blind sloughs with no stream input or upstream habitat for these fish.

Finally, the proposed Phase 2 actions do not necessitate or imply any changes to the management, operations, monitoring, or overall conditions (including habitat values or water quality characteristics) of the non-Phase 2 ponds covered in this Board Order.

Section 2. Response to Second Portion of Comment #1 (Matrix Items 4 and 5)

Table 2 (below) is prepared in response to Comment 1's Item #4 and #5 which respectively asked for a systematic check of Findings 41-52 for Item #4 and of Findings 53-67 for Item #5.

Table 2. Board Order R2-2008-0078 Comparison of Findings

Finding #	Topic	Response
Changes to Pond Management Activities. Findings 41 through 52 addressed pond management and operations activities.		
41	Alviso System A2W	As part of Phase 2, Alviso System A2W (which includes Ponds A1 and A2W) is proposed to be breached to open it to full tidal action and begin converting to tidal marsh. The existing siphons and gates would be removed. The residence time of water in the ponds would decrease substantially. The details of operations and management of the Phase 2 ponds are fully detailed in the application for the Phase 2 water quality certification and so is not repeated here.
42	Alviso System A3W	No operational changes to these ponds (AB1, AB2, A3W, A2E, and A3N).
43	Alviso System A7	In this Order, Ponds A5, A7, and A8 have been grouped into the Alviso System A7. These ponds were included in Phase 1 implementation, which added hydraulic connectivity between them (and also with Pond A8S) by breaching the internal levees between them. Phase 1 also added one culvert into the sloughs adjacent to Ponds A5 and A7 and also added a variable-width and reversible armored notch between Pond A8 and Alviso Slough to allow management of the muted tidal flows into or out of this pond group. Following construction, the notch was closed seasonally to avoid entraining migrating salmonids. During its 'open period' each year, the notch was opened different widths to enable the applied studies about the effects of different amounts of tidal circulation on residual mercury and its methylation, speciation, and uptake by fish and birds. The results of several years of those applied studies on mercury levels have indicated that the notch can safely be permanently opened fully to its maximum of 40 feet. That step has been implemented, and the notch is expected to remain open. There are no other operational changes proposed for this pond group. The proposed action for Phase 2 involves building habitat transition zones at the southwest and southeast corners of this pond group (in what had been Pond A8S). These transition zones will provide immediate benefit by protecting the levees behind them from erosion associated with wind fetch and muted tidal flows. One of these two levees abuts a closed landfill, so this protection is even more important there. They also add some amount of habitat structure and complexity in what are otherwise somewhat deeply subsided ponds. The long-term plan for this pond group is full tidal restoration, to take place in a future project phase, so these habitat transition zones lay the foundation for this future tidal elevation. Following the implementation of the Phase 2 actions to build these transition zones, operation and maintenance of this pond group would be similar to its current operations, with the exceptions that the notch would no longer be closed seasonally and that there would be some additional control of invasive plant species on the slopes of the habitat transition zones and the potential for new locations of existing practices used for mosquito abatement. The details of this proposed new management activities are explained in the response to RWQCB Comment #2 (our response item #6), which develops an addendum to the Adaptive Management Plan.
44	Alviso System A14	No operational changes to these ponds (A9, A10, A11, A12, A13, A14, and A15).
45	Alviso System A16	This Order groups Ponds A16 and A17. These ponds were included in Phase 1 implementation, in which Pond A17 was breached to restore tidal flows and initiate its transition to tidal marsh. Pond A16 was enhanced as a reconfigured managed pond. It had sixteen habitat islands constructed within it, and a fish screen was added between these two ponds to exclude anadromous fish that are expected to use the newly opened Pond A17. These Phase 1 implementations were addressed in Board Order No. R2-2012-0014, which detailed the project and the required operations and management activities, including the seasonal closures of the intake structure into managed Pond A17. There are no further changes to those presented in that Board Order No. R2-2012-0014.
46	Alviso System A23	No operational changes to these ponds (A22 and A23).
47	Eden Landing Complex	This finding is an introductory statement to the next five, which address the Eden Landing pond complex. There are no operational or management actions in this finding.
48	Eden Landing Systems E2 and E2C	This finding is really about two systems: the E2 system (E1, E2, E4, and E7) and the E2C system (E6, E5, E6C, E4C, E3C, and E2C). All of these ponds are in the southern half of Eden Landing, and all are included in Phase 2 of the project. However, that project is undergoing its NEPA and CEQA environmental review now, with final selection of restoration plans for the ponds and well as design and permitting to follow in subsequent years. No changes to the operations or management of these ponds are proposed at the present time because the configuration of these ponds and their hydraulic connections with each other, with Old Alameda Creek, with the Alameda County Flood Control Channel, and with San Francisco Bay are not yet known.
49	Eden Landing System E6A	No operational changes to the three ponds in this system (E6A, E6B, and E8).
50	Eden Landing System E8A	The ponds in this system (E9, E8A, E8X, E12, E13, and E14) were addressed in Phase 1. This finding accurately describes the implemented Phase 1 project. There would be no operational changes to the management actions described in it.
51	Eden Landing System 11	No operational changes to these ponds (Ponds E10 and E11).

Finding #	Topic	Response
52	Ravenswood Complex	This finding discusses all seven Ravenswood Ponds. Ponds R1 and R2 continue to be managed as seasonal ponds as described in this finding. Pond SF2 was included in Phase 1 and was reconfigured with approximately 30 habitat islands and new water intake and outflow gates, per the Phase 1 permits. It will continue to be operated to circulate water around the habitat islands to meet water quality objectives, discharge requirements, and to provide beneficial forage for the roosting or nesting birds there. Board Order R2-2012-0014 describes the approved Phase 1 implementation. No operational changes are proposed for Pond SF2 beyond what is already addressed in that Board Order. The details of operations and management of the Phase 2 ponds at Ravenswood (R3, R4, R5, and S5) are fully detailed in the application for the Phase 2 water quality certification and so is not repeated here. In sum, though: As part of Phase 2, Pond R4 is proposed to be breached to open it to full tidal action and begin converting to tidal marsh. The existing culverts and gates would be removed. The residence time of water in the pond would decrease substantially. Pond R3 would be fitted with two new water control structures to allow improved and more direct management of water levels in the pond and in its historic slough trace and internal borrow ditches. Derelict culverts and gates would also be removed. This is a habitat enhancement to improve Pond R3 for the use of the listed western snowy plover. Finally, Ponds R5 and S5 will become reconfigured managed ponds and fitted with several water control structures to connect them to Flood Slough, Pond R4, and Pond R3; they will also be connected to each by removing most of the existing internal levees. They will be operated to meet water quality objectives, discharge requirements, and to provide beneficial forage or roosting/nesting habitat for birds.
Changes to Monitoring Programs / Overview of Pond Discharges: Findings 53-67 addressed monitoring of pond discharges.		
53	Identification of parameters of concern	This finding identifies the main parameters of concern for pond discharges as being salinity, metals, dissolved oxygen, pH, and temperature. The SBSP Restoration Project proposes no changes to this list of concerns.
54	Salinity Levels of Pond Discharges	This finding reads, "For ponds unaffected by Phase I actions, the Discharger will continue to operate these ponds to limit salinity discharge levels. While the Discharger designed pond systems to ensure that discharged salinity levels remain below 40 ppt, the Discharger modeled the impact on receiving water salinities of discharging salinity levels near 44 ppt, in order to be conservative (for development of Order No. R2-2004-0018). This modeling effort showed that discharging pond waters at salinity levels up to 44 ppt will not cause any significant or potentially significant impacts to any receiving waters." The words "or Phase 2" should be added between "Phase I" and "actions" in the first sentence to note that Phase 2 implementation will convert or otherwise enhance several ponds (which would also be monitored and managed according to permit requirements). The remaining ponds (i.e., those not addressed by Phase 1 or Phase 2) would continue to be monitored and managed as described in the issued Board Orders.
55	Salinity as a Surrogate for Metals	This finding describes the rationale for using salinity as a surrogate for metals. The SBSP Restoration Project proposes no changes to this point.
56	Metals Concentrations	This finding links concentrations of each metal to the threshold for salinity of discharged water. The SBSP Restoration Project proposes no change to these limits.
57	Diurnal Variations in Dissolved Oxygen and pH	This finding summarizes the daily cycles of DO and pH and the influence of algal growth on them. The SBSP Restoration Project proposes no changes to the current monitoring and management practices. It should be noted that the Phase 2 actions would increase circulation in several large ponds (R4, A1, and A2W) by opening them to tidal flows and would add water control structures to enhance management of water quality (including DO conditions) in Ponds R3, R5, and S5.
58	Temperature	This finding notes the results of temperature monitoring since 2004 and sets limits on the temperature of discharged water. The SBSP Restoration Project proposes no changes to these limits. Again, the Phase 2 actions would continue to increase mixing and reduce the problems associated with shallow ponds and increased temperature.
59	Migration of Salmonids	This finding includes seasonal closures of unscreened intakes into ponds to prevent salmonid entrainment. This finding is among those modified by Order R2-2012-0014, which includes the aforementioned modified design for Ponds A16 and A17, which required the fish screen there. In addition, Phase 1 of the project included the reversible notch between Guadalupe Rive/Alviso Slough into Pond A8 (of the Alviso A7 System, described above). Until recently, that notch was closed during salmonid migration season. However, following guidance from the National Marine Fisheries Service, the project monitored and tracked entrainment in these ponds, showed no adverse effect, and has recently been given permission to leave the notch open year-round. The SBSP Restoration Project proposes no changes to monitoring but will continue to monitor for entrainment.

Finding #	Topic	Response
60	Adaptive Management to Improve Water Quality	This finding notes various past uses of adaptive management to improve water quality. The SBSP Restoration Project is committed to continuing to develop, apply, monitor, and report on new adaptive management measures to improve water quality. As noted above, the Phase 2 actions would increase circulation in many individual ponds and/or otherwise improve the ability to actively manage to improve water quality. No specific changes to adaptive management to improve water quality are proposed here.
61	Dissolved Oxygen and Within Pond Fish Mortality	This finding summarizes the linkages between low DO and fish mortality and a general pattern of where that occurs. The SBSP Restoration Project proposes no changes to the monitoring associated with DO and fish mortality.
62	FWS - Adaptive Management	This finding is specific to the USFWS National Wildlife Refuge, as is the response to it. As above, the SBSP Restoration Project proposes no new or additional adaptive management to address low DO and fish mortality. The directional flows implemented have helped reduce problems at the listed ponds, and the proposed Phase 2 actions (as well as the recent approval to leave the A8 notch open year-round) will continue to improve those conditions.
63	FWS - Altering Managed Ponds	This finding is specific to the USFWS National Wildlife Refuge, as it the response to it. As above, the SBSP Restoration Project proposes no new or additional adaptive management to address low DO in managed ponds.
64	DFG - Adaptive Management	This finding is specific to CDFW's Eden Landing Ecological Reserve, as is the response to it. As above, the SBSP Restoration Project proposes no new or additional adaptive management to address low DO in managed ponds.
65	DFG – Altering Managed Ponds	This finding is specific to CDFW's Eden Landing Ecological Reserve, as is the response to it. As above, the SBSP Restoration Project proposes no new or additional adaptive management to address low DO in managed ponds.
66	Regulation of Dissolved Oxygen	This finding is specific to CDFW's Eden Landing Ecological Reserve, as is the response to it. As above, the SBSP Restoration Project proposes no new or additional adaptive management to address low DO in managed ponds.
67	Applied Studies	The SBSP Restoration Project continues to conduct applied studies as directed in this finding. The Project also conducts annual meetings of the principal investigators and periodically aggregates their results and reports to the Stakeholder Forum. Finally, several publications reporting on the Phase 1 applied studies are in press at the current time. The Project also continues to provide annual reports on its self-monitoring efforts. Currently, the Project is developing and vetting ideas for Phase 2 applied studies. The RWQCB will be provided with the draft list of Phase 2 applied studies and other ongoing monitoring and data integration and distribution as those products are completed.

Section 3. Response to Comment #2 (Matrix Item 6)

As noted in the introductory section of this document, Comment #2 in the Board's letter requested an updated Adaptive Management Plan (AMP) to include habitat transition zones. The main feature of the AMP is the adaptive management summary table, which is in Appendix C of that document

Addendum to the Adaptive Management Plan

20 June 2017

This Addendum to the Adaptive Management Plan (AMP) for the South Bay Salt Pond (SBSP) Restoration Project is intended to incorporate a new type of habitat restoration and enhancement feature to the previously adopted AMP. It defines and explains those features and sets for a system for how the AMP's principles and feedback mechanisms would be applied to the new features and what sorts of monitoring and adaptive management actions may be applied to them.

The SBSP Restoration 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 or levees 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". 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:

1. Establish areas in which terrestrial marsh species can take refuge during high tides and storm events, thereby reducing their vulnerability.

2. Expand habitat for a variety of special status plant species that occupy this specific elevation zone.

3. 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 are 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 (15:1 to 30:1). 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 levees are raised or improved, such as at the All-American Canal levees, the only area remaining to

build the transition zones is into the 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 use fill from upland excavation projects to create habitat transition zones inside the former salt ponds. The transition zones would provide habitat complexity and connectivity as marsh is restored. This would help improve habitat quality, particularly for endangered and threatened species, and improve resiliency of the shoreline over time as sea levels rise.

The SBSP Restoration Project notes in this Addendum that there are other new actions associated with the ongoing and more basic actions of maintaining the habitat transition zones that are more like routine maintenance of any part of the National Wildlife Refuge than they are adaptive in nature. Those activities would include the same kinds of actions performed under various regulatory permits, guidance documents, and other agreed-upon protocols. For example, commonplace Refuge practices like trash removal, fencing repairs, biological monitoring of bird populations, trail upkeep, removing invasive plant species and controlling or removing nuisance wildlife species, and other actions would proceed as normal and would therefore be implemented as needed on the habitat transition zones.

More broadly, the SBSP Restoration Project would continue to cooperate with the Santa Clara County, Alameda County, and San Mateo County Mosquito Abatement Districts to provide access by these districts to control mosquito populations. The Project would also work with the Invasive Spartina Project to remove or control populations of the non-native forms of that plant species. Similar coordination efforts to coordinate with adjacent or nearby city or county parks to control and manage use of the public access trails near transition zones by humans (and their pets, if/where allowed) would proceed as normal. None of these actions is what is typically meant by "adaptive management".

Therefore, the table below is limited to the two more adaptive aspects of habitat transition zones: (1) the successful establishment and spread of elevationally-varying vegetation communities and habitat types, and (2) the transition zones' ability to help maintain or improve existing levels of flood protection in the areas landward of where they are constructed. This effect is largely indirect, as habitat transition zones do not directly provide flood protection but do help protect existing levees or uplands from scour or wave run-up.

Proposed New Rows for Adaptive Management Plan Summary Table

Category / Project Objective	Restoration Target	Monitoring Parameter (Method)	Spatial Scale for Monitoring Results	Expected Time Frame for Decision-Making	Management Trigger	Applied Studies	Potential Management Action
Habitat Transition Zones Project Objective 1A. 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.	The range and mosaic/composition of various vegetation communities and associated wildlife species habitat on the transition zones is at or on a trajectory resembling that of a natural (i.e., predevelopment) gradient between intertidal mudflats, low tidal marsh, high tidal marsh, and upland vegetation. This includes characteristics such as vegetation acreage and density per unit of transitional habitat, species composition, and other observable aspects of existing natural or successful marsh restoration sites in South San Francisco Bay.	- Monitoring of planted vegetation to evaluate success of establishment and spread - Acreages of each type of sub-, inter-, and -supratidal habitat (collected via remote imagery with limited ground-truthing) as a percent of the total restoration area; plant species composition, including abundance of nonnatives such as those listed elsewhere in the AMP (qualitative assessments for invasive species will occur annually, quadrant or transect sampling once habitat transition zone has 20% vegetation cover); being on habitat trajectory toward a reference marsh and other restoration sites - Habitat qualities of those different elevationally varying habitat rated as high, medium, or low based on suitability or potential usefulness to Ridgway's rail and salt marsh harvest mouse, determined every 2-3 years using aerial photos, ground-truthing, and/or other methods to evaluate these characteristics - Habitat mapping will take place every 5-8 years, beginning 5 years after the different sections of the constructed transition zone have established vegetation communities. Once 40% vegetation cover has been achieved, species composition (including native vs non-native) will be collected in a variety of zones (low marsh, high marsh, upland) on each transition zone.	Each of the proposed Phase 2 transition zones would be monitored. There are six in total. Two in Pond R4, two in Pond A8S, and one each in Pond A1 and Pond A2W.	- Establishment of different vegetation communities on the lower slopes of habitat transition zones depends on tidal flux, the depth of each pond (i.e., pond bottom elevations relative to tidal elevations). Yet natural vegetation colonization is anticipated to be detectable within 5 years (or less) of reaching appropriate elevations, while habitat development trajectory anticipated to be detectable within 15 years (and possibly less) of the onset of vegetation colonization. - In the areas where planting would take place (the higher portions of the zones), the successful establishment and spread of the planted vegetation is expected to be detectable in 5 years. - Invasive species establishment is expected to be detectable within the first year of its occurrence.	- Failure of habitat transition zones to develop native vegetation communities in elevations where those are expected to develop. - Vegetation deviates significantly (30–50%) from projected trajectory after colonization elevations are achieved. - Failure of the zones to hold or retain actively seeded or planted vegetation communities in elevations where that takes place. - Non-native Spartina, Pepperweed or Phragmites present in large numbers on site. - A level of invasive plant establishment and resistance to active control and management efforts that undermines the ecological values of the native communities and habitats intended for the transition zones to provide. - Inability to control and prevent outbreaks of vector (mosquitoes) on the slopes of the habitat transition zones using the methods and techniques discussed in the Vector Control Project Objectives.	**Applied Study Question #2017-1. Will habitat transition zones become established with naturalistic, native vegetation communities across a range of elevations and thereby provide a gradient of habitats for marsh plants and special-status species, including the California Ridgway's rail and the salt marsh harvest mouse?** Project Objective 1A states that the South Bay Salt Pond Restoration Project will 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. Most ecotone and transitional habitat between the waters of San Francisco Bay and the adjacent uplands have been lost as a consequence of historical land use and development. The Phase 2 actions to construct habitat features to replace this lost natural gradient is an important part of meeting Project Objective 1A.	- Study causes of slow vegetation establishment - Active revegetation - Increased non-native invasive plant species control - If invasive species cannot be controlled, study biotic response to non-native vegetation - Continue to re-evaluate what is meant by “control” of invasive species and adjust monitoring and management triggers based on the latest scientific consensus

Category / Project Objective	Restoration Target	Monitoring Parameter (Method)	Spatial Scale for Monitoring Results	Expected Time Frame for Decision-Making	Management Trigger	Applied Studies	Potential Management Action
Habitat Transition Zones. Project Objective 2. Maintain or improve existing levels of flood protection in the South Bay area.	- No increase in tidal flood risk at any levee or adjacent uplands associated with a habitat transition zone.	- Collect high water mark elevations on the existing levees and adjacent uplands prior to construction and then periodically after construction, especially following large storm or flood events. - Inspect for levee erosion initially monthly, then annually, and after major rainfall and/or tidal events	Each of the proposed Phase 2 transition zones would be monitored. There are six in total. Two in Pond R4, two in Pond A8S, and one each in Pond A1 and Pond A2W.	- Slope failure or erosion/scour is expected to be detectable within 5 years of normal weather, but heavy storm years may cause it to occur earlier or sooner. -If after 10 years, no substantial failure or erosion beyond minor, localized failures, it would be unlikely to occur, as the vegetation communities and natural sediment dynamics should have become established.	- Significant erosion observed - Elevated (higher) water surface elevations projected by modeling effort and/or observed in the field - Field data collection and/or observation indicates that flood risk is greater than that predicted by models	**Are habitat transition zones effective in slowing the amount of erosion or scour due to tides, storm surges, wind waves, or other erosional forces and thereby reducing the risk of levee failure or other aspects of flood risk to surrounding communities and infrastructure?** Habitat transition zones also address Project Objective 2 (Maintain or improve existing levels of flood protection in the South Bay area) because they slow wave run up, buffer storm surges, and provide a broader range of roughly horizontal surfaces on which sediment can accrete and vegetation can form. They thereby provide a foundation for naturalistic future sea-level rise adaptation by providing substrate on which tidally varying habitats can migrate upslope.	- Reconstruct failing portions of the habitat transition zones with material of higher quality. - Construct transition zones with a higher level of soil compaction.

With this letter, the USFWS believes that it has provided all necessary information from the applicant to the RWQCB to file its application as complete. Should you have any questions as you continue your review of this application, please feel free to contact me at (510) 792-0222 or my project representatives John Bourgeois, SBSP Restoration Project Executive Project Manager, at (408) 314-8859 or Dillon Lennebacker, AECOM, at (510) 282-3835. The Refuge appreciates your time and effort during this process and thanks you for working to move forward our shared goals of restoring the San Francisco Bay's beneficial uses.

Thanks,

Chris Barr
Deputy Complex Manager
San Francisco Bay National Wildlife Refuge Complex
United States Fish and Wildlife Service

cc: Naomi Feger/ Dale Bowyer/ Keith Lichten/ Christina Toms/ Robert Schlipf, RWQCB
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Addendum to the Adaptive Management Plan

2 March 2018

This Addendum to the Adaptive Management Plan (AMP) for the South Bay Salt Pond (SBSP) Restoration Project is intended to incorporate a new type of habitat restoration and enhancement feature to the previously adopted AMP. It defines and explains those features and sets for a system for how the AMP's principles and feedback mechanisms would be applied to the new features and what sorts of monitoring and adaptive management actions may be applied to them.

The SBSP Restoration 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 or levees 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". 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:

1. Establish areas in which terrestrial marsh species can take refuge during high tides and storm events, thereby reducing their vulnerability.

2. Expand habitat for a variety of special status plant species that occupy this specific elevation zone.

3. 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 are 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 (15:1 to 30:1). 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 levees are raised or improved, such as at the All-American Canal levees, the only area remaining to build the transition zones is into the 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 use fill from upland excavation projects to create habitat transition zones inside the former salt ponds. The transition zones would provide habitat complexity and connectivity as marsh is restored. This would help improve habitat quality, particularly for endangered and threatened species, and improve resiliency of the shoreline over time as sea levels rise.

The SBSP Restoration Project notes in this Addendum that there are other new actions associated with the ongoing and more basic actions of maintaining the habitat transition zones that are more like routine maintenance of any part of the National Wildlife Refuge than they are adaptive in nature. Those activities would include the same kinds of actions performed under various regulatory permits, guidance documents, and other agreed-upon protocols. For example, commonplace Refuge practices like trash removal, fencing repairs, biological monitoring of bird populations, trail upkeep, removing invasive plant species and controlling or removing nuisance wildlife species, and other actions would proceed as normal and would therefore be implemented as needed on the habitat transition zones.

More broadly, the SBSP Restoration Project would continue to cooperate with the Santa Clara County, Alameda County, and San Mateo County Mosquito Abatement Districts to provide access by these districts to control mosquito populations. The Project would also work with the Invasive Spartina Project to remove or control populations of the non-native forms of that plant species. Similar coordination efforts to coordinate with adjacent or nearby city or county parks to control and manage use of the public access trails near transition zones by humans (and their pets, if/where allowed) would proceed as normal. None of these actions is what is typically meant by “adaptive management”.

Therefore, the table below is limited to the two more adaptive aspects of habitat transition zones: (1) the successful establishment and spread of elevationally-varying vegetation communities and habitat types, and (2) the transition zones’ ability to help maintain or improve existing levels of flood protection in the areas landward of where they are constructed. This effect is largely indirect, as habitat transition zones do not directly provide flood protection but do help protect existing levees or uplands from scour or wave run-up.

Proposed New Rows for Adaptive Management Plan Summary Table

Category / Project Objective	Restoration Target	Monitoring Parameter (Method)	Spatial Scale for Monitoring Results	Expected Time Frame for Decision-Making	Management Trigger	Applied Studies	Potential Management Action
Habitat Transition Zones Project Objective 1A. 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.	The range and mosaic/composition of various vegetation communities and associated wildlife species habitat on the transition zones is at or on a trajectory resembling that of a natural (i.e., predevelopment) gradient between intertidal mudflats, low tidal marsh, high tidal marsh, and upland vegetation. This includes characteristics such as vegetation acreage and density per unit of transitional habitat, species composition, and other observable aspects of existing natural or successful marsh restoration sites in South San Francisco Bay.	- Monitoring of planted vegetation to evaluate success of establishment and spread - Acreages of each type of sub-, inter-, and -supratidal habitat (collected via remote imagery with limited ground-truthing) as a percent of the total restoration area; plant species composition, including abundance of nonnatives such as those listed elsewhere in the AMP (qualitative assessments for invasive species will occur annually, quadrant or transect sampling once habitat transition zone has 20% vegetation cover); being on habitat trajectory toward a reference marsh and other restoration sites - Habitat qualities of those different elevationally varying habitat rated as high, medium, or low based on suitability or potential usefulness to Ridgway's rail and salt marsh harvest mouse, determined every 2-3 years using aerial photos, ground-truthing, and/or other methods to evaluate these characteristics - Habitat mapping will take place every 5-8 years, beginning 5 years after the different sections of the constructed transition zone have established vegetation communities. Once 40% vegetation cover has been achieved, species composition (including native vs non-native) will be collected in a variety of zones (low marsh, high marsh, upland) on each transition zone.	Each of the proposed Phase 2 transition zones would be monitored. There are six in total. Two in Pond R4, two in Pond A8S, and one each in Pond A1 and Pond A2W.	- Establishment of different vegetation communities on the lower slopes of habitat transition zones depends on tidal flux, the depth of each pond (i.e., pond bottom elevations relative to tidal elevations). Yet natural vegetation colonization is anticipated to be detectable within 5 years (or less) of reaching appropriate elevations, while habitat development trajectory anticipated to be detectable within 15 years (and possibly less) of the onset of vegetation colonization. - In the areas where planting would take place (the higher portions of the zones), the successful establishment and spread of the planted vegetation is expected to be detectable in 5 years. - Invasive species establishment is expected to be detectable within the first year of its occurrence.	- Failure of habitat transition zones to develop native vegetation communities in elevations where those are expected to develop. - Vegetation deviates significantly (30–50%) from projected trajectory after colonization elevations are achieved. - Failure of the zones to hold or retain actively seeded or planted vegetation communities in elevations where that takes place. - Non-native Spartina, Pepperweed or Phragmites present in large numbers on site. - A level of invasive plant establishment and resistance to active control and management efforts that undermines the ecological values of the native communities and habitats intended for the transition zones to provide. - Inability to control and prevent outbreaks of vector (mosquitoes) on the slopes of the habitat transition zones using the methods and techniques discussed in the Vector Control Project Objectives.	**Applied Study Question #2017-1. Will habitat transition zones become established with naturalistic, native vegetation communities across a range of elevations and thereby provide a gradient of habitats for marsh plants and special-status species, including the California Ridgway's rail and the salt marsh harvest mouse?** Project Objective 1A states that the South Bay Salt Pond Restoration Project will 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. Most ecotone and transitional habitat between the waters of San Francisco Bay and the adjacent uplands have been lost as a consequence of historical land use and development. The Phase 2 actions to construct habitat features to replace this lost natural gradient is an important part of meeting Project Objective 1A.	- Study causes of slow vegetation establishment - Active revegetation - Increased non-native invasive plant species control - If invasive species cannot be controlled, study biotic response to non-native vegetation - Continue to re-evaluate what is meant by "control" of invasive species and adjust monitoring and management triggers based on the latest scientific consensus

Category / Project Objective	Restoration Target	Monitoring Parameter (Method)	Spatial Scale for Monitoring Results	Expected Time Frame for Decision-Making	Management Trigger	Applied Studies	Potential Management Action
Habitat Transition Zones. Project Objective 2. Maintain or improve existing levels of flood protection in the South Bay area.	- No increase in tidal flood risk at any levee or adjacent uplands associated with a habitat transition zone.	- Collect high water mark elevations on the existing levees and adjacent uplands prior to construction and then periodically after construction, especially following large storm or flood events. - Inspect for levee erosion initially monthly, then annually, and after major rainfall and/or tidal events	Each of the proposed Phase 2 transition zones would be monitored. There are six in total. Two in Pond R4, two in Pond A8S, and one each in Pond A1 and Pond A2W.	- Slope failure or erosion/scour is expected to be detectable within 5 years of normal weather, but heavy storm years may cause it to occur earlier or sooner. -If after 10 years, no substantial failure or erosion beyond minor, localized failures, it would be unlikely to occur, as the vegetation communities and natural sediment dynamics should have become established.	- Significant erosion observed - Elevated (higher) water surface elevations projected by modeling effort and/or observed in the field - Field data collection and/or observation indicates that flood risk is greater than that predicted by models	**Are habitat transition zones effective in slowing the amount of erosion or scour due to tides, storm surges, wind waves, or other erosional forces and thereby reducing the risk of levee failure or other aspects of flood risk to surrounding communities and infrastructure?** Habitat transition zones also address Project Objective 2 (Maintain or improve existing levels of flood protection in the South Bay area) because they slow wave run up, buffer storm surges, and provide a broader range of roughly horizontal surfaces on which sediment can accrete and vegetation can form. They thereby provide a foundation for naturalistic future sea-level rise adaptation by providing substrate on which tidally varying habitats can migrate upslope.	- Reconstruct failing portions of the habitat transition zones with material of higher quality. - Construct transition zones with a higher level of soil compaction.