REPORT

OPPORTUNITIES AND CONSTRAINTS FOR ALVISO POND COMPLEX

SOUTH BAY SALT PONDS RESTORATION, PHASE II

Prepared for

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Acronyms

AMP	Adaptive Management Plan
BA	Biological Assessment
BCDC	(San Francisco) Bay Conservation and Development Commission
BO	Biological Opinion
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
Conservancy	California State Coastal Conservancy
EFH	Essential Fish Habitat
EIS/EIR	Environmental Impact Statement
ESA	Endangered Species Act
HMMP	Habitat Mitigation and Monitoring Plan
LEDPA	Least Environmentally Damaging Practicable Alternative
ISP	Initial Stewardship Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI/NOP	Notice of Intent/Notice of Preparation
PMT	Project Management Team
project	South Bay Salt Ponds Restoration Project
PWA	Philip Williams and Associates
Refuge	Don Edwards National Wildlife Refuge
ROD	Record of Decision

SBSP	South Bay Salt Ponds (Restoration Project)
Shoreline Study	South San Francisco Bay Shoreline Feasibility Study
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

The South Bay Salt Pond Restoration Project (project) encompasses approximately 15,100 acres of former salt ponds located on the perimeter of San Francisco Bay, including the 7,900-acre Alviso Pond Complex at the southern end of the Bay (Figure 1). The project also includes the Eden Landing Pond Complex and the Ravenswood Pond Complex. The Ravenswood and Alviso Pond Complexes are part of the U.S. Fish and Wildlife Service's (USFWS) Don Edwards National Wildlife Refuge (Refuge). The Eden Landing Pond Complex is under the California Department of Fish and Game's (CDFG) Eden Landing Ecological Reserve.

The project has three main goals: habitat restoration, flood management, and improved public access. Each of these is briefly described below.

The purpose of this memorandum is to

- Develop a set of proposed Phase II project actions for the Alviso Pond Complex
- Evaluate the ability of those actions to achieve project goals and objectives
- Make an initial assessment of the opportunities and constraints of those actions,
- Outline a strategy for environmental clearance and permitting.

This memorandum was written for the California State Coastal Conservancy (Conservancy) and the Project Management Team (PMT) of key stakeholder representatives. As such, it assumes that the reader is familiar with the overall project, the setting, and the actions undertaken under the Initial Stewardship Plan (ISP) and Phase I.

1.1 HABITAT RESTORATION

Habitat restoration is the project's primary goal, to be achieved while incorporating flood management and public access as corollary goals. The actual configuration of each Alviso Pond Complex Phase 2 restoration activity will be guided by the Adaptive Management Plan (AMP; FEIS/R App. D 2007) – a strategy that is continuously adjusted based on each site's response to previous restoration activities observed through strategic monitoring and data evaluation – and furthered by this initial analysis of opportunities and constraints. The habitat restoration goals are linked to numerous species – including those listed under the Federal or California Endangered Species Acts (ESA), California species of special concern, migratory birds, and others – that depend upon these habitats for all or part of their life cycles.

Restored habitat should be of sufficient size, function, and appropriate structure to promote restoration of special status species, support current migratory bird species that utilize existing salt ponds and associated structures, and increase abundance and diversity of native species in various South San Francisco Bay aquatic and terrestrial ecosystem components (EDAW et al. 2007).

1.2 FLOOD MANAGEMENT

In order to address sea level rise, public safety, and property protection, one of the project's main purposes is flood management. The specific objective listed in the EIR is to maintain or improve existing levels of flood protection in the South Bay Area (EDAW et al 2007). Flooding in the project area can potentially be caused by high tides, El Niño effects, sea level rise, and fluvial flood hazards (rainwater runoff). Congress authorized the Corps of Engineers to conduct the

South San Francisco Bay Shoreline Study, together with the Santa Clara Valley Water District and State Coastal Conservancy, to identify and recommend Alviso Complex projects that simultaneously address flood damage reduction, ecosystem restoration, and public access.

1.3 PUBLIC ACCESS

A key component of the pond complex design goals is to provide wildlife-compatible public access and recreational opportunities. This public access will be provided for hiking, hunting, fishing, wildlife viewing, and other recreational activities. This increased public access may include walkways and trails, as well as interpretive signage and elevated viewing platforms. These public access and recreation features will be integrated with the Bay Trail and other existing regional and local plans for trails. Evaluating and addressing possible conflicts between recreation and restoration goals will be a key part of this project.

1.4 RESTORATION APPROACH

The basic restoration approach is to restore tidal marsh and managed pond habitat with an ultimate ratio somewhere between 50/50 and 90/10 for tidal marsh/managed pond. Initially, restoration design will aim to meet the 50/50 level goal, increasing the percentage of tidal marsh restoration to as much as 90 percent through the life of the project. The actual configuration of each restoration activity will be guided by the AMP, a strategy that is continuously adjusted based on each site's response to previous restoration activities observed through strategic monitoring and data evaluation. Regular monitoring and evaluation of the data is a vital component of a successfully administered AMP. URS will maintain or improve upon what has been a successful AMP. This approach is a valuable and necessary strategy for projects with a complex set of interrelated variables. In addition, the precise impacts of climate change and associated sea-level rise or changes in amounts or intensity of rainfall are unknown. Yet, they are likely to affect flood control management and tidal marsh restoration and must also be adaptively managed.

This section provides a summary list of reports and other documents reviewed as part of the background research on this project.

Ackerman, Josh, USGS; Mark Marvin-DiPasquale, USGS; Darrell Slotton, UC Davis; Collin Eagles-Smith, USGS. 2010. Memo to Laura Valoppi (USGS), Ann Buell, State Coastal Conservancy, Meghan Hertel, Resources Legacy Fund; Quarterly Report for RLF Grant #2009-0421. The Effects of Wetland Restoration on Mercury Bioaccumulation in the South Bay Salt Pond Restoration Project: Using the Biosentinel Toolbox to Monitor Changes across Multiple Habitats and Spatial Scales. April.

Fulfrost, Brian, Brian Fulfrost Associates. 2011. *Annual Report (Year Two) on the Habitat Evolution Mapping Project for the South Bay Salt Pond Restoration Project*. July 6.

Brown and Caldwell in association with PWA, EDAW, Harvey and Assoc. 2008. South Bay Salt Pond Restoration Project, Attachment to the Application for 401 Water Quality Certification Operations and Maintenance and Phase 1 Actions. May.

Foxgrover, Amy; David Finlayson, Bruce Jaffe. 2011. 2010 Bathymetry and Digital Elevation Model of Coyote Creek and Alviso Slough, San Francisco Bay, California; USGS Survey Open File Report 2011-1315.

Harvey and Assoc. 2008. *South Bay Salt Pond Restoration Project, Phase 1 Monitoring Plan*. October.

Philip Williams and Associates (PWA), EDAW, Harvey and Assoc., Brown and Caldwell. 2006. *South Bay Salt Pond Restoration Project, Final Alternatives Report (FAR)*. January.

PWA, EDAW, Harvey and Assoc., Brown and Caldwell, and Geomatrix. 2007. *South Bay Salt Pond Restoration Project, Final EIS/R*. December.

Santa Clara Valley Water District. Not Dated. *Relationship between Groundwater Elevations and Local Subsidence in Santa Clara County*.

Stacey, Mark. 2010. *The Interactions of Island Pond Restoration and Coyote Creek Final Report to Legacy Fund*, Grant #2009-0105; UC Berkeley; 6/2011. South Bay Salt Pond Restoration Project; Annual Report, 2011; 2/2012. South Bay Salt Pond Restoration Project, Project Status Report, 8/2009. South Bay Salt Pond Restoration Project, Table of Key Uncertainties and Phase 1 Studies. August.

SBSP (South Bay Salt Pond) Project Management Team. 2010. South Bay Salt Pond Restoration Project, Phase 2: Preliminary Options for Future Actions. September.

SBSP (South Bay Salt Pond) Project Management Team. 2009. *South Bay Salt Pond Restoration Project Status Report*. August.

Takekawa, J., Arriana Brand, Isa Woo, Stacy Moskal. 2011. Effects of regional wetland restoration on the Alviso Shoals of the South San Francisco Bay: migratory bird ecology, food webs, and sediment supply. February.

United States Fish and Wildlife Service (USFWS) and United States Geological Survey (USGS). 2011. *South Bay Salt Pond Restoration Project, 2011 Annual Self-Monitoring Report*. March.

United States Fish and Wildlife Service (USFWS). 2007. Recovery Plan for the Pacific Coast Population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*). In 2 volumes. Sacramento, California. xiv + 751 pages.

This section first provides an overview of the two main parts of the Alviso Pond Complex being considered as part of Phase II of the South Bay Salt Pond Restoration Project. It then presents and evaluates the proposed actions and the opportunities and constraints for the design elements that may be used to implement them. The attached Table 1 summarizes the opportunities and constraints. Opportunities are essentially alternatives for how particular actions could be achieved. Constraints are technical, legal, financial, temporal, or political/social barriers to successful implementation. They are included to assist the Conservancy in considering cost, ease of permitting, and consistency with the three goals of habitat restoration, flood control, and public access/recreation.

Within the Alviso Pond Complex, there are two clusters of ponds that are being considered as part of Phase II. They are (1) A1, A2W, and the City of Mountain View's Charleston Slough at the western end, and (2) A19, A20, and A21 at the eastern end. Ponds A19, A20, and A21 are often collectively referred to as "the Island Ponds." For convenience, this document will also refer to ponds A1, A2W, and the adjacent Charleston Slough as "the Mountain View Ponds," even though Charleston Slough is neither a former salt pond nor part of the Refuge, which is managed by the USFWS.

The Mountain View Ponds generally receive higher visitation and recreational use than the Island Ponds do, largely because of their existing facilities and close proximity to developed communities. The lack of access to the Island Ponds makes them less of a recreation destination and more of a focus for habitat restoration. Thus, planning for recreation is more of a focus at the Mountain View Ponds than it is as the Island Ponds. Flood control is also a more pressing topic at the Mountain View Ponds than at the Island Ponds because of their closer proximity to developed communities and businesses.

3.1 ALVISO A1 AND A2W AND CHARLESTON SLOUGH

This section describes actions being considered for the Mountain View Ponds at the Alviso Pond Complex. Figure 2 illustrates these conceptual actions and their possible locations.

3.1.1 Summary Information and Restoration Approach

The Mountain View Ponds are located adjacent to the City of Mountain View's Shoreline Park. At present, Ponds A1 and A2W are managed by the USFWS, which has been operating them as continuous flow-through systems by circulating water through inlet and discharge gates to maintain water quality standards. The City of Mountain View owns the adjacent Charleston Slough, which is being considered in parallel with restoration actions as Pond A1 and A2W because of various opportunities to collaborate on what would otherwise be two separate actions.

The main habitat restoration goal for the Mountain View Ponds system is to restore these ponds to full tidal marsh by breaching the levees between Charleston Slough and A1, A1 and Mountain View Slough, Mountain View Slough and A2W, and/or A2W and Stevens Creek.

The public access and recreational trails on the pond's southern borders are heavily visited because of their proximity to Shoreline Park. There are several restoration and public access options for improving existing trails and/or providing spur trails along side of or into one or more of the restored ponds.

In addition, an action involving the City of Mountain View's Charleston Slough is included in this memorandum because of an opportunity to integrate habitat restoration at Charleston Slough and its adjacent tidal mud flats with actions at Ponds A1 and A2W. Mountain View must restore 53 acres of tidal wetland as mitigation required in a permit issued by the San Francisco Bay Conservation and Development Commission (BCDC). Discussions between the Conservancy and the City are underway about whether and how to integrate that restoration with those of the Alviso Pond Complex. This would likely reduce the amount of work required to achieve the mandated level of flood protection because the flood storage capacity would be increased by connecting the basins and thereby attenuating the flood surge. It could also allow the Conservancy and Mountain View to share planning, permitting, and implementation costs; and possibly achieve more habitat restoration, flood protection, and recreational access at a lower cost and/or in less time.

Potential Phase II actions at the Mountain View Ponds are as follows:

- Restore tidal marsh in A1 and A2W by breaching
- Integrate Mountain View's mitigation project at Charleston Slough into the SBSP Restoration Project
- Add and/or improve recreation trails and viewpoints along southern margins of A1 and A2W

3.1.2 Restore Tidal Marsh in Pond A1 and A2W

This action is described in the 2011 Annual Self-Monitoring Report. The concept is to breach or lower the slough-facing sides of the levees. These are the levees separating Charleston Slough from A1, A1 from Mountain View Slough, Mountain View Slough from A2W, and A2W from Stevens Creek. Specific details to consider for these breaches are their sizes and locations, as well as potential interference caused by two or more breaches in the same levee. Similar considerations are required for lowering portions of these levees.

These actions are particularly suited to the AMP because the system's response to the breaching could be very complex, due to the number of interrelated variables and drivers. Examples of some of the more pronounced variables are timing and intensity of storm runoff, tidal dynamics, sea level rise, sediment supply, and flood protection or response to specific breaching activities.

An additional option is to lower the height of a portion of the Bay-side levees of these ponds to hasten their conversion to tidal marsh. The height of the lowered portion would be set equal to the desired finished elevation this would create a sill at the outer edge of each pond. The sills could be hardened to prevent scour from tidal and storm surges, yet the surges would likely continue to bring in sediment until the pond grade matches that of the sill. A full breach of these Bay-side levees could increase risks associated with loss of flood control.

Opportunities

There are several opportunities and advantages associated with tidal marsh restoration of these ponds.

Locating and sizing the breaches or levee lowerings to achieve maximum sediment delivery rates would speed accretion and restoration. Doing so in conjunction with temporary berms constructed on the marsh plain to direct and deliver sediment to particular locations would

further speed the restoration. There would be an increase in habitat diversity given the increase in topographic diversity. Tidal habitat is strongly controlled by even slight topographic differences. The orientation, shape, elevation, and size of the breaches and/or temporary berms will affect their effectiveness in facilitating deposition.

There is an opportunity for the project to incorporate the acceptance and placement of upland fill material and dredged material for use in restoration and flood protection. This material is likely to be available at no cost (or may generate revenue for the project) and in large quantities. The use of this material to add islands to the ponds as they are forming marsh would increase habitat diversity. The use of this material to create ecotone (upland transitional habitat) would similarly increase habitat diversity and recreational quality in the areas adjacent to the trails.

Dredged material from other locations around the Bay could be used to raise the grade of the ponds and thereby reduce the time needed to reach an elevation on which vegetation could grow. If tidal inflows are the only source of sediment (i.e., if additional material sediment is not brought in), it may take a long period of time to achieve proper marsh plain grade.

Breaching levees along the ponds' borders with two large conveyors of stormwater runoff (Charleston Slough and Stevens Creek) could increase flood storage capacity by linking these water bodies with large basins into which high flows could go, though the magnitude of this effect is unknown. In addition to adding some degree of flood protection, this option could speed sediment accretion because flood runoff is a competent, if infrequent, conveyor of sediment, and it is virtually free of cost.

The add-on option of lowering a portion of the Bay-side levees of Ponds A1 and A2W would speed restoration by adding a second source of sediment delivery. Sediment delivered by high tide and storm surge will augment that which is delivered through the inland levee breaches.

An opportunity exists to integrate the Stevens Creek mitigation marsh with the larger restoration and recreational actions being considered for Ponds A1 and A2W. The Stevens Creek mitigation marsh is owned by the City of Mountain View and is located immediately south of the eastern end of Pond A2W and west of Stevens Creek. There is a levee separating the marsh from Stevens Creek, but that levee has two culverts passing through it to provide some muted tidal flows. There are trails on all three sides of the marsh. There is potential to either breach part of the levee between the mitigation marsh and Stevens Creek and/or to connect it in some manner to a tidally-restored Pond A2W. This would create larger restored marshes instead of "pockets" of marsh that are isolated by levees. However, there are constraints associated with this opportunity, as discussed below.

Constraints

If the restoration of Pond A1 is done by breaching the levee along Charleston Slough, additional flood control measures would need to be developed and implemented. This could involve raising and/or improving the unbreached portions of that levee to increase the flood protection it provided. Alternatively, the levees on the southern (adjacent to City of Mountain View) and northwestern (adjacent to the Palo Alto Flood Control Basin) may need to be similarly enhanced.

The City of Mountain View has a pump intake in Charleston Slough to provide water for the park's recreational sailing lake; water is discharged into Mountain View Slough/Permanente Creek. The water supply (over 5.4 million gallons per day) must continue to be provided to the

lake, though not necessarily from this location. The existing pump station could be moved to a more suitable location, but relocating an existing pump station is quite expensive and would need targeted studies to fully evaluate. Alternatively, extending the intake pipe to the Bay may be feasible and effective, though this would need to be examined with targeted studies.

If the ultimate decision is made to breach the levee between A1 and Charleston Slough, the sediment budget of Charleston Slough should be considered. There is the possibility that the sediment-starved A1 would draw sediment out of Charleston Slough and degrade habitat there. One possible solution would be bringing sediment in to A1 prior to breaching that levee.

There is also a landfill south of A1 and A2W that must be considered as part of project design in both the short- and long-term. Contamination must be avoided. The weight or pressure of the material brought in to increase flood protection or to create upland transitional habitat must not disturb the landfill cells.

Breaching or lowering the slough-side levees could alter the sediment-transport competence of the sloughs. All proposed levee alterations should be evaluated for their effects on sediment dynamics prior to implementation.

PG & E has three access points along the east and north sides of Pond A2W. Vehicular access to these points must be maintained. Any levee breaches along this route must be hardened and bridged to allow vehicular access.

Water quality and sediment quality are other possible constraints. Because of historic mercury mining in the nearby Guadalupe River watershed, some of the sediment coming in from the Bay may have undesirable characteristics, such as elevated mercury levels. Elemental mercury tends to settle in the deeper layers of sediment (greater than four feet) and can mobilize if those sediments are disturbed. It would be valuable and relatively inexpensive to quantify the mercury levels of the sediment, particularly those which are to be relocated for use in other areas of the complex. This is a general concern in the southern San Francisco Bay, and it applies to most of the actions considered in this memorandum.

Mercury is of particular concern for the water intake for Shoreline Lake, which would need to be fully evaluated to determine what potential existed to introduce contaminants into the lake and any changes in the water chemistry.

Similarly, dissolved oxygen (DO) has been an occasional problem in these ponds even though the USFWS circulates water through the system. The tidal sill option, if done in isolation (i.e., if no other breaches are made in the inland levees), may require other measures to ensure that adequate circulation is provided to address DO as well as to help control odors that might otherwise disturb visitors. Otherwise, the current DO problem could be exacerbated. If, however, full breaches are made along the sloughs, then circulation is likely to be sufficient.

There is a possible reduction in number and diversity of pond-dependent birds (diving birds, dabbling ducks, etc.) as they may be displaced by the increased area of tidal marsh and uplands.

Varying elevations for extended periods of time on the marsh plains or ecotones may provide an opportunity for invasive plants to get started. The best way to diminish the dominance is to plant the ecotones with native species during and immediately after construction efforts.

If ecotones are constructed, however, their construction could require additional truck traffic as the material is brought in and cause potential disruption to the Shoreline Park users and the

neighborhoods along the transport routes. Further, the stability of the existing levees to support heavy trucks would need to be considered.

If the Stevens Creek mitigation marsh it connected via breaches along either its eastern border with Stevens Creek or its northern border with Pond A2W, bridges over the breaches would need to be added to maintain the current trail network. Further, the Bay Trail runs along the northern and eastern levees, so disruptions here would be more difficult to permit. If ecotone is placed in Pond A2W, then the opportunity to connect that pond with Stevens Creek mitigation marsh would be lost.

3.1.3 Integrate Mountain View's Mitigation into the SBSP Restoration Project

This action is primarily institutional and organizational in nature. As briefly described in Section 3.1.1, the City of Mountain View is required to restore 56 acres of tidal marsh in Charleston Slough. If included in the project, the Conservancy and the city would develop a formal agreement by which they would incorporate Charleston Slough into the work at Pond A1 and A2W. Note that restoring A1 to tidal marsh by breaching the levee between A1 and Charleston Slough does not depend on the full integration described in this action. That levee could be breached without this arrangement; however, a significantly greater amount of additional flood control would then be needed between A1 and Charleston Slough. This action proposes to reduce that requirement and gain other efficiencies by doing joint planning, design, permitting, and perhaps even cost-sharing.

The Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR)(PWA et al. 2007) discusses Charleston Slough as being within the Authorized Expansion Boundary for the USFWS because of the additional restoration and conservation opportunities it offers. Although this transfer of ownership is not necessarily a required component of this proposed action, it would be one way to achieve it. Easements or other mechanisms to temporarily or permanently transfer certain rights could be used to achieve similar results.

At the present time, there is interest at both the Conservancy and the City of Mountain View in exploring this action. The description here is preliminary and speculative because many legal, financial and regulatory processes would need to occur for full integration to be effective.

Opportunities

As noted, the reduced requirement for additional flood control along the A1/Charleston Slough border is a large advantage for this collaborative action.

An above-listed action discussed the pump station and the intake pipe currently located in Charleston Slough and the need to supply water to the sailing lake in Shoreline Park. This is another opportunity for flexibility and/or cost-sharing of ways to meet or overcome the various requirements. Perhaps Mountain View could extend the intake pipe or assist in reconfiguring the intake or the pump station itself.

Full integration of these restoration actions could reduce the combined costs of these projects by allowing design, National Environmental Policy Act and California Environmental Quality Act (NEPA/CEQA) documentation, and permitting to address both of them. Similarly, public involvement and stakeholder engagement could be streamlined.

Finally, the City of Mountain View is about to undertake a capital improvement planning (CIP) project to address its current levee system under future sea-level rise and other dynamics. Making sure that project's findings inform and are informed by the SBSP Restoration Project would likely enhance both of them and increase their overall efficiency.

Constraints

Integrating the City of Mountain View's mitigation requirements with the SBSP Phase II actions could add complexity to the permit process. The opinions and positions of the many regulatory agencies that would review and issue permits or agreements for these actions are unknown at this time. Early coordination with those agencies is critical. The BCDC is particularly important to involve because the mitigation requirement is in one of its issued permits.

The existing BCDC permit should be thoroughly analyzed for what it would or would not allow. For example, the permit required City of Mountain View to restore the north end of A1/Charleston levee for least tern roosting habitat. It would be beneficial to know if this would be affected by breaching.

There could also be legal or financial barriers to the sorts of arrangements described here, and they would need to be investigated. A hypothetical example is which entity would be responsible if the Charleston Slough mitigation habitat or the sailing lake intake were to be impaired after breaching the A1/Charleston Slough levee.

3.1.4 Add/Improve Recreation Trails and Public Access

This action would add and/or improve public access around and into these ponds, primarily by adding and improving walking/biking trails along the southern margins of A1 and A2W, but also by considering spur trails into the heart of the restoring marshes or a bridge over the slough separating them.

Opportunities

Following the necessary improvements, create spur trails along existing levees out to breach points, or over them if a bridge is also provided. Link the spur trails with the Bay Trail and/or Shoreline Parks trail network. Adding interpretive signage, an elevated viewing platform, and/or trails on boardwalks would increase the recreational quality. Build a bridge over Mountain View Slough to increase trail use and quality of the recreational experience. An overlook on the hill near Shoreline Amphitheater would also provide a scenic vista with minimal disruption to restoration actions. That part of the park does have burrowing owl, however, so it would need to be planned carefully.

Constraints

Human visitation is often disturbing to wildlife. Facilitating increased visitation can also facilitate disturbance. There are design and management actions available to minimize these impacts – such as constructing trails at certain distances away from likely habitats for sensitive species, use of boardwalks, or having a "stay on trail" policy – but these will require signage, public education, and enforcement, all of which increase costs. There are other environmental constraints to adding trails or bridges (for example, constructing a bridge over Mountain View

Slough) that would need to be evaluated and taken into account as part of planning and permitting.

The construction activities being considered for this project, including breaching, stockpiling upland or dredged material, creating ecotones, and so on, would all have at least temporary impacts on recreational trail use. The presence of truck traffic in and through Shoreline Park would be particularly disruptive. Public resistance to or dissatisfaction with these impacts could be a form of constraint if they cause a drop in public support for the SBSP Restoration Project as a whole.

Since trails in Shoreline Park are used as maintenance access, the locations of future trails may need to be designed and placed to allow maintenance equipment and access. Because some of the hauling routes for fill material to raise levees, add trails, etc. are located on existing levees, those routes should be evaluated for their suitability to carry truck traffic. Of particularly note is the levee between Shoreline Lake and the Coast Casey forebay.

Many of the constraints that pertain to building upland transition zones that abut the existing landfill also pertain to some design elements involving adding or raising trails.

Shoreline Park is also known to host burrowing owls, though not adjacent to Ponds A1 or A2W, so their habitats must be protected during project actions, particularly those involving construction and terrestrial recreational access.

3.2 ALVISO PONDS A19, A20, AND A21

This section describes actions being considered for the Island Ponds at the Alviso Pond Complex. Figure 3 illustrates these conceptual actions and their possible locations.

3.2.1 Summary Information and Restoration Approach

The Island Ponds were breached with a goal of restoring tidal marshland as part of the Initial Stewardship Plan (ISP). The southern levee along Coyote Creek was breached in 5 locations in 2006: two each along A21 and A19, and one in A20. The existing breaches allow and promote the healthy growth of pickleweed and other salt marsh vegetation. According to the 2011 Self-Monitoring Program Annual Report, these ponds – particularly A20 and A21, which are closer to the Bay – are accreting sediment and developing habitat faster than expected. Pond A19 lags behind A20 and A21 in accretion rate and subsequent vegetation establishment. This is very likely caused by the locations of the A19 breaches, which are at a greater distance from the Bay.

The rate of sediment accretion and marsh restoration is important primarily because of anticipated sea-level rise in the coming decades. If that occurs fast enough, marsh areas will get inundated before they can become established and spread. There is much uncertainty about the expected rates of sea-level rise, but this issue needs to be included in tidal marsh restoration, particularly in actions where changing the *rate* of accretion and restoration is the goal.

These ponds are somewhat remote for land-based recreational access but could be interesting side trips for kayakers in South San Francisco Bay, though vandalism of cultural resources at the historic town site of Drawbridge would be a concern. Recreational access is less critical here than at other places in the SBSP Project as a whole.

The restoration actions to consider for the Island Ponds involve adding breaches to one or more of these ponds and/or modifying the existing breach or lowering existing levees. There are also options for providing hydrological and/or biological connectivity between one or more of these ponds.

Note that, as in the Mountain View Ponds and at the Eden Landing and Ravenswood Pond Complexes, upland and/or dredged material could be used to reduce the time required to raise pond floor elevations to where vegetation would grow or to create islands for habitat for western snowy plover or other nesting birds is conceivable. However, getting this material to these comparable inaccessible ponds may be cost-prohibitive. That is a "blanket constraint" that applies to restoration in the Island Ponds. If instead the decision is made to accelerate the pace of A19 or all three ponds and not wait for breaches to bring in material, a suction dredge operation or other pipeline delivery system may be justified based on the volume of material needed and a nearby source.

Another blanket constraint is that specialized equipment, such as amphibious excavators, barged-in equipment, or floating dredgers, would be needed for work at the Island Ponds, which would increase costs.

As at the Mountain View Ponds, water quality and sediment quality are possible constraints. Because of historic mercury mining in the nearby Guadalupe River watershed, some of the sediment coming in from the Bay may have undesirable characteristics, such as elevated mercury levels. Elemental mercury tends to settle in the deeper layers of sediment (greater than four feet) and can mobilize if those sediments are disturbed. It would be valuable and relatively inexpensive to quantify the mercury levels of the sediment, particularly those which are to be relocated for use in other areas of the complex. This is a general concern in the southern San Francisco Bay, and it applies to most of the actions considered in this memorandum.

A final overarching constraint is the need to not undo the improvements in fish habitat that have been observed since the earlier restoration actions. The monitoring of fish populations by species since the earlier breaching of the Island Ponds has shown a great increase in the numbers of native fish species using these ponds and the adjacent slough. Actions taken to speed sediment accretion or otherwise improve habitat restoration should avoid reversing this positive trend.

The actions considered for A19, A20, and A21 are:

- Breach (or lower) northern levee of A19 along Mud Slough
- Breach (or lower) northern levee of all 3 Island Ponds along Mud Slough
- Add or modify breaches in the levees between the Island Ponds and Coyote Creek to the south
- Provide hydrological connectivity between A19 and A20
- Enhance water-based recreational access in Coyote Creek and/or Mud Slough

3.2.2 Breach Northern Levee of A19 along Mud Slough

As noted, A19 is accreting sediment more slowly than A20 and A21. The action here would be to increase that rate by adding one or more breaches along the northern levee of A19, along Mud Slough. The USFWS has advised that the existing levee between A19 and Mud Slough has no

current flood control or other management purpose and could safely be breached. The location, dimensions, and orientation of the levee breach(es) would be selected to avoid or minimize adverse effects on other levees.

A conceivable alternative to breaching the northern side of A19 would be to narrow or close the southern levee breaches in A20 and/or A21 to allow more sediment to reach A19. However, it is understood that reversing previous management actions is not preferred, and that concept has been eliminated from further consideration for the time being. Results of future monitoring conducted under the AMP may indicate revisiting this idea.

Opportunities

A related opportunity, while not technically a breach, is to lower all or part of the northern levee to further increase the sediment accretion rate. This would be similar to the tidal sills discussed for the Mountain View Ponds.

Material from the breached (or lowered) levee could be deposited in the center of the pond equidistant from Mud Slough and Coyote Creek, where accretion would otherwise occur last. This would raise the pond-bottom elevation and shorten the time required to allow vegetation to become established. The material from lowering or breaching could also be used to fill in borrow ditches or to create upland transition zones, though these would be rather small due to the quantity of material.

Another opportunity is to create topographic alterations (e.g., a channel in the pond bottom and/or a series of berms) on the marsh plain to direct incoming sediment from the breach to specific locations in A19. The orientation, shape, and size of these alterations would affect their effectiveness in facilitating deposition.

Finally, supplemental habitat for western snowy plover could be provided by adding shells and/or salt moguls along existing levees. The Island Ponds' relative isolation from human activities makes them a good spot for plover, if suitable nesting habitat can be provided.

Constraints

As noted above, the purpose of breaching the northern levee of A19 along its border with Mud Slough would be to increase the rate of sediment accretion there. Doing so may not be strictly necessary because eventually, when A21 and A20 reach marsh plain elevation, the sediment currently being deposited in those ponds would instead be delivered further upstream in Mud Slough and into A19. Thus, eventually, A19 would become tidal marsh as intended; adding breaches along Mud Slough would merely speed this process.

As at the Mountain View Ponds, the hydrologic dynamics are complex and can be somewhat unpredictable as they are driven by storm surges and complicated by tidal action. Increased sediment loads are delivered during wind-driven storm surges in combination with high tides, as well as by freshwater storm runoff. While tidal action is predictable, the high variability of storm runoff is not. Further, large storm events have the potential to scour away previously deposited sediments.

Breaching or lowering this levee could reduce the sediment-transport competence of Mud Slough by reducing its stream power. That is, additional breaches would slow the velocity of water flowing through Mud Slough by increasing its total cross-sectional area, Slower flows have

lower sediment-transport capacity. This possible effect should be evaluated prior to implementing any alteration to the levee.

There are several patches of *Eleocharis parvula*, the small spikerush, scattered along the mudflat-marsh adjacent to the borrow ditch along the interior of the levee that would be breached or lowered under this action. This plant species is listed by the California Native Plant Society as "uncommon" and is not very endangered in California. Therefore, while it is not formally protected under any law or regulation, it is likely CDFG would prefer that potential impacts on it be evaluated (for CEQA compliance) and avoided if possible. Breach locations should consider the species locations and be chosen to minimize impacts on it.

The quality of the sediment expected to be delivered to A19 by breaching or lowering would need to be evaluated.

The status of the fisheries in the Island Ponds has improved since their southern margins were breached. Any action to breach the northern levee or other otherwise modify the local hydrology and sediment accretion rates would need to avoid adversely affecting this trend.

Without additional material, the upland transition zones created by this action would be quite small. If the only source of material is local breaching or lowering of levees, it would probably be better used to raise pond-bottom elevations or perhaps to create nesting islands – more for avocets or terns than for snowy plover – though these would need to be rather high because of the large tidal elevation change in these ponds.

Implementing this action could reduce construction access to the northern levees of A20 and A21 should they eventually need to be breached.

Finally, the topographic modification aspects of this option would involve use of heavy equipment, which could disturb wildlife and the recovering plant community.

3.2.3 Breach Northern Levees of All Three Island Ponds along Mud Slough

This action and its associated opportunities and constraints are quite similar to the ones discussed above, except that they would take place at all three of the Island Ponds. Adding north-side breaches to A20 and A21 as well would allow those ponds to reach the sediment elevational equilibrium sooner. This may be particularly important if sea-level rise proceeds rapidly enough that tidal marsh is inundated faster than it can form, establish, and spread.

Afterward, there would be an increase in the amount of Mud Slough sediment available to A19, which would in turn speed its sediment accretion rate. Also, the sediment accretion at A20 and A21 has been occurring disproportionately close to the breaches. This is a normal pattern of sediment deposition: water enters the breach, its velocity decreases, sediment drops out near the breach, and then fills in from the leading edge. This action would reduce this effect by modifying the inter-pond hydrology and spreading the sediment more evenly throughout the ponds.

Opportunities

The list of opportunities in Section 3.2.2 applies here as well.

An additional opportunity (though not without a downside, as discussed in the Constraints below) would be to breach A19 first and then monitor it for a year or more to inform the AMP to determine whether or not additional breaches to the other two ponds were necessary. If they

were, then creating these from east to west with a season or two between them would allow Pond A19 a "head start" on increasing its accretion rate. Note that it may be inadvisable to further open A20 or A21 until A19 has achieved final elevation. Doing so would risk halting accretion in A19 until A20 and A21 reached equilibrium.

Constraints

The list of constraints in Section 3.2.2 applies here as well.

The east-to-west sequence of levee breaches approach described above could also have an adverse impact. If A19 is breached first, it could be more difficult to get the equipment to the breach locations of Ponds 20 and 21. Installing breaches from east to west may be impractical from a constructability standpoint, even if somewhat more efficient ecologically. On the other hand, this is not necessarily a critical issue; as noted earlier, specialized equipment is necessary to reach any of the Island Ponds.

There is an associated risk that breaching at the north ends of A20 and A21 might actually scour away some of the newly accreted marsh and its vegetation. Since restoration at these ponds appears to be these ahead of schedule, adding breaches to them might be an unnecessary risk.

Finally, this action would bring the additional cost of opening breaches in these levees that may not be ecologically necessary (unless sea-level rise occurs faster than marsh establishment, as discussed above) but instead might simply hasten the rate of accretion.

3.2.4 Add or Modify Breaches in Southern Levees

In addition to the aforementioned actions on the northern levees, breaches in the southern levees of one to three of these ponds could be made, the existing openings could be enlarged. This would avoid the risk of altering Mud Slough's hydrology or sediment dynamics while still increasing the rate of sediment accretion in these ponds. As above, the spoils from the breaches could be deposited in the middle or northern sections of the ponds (depending on whether the northern levees were also breached or not), where accretion would otherwise occur last. Finally, as another modification, the levees could be lowered to marsh plain elevation along all or part of their lengths, and the spoils could be deposited in the middle of the pond.

Opportunities

The primary opportunity is to increase the sediment deposition rate in Pond A19 by adding breaches in the southern levees. This action could be combined with the previous two actions, and it would present similar opportunities as those listed there.

Constraints

Most of the list of constraints in Section 3.2.2 applies here as well, though since there already is a breach in these levees, the water quality would not change appreciably.

Equipment access to these breaches would be difficult. Finally, opening additional breaches would bring added cost. Yet the benefits might only be a faster tidal marsh restoration, not necessarily a better one.

3.2.5 Breach or Lower the Levee between Pond A19 and Pond A20

The goal of this action would be to increase the hydraulic connectivity between these two ponds, which would speed up A19's accretion and overall rate of conversion to tidal marsh. It would also increase the aquatic habitat value to fish and tidal marsh species by providing a larger body of contiguous tidal marsh, once restoration is complete.

Opportunities

In addition to improving connectivity, this action would also provide more material to use as islands, ditch blocks, or raising pond bottom elevations. Using this material in this way could increase habitat complexity and/or speed the conversion to tidal marsh.

Constraints

Creating ecotone with fill from the breached or lowered levee could be hard to permit and have direct impacts on existing fringing pickleweed habitat on the inside of the ponds. This use of that material may not be feasible; however, creating islands or other features may still be possible.

3.2.6 Add or Enhance Water-Based Recreation in Coyote Creek and/or Mud Slough

This action could be combined with any of the others described above. It would simply be a way to provide or enhance recreational access to view these ponds from kayaks or similarly small watercraft.

Opportunities

Extend the "Water Trail" concept into Mud Slough and/or Coyote Creek. Development to accommodate this use could be very rustic and low-impact, consisting of a few signs coordinated with a map and some tidal guidance and put-in/ take-out protocol. These improvements could initially be provided by a local club that may adopt and maintain these spurs off of the Water Trail, if one could be identified.

Constraints

The low tides are difficult in these sloughs, and there is a risk of temporary stranding of small boats there. Educating potential visitors should be a top priority if this action is pursued.

Increased water-based recreation and visitation could disturb fish and other aquatic wildlife. Foot trails should not be considered because connectivity with existing trail routes would be problematic.

4.1 NEPA/CEQA STRATEGY

A Programmatic EIS/EIR for the entire SBSP Restoration Project was completed and signed in 2007 (PWA et al. 2007). That document also served as a project-level EIS/EIR for the Phase I actions that were to be undertaken at all 3 complexes. Under the current scope, the preparation of an EIS/EIR for Phase II projects at the Alviso and Ravenswood Pond Complexes will be tiered off of the Programmatic document and will use as much of the existing Phase I project material as possible. A similar EIS/EIR for the Eden Landing Pond Complex will be produced as part of a subsequent project task with the Conservancy.

In order to streamline the NEPA/CEQA process, a single EIS/EIR will be prepared that will cover both Alviso and Ravenswood Pond Complexes. After the conceptual (10%) design alternatives have been developed, the impacts of at least three alternatives will be compared, including the 'no project' alternative. Alternatives may be in the form of the number/sequence of restoration actions (as done for the Phase 1 EIS/EIR) or could be different design alternatives for each restoration action proposed. The likely case will be a mixture of both of these interpretations of "alternatives."

Project descriptions will be written for each of the alternatives and summarized in the Notice of Intent/Notice of Preparation (NOI/NOP). After the NOI/NOP is released, a public scoping meeting will be held to inform the public and agencies of the project alternatives and their potential impacts and to solicit their input regarding the environmental analysis. The EIS/EIR will then be drafted. The following sections are expected to be included in the EIS/EIR which largely follow the format of the Programmatic EIS/EIR (PWA et al. 2007):

- Hydrology, Flood Management, and Infrastructure (to include Sea-level Rise)
- Surface Water, Sediment, and Groundwater Quality
- Wetlands and Waters of the United States
- Geology, Soils, and Seismicity
- Biological Resources
- Recreation/Public Access Resources
- Cultural Resources
- Land Use
- Public Health and Vector Management
- Socioeconomics and Environmental Justice
- Traffic
- Noise
- Air Quality/Greenhouse Gas Emissions
- Public Services
- Utilities

- Visual Resources
- Cumulative Impacts

Additional field and technical studies are needed to complete the wetlands and other waters, biological resources, cultural resources, and recreation/public access sections. These studies will be conducted early during the development of the EIS/EIR and used to further inform future permitting tasks.

The Draft EIS/EIR will be released for public review. Interested parties and adjacent property owners will be notified directly. In addition, a public hearing will be conducted to receive public comments on the draft document. A Final EIS/EIR will be produced based on the public comments and a record of decision (ROD) and findings statement will be published and filed

4.2 PERMITTING STRATEGY

Permitting preparation will begin after the 10% conceptual design for the restoration actions is completed and NEPA/CEQA document is drafted in order to increase efficiency. The permits will utilize the framework of the Phase 1 permit applications and the project description prepared for the 10% design memo. Similarly, the Phase I permit conditions and/or those proposed in the Phase I applications will be used as source material for the Phase II applications. Though the conditions will not be exactly the same, the material will be useful in developing and proposing appropriate avoidance, minimization, and mitigation measures.

The permitting for Alviso will be combined with the permitting for the Ravenswood complex (both owned by USFWS) to the extent possible. This will limit the number of applications that need to be prepared and can reduce redundancy in preparation of background material that is the same for both complexes.

The following permit documents are expected to be needed for this complex:

- Jurisdictional Wetland Delineation Report for the USACE
- Biological Assessment for the U.S. Fish and Wildlife Service (USFWS) (through USACE)
- Biological Assessment for the National Marine Fisheries Service (NMFS) (through USACE)
- Essential Fish Habitat Consultation with NMFS
- Clean Water Act Section 404 permit application for U.S. Army Corps of Engineers (USACE)
- Clean Water Act Section 401 water quality certification application for the Regional Water Quality Control Board
- Clean Water Act Section 404(b)(1) Alternatives Analysis for the Environmental Protection Agency
- Consistency Determination request or Incidental Take Permit application for California Department of Fish and Game (CDFG)
- National Historic Preservation Act (NHPA) Section106 Technical Report for the State Historic Preservation Officer (through USACE)
- Native American consultation letters for NHPA compliance for USACE archaeologist

- Habitat Mitigation and Monitoring Plan for the USACE
- San Francisco Bay Conservation and Development Commission (BCDC) major permit application

Many regulatory agencies will be involved in the permitting process. To streamline the various application processes, prior to the preparation of applications, permit scoping will be a primary subject at the annual SBSP multi-agency meeting. Communication with agency staff will be on-going through the application development process to ensure that applications adequately cover all of the topics of interest. Additional strategies related to each permit application or document are provided below.

4.2.1 Jurisdictional Delineation of Waters of the United States

A delineation of jurisdictional wetlands and other waters of the U.S. will be conducted in order to quantify those wetlands and other waters that would be impacted by the restoration actions. To the extent possible, the delineation will rely on existing LiDAR data and aerial imagery to define wetland and other waters extents. These extents will be verified and/or modified in the field. A previous delineation of wetlands was done for those ponds included in the Phase I actions, but it does not cover the area impacted under the Phase II actions. The wetland delineation will be conducted as early as possible, to serve as background data for the preparation of the NEPA/CEQA document, but more importantly, will be timed to occur with the blooming period of the wetland-indicator plant species.

As early as possible, the jurisdictional delineation report will be submitted to the USACE for its review and approval or modification of the jurisdictional boundaries. This is a critical step to take in the early parts of the project because several subsequent project applications and steps depend on a verified delineation from the USACE.

4.2.2 Biological Assessments for USFWS and NMFS

The Biological Assessment (BA) documents will be prepared concurrently with the 404/401 applications and will address federally-listed species with potential to occur in the Alviso complex and potentially impacted by the project. These BAs will be based on those prepared for Phase I and the issued Programmatic Biological Opinion (BO) and the BO for Phase I. The species expected to be covered under the BA for USFWS are: western snowy plover, California least tern, salt marsh harvest mouse, and California clapper rail. The species expected to be covered under the BA for NMFS are Central California Coast steelhead and green sturgeon.

As part of the Biological Assessments, conflicts among the recovery plans will need to be identified. Restoration actions beneficial to one listed species may be detrimental to another listed species. BAs will rely primarily on desktop data to map habitats and determine the potential presence of species, but some field work to assess species occurrence may be necessary.

4.2.3 Essential Fish Habitat Consultation with NMFS

Under the Magnuson-Stevens Fishery Management and Conservation Act, consultation with NMFS about impacts to areas designed as Essential Fish Habitat (EFH) for federally managed

fish species is required. NMFS must consider whether a federal or state action would adversely affect EFH and is required to provide conservation recommendations if it is. Much of the information in the BA that will be submitted to NMFS as part of Section 7 ESA consultation can be re-used in the EFH consultation.

4.2.4 Clean Water Act 404/401 applications

The 404 and 401 applications will be developed concurrently by staff that is familiar with the requirements of both USACE and RWQCB. Much of the information in these documents is the same, so figures and text will be shared between the two documents to the extent possible.

4.2.5 404(b)(1) Alternatives Analysis

This document describes alternatives to the project and identifies the Least Environmentally Damaging Practicable Alternative (LEDPA). The Alternatives Analysis will use the alternatives and project goals as defined the EIS/EIR prepared for the Phase II actions. It will analyze impacts to wetlands and other waters as defined by the wetland delineation, and therefore, must be developed after the wetland delineation is complete and has been verified by the USACE.

4.2.6 Consistency Determination/Incidental Take Permit

Of the species potentially affected and covered under the USFSWS Biological Opinion, the California clapper rail, California least tern, and salt marsh harvest mouse are also state listed. There are two avenues for obtaining take permission from CDFG for these species: a consistency determination or an Incidental Take Permit.

A consistency determination is appropriate only for species listed under both the Federal and California Endangered Species Acts. It is a letter from CDFG indicating that it agrees with the provisions of the Biological Opinion and that the measures therein are adequate to avoid jeopardy for the species; it also allows some level of take. It is the simplest and least costly way to obtain permission to take a California ESA-listed species.

CDFG will be approached about Consistency Determinations for those species covered under the BO(s) issued by USFWS and/or NMFS. But in recent years, CDFG has not been as willing to issue them as it had been previously. Early consultation with CDFG will be initiated to determine whether Incidental Take Permit applications will be necessary for dually listed species.

For species listed only under the California ESA, Incidental Take Permits from CDFG would be necessary if they would be affected by the project. There are several species listed in the 2007 EIS/EIR that are state-listed, but not federally listed. If these species are to be impacted, an Incidental Take Permit would be required as these species would not be covered under the Biological Opinion. These state-listed species include American peregrine falcon, California black rail, and bank swallow. None of these species are expected to be nesting in the vicinity of the Alviso Pond Complex. It is assumed that they would not be impacted by the Phase II project activities, and would not trigger the need for an Incidental Take Permit.

4.2.7 Consultation in Accordance with the National Historic Preservation Act

The Alviso Pond Complex qualifies as National Register of Historic Places-eligible as a cultural landscape. The impacts to an eligible cultural landscape would require some sort of mitigation, potentially Historic American Buildings Survey/Historic American Engineering Record documentation. To address cultural resources at Alviso, a desktop survey and field assessment for cultural resources would be conducted as part of the evaluation for the NEPA/CEQA document. The results of these surveys would be provided in a Technical Report to be submitted to the State Historic Preservation Officer. For example, the remaining structures at the location of the historic town of Drawbridge will need to be addressed. These eligible cultural resources are identified for mitigation, such as recordation and interpretive development. In addition to the preparation of the technical report, consultation would include preparation and submittal of letters to relevant local Native American tribes associated with the landscape.

4.2.8 Habitat Mitigation and Monitoring Plan (HMMP)

This is a document required to be submitted with the 404 and 401 applications. It discusses project mitigation and post-construction monitoring and success criteria. The HMMP will comply with the AMP, will incorporate the results of the ongoing Applied Science Studies, and will be based on the approaches and measures used in the Phase 1 projects and the permits and other documents associated with it. It will include post-construction mitigation measures for fill in wetlands and other waters of the United States. The mitigation approach will be to suggest that the project is self-mitigating, and that on-site restoration activities account for any wetland and other waters lost as part of the project. No off-site mitigation is expected to be necessary or proposed as part of the project. The HMMP structure will follow the USACE outline for wetlands and other waters mitigation. In addition, mitigation requirements to enhance wildlife habitat or protect water quality that might be required under the biological opinions or other permits may also be included. This would allow a single document to be used to describe all post-construction monitoring and maintenance requirements.

4.2.9 San Francisco Bay Conservation and Development Commission Major Permit

In previous discussions the Conservancy has had with BCDC, the latter has indicated that its preference would be to amend an existing permit rather than apply for a new permit. A single permit amendment application would be prepared for Ravenswood and Alviso complex Phase II actions. Prior to acceptance of the amendment request, two hearings, one with the Design Review Board and a second with the Commission, are anticipated.

Though many regulatory agencies prefer to be the last one to issue a permit – so that they can review the others before issuing their own – BCDC generally insists on it. Therefore, this application is planned to be the last one applied for.

4.3 PERMITTING SEQUENCE

The attached Gantt chart (Figure 4) depicts a proposed permitting sequence and timing. While the dates may change, the sequence and relationship between different permitting elements is expected to stay the same. The conceptual design and project alternatives would be developed first, followed by development of the EIS/EIR document.

Permit application preparation would follow the completion of these two documents, though the field work, pre-application meetings with agencies, development of the strategies behind the individual permits, and even the drafting of portions of the text (e.g., the project descriptions) will likely begin before those documents are complete.

The planned schedule for the applications will contain time for responding to agencies' requests for additional information. The maximum agency review period will be assumed to be required. We also anticipate that all regulatory agency application processing fees will be required.

4.4 RISKS

Risks to permitting the project include:

- Cultural resources: Identification of unexpected cultural resources during survey may delay permitting process by adding additional mitigation in the form of recordation and interpretation.
- Public access: Recreational users interested in using the area may be particularly interested in seeing that the design provides public access opportunities. This risk will be minimized by having frequent and early stakeholder involvement.
- Threatened and endangered species habitat: Due to differing species habitat requirements, it is impossible to create habitat that will be compatible or suitable for all species. For example, tidal marsh habitat that is suitable for salt marsh harvest mouse will be unsuitable for western snowy plover. In order to obtain permits from state and federal wildlife agencies, the designs must include a diversity of habitats that can accommodate multiple species. Early consultation with state and federal agencies during the design process will ease obtaining permits. Communication should involve both state and federal agencies, where appropriate.
- Tidal marsh versus managed ponds: In addition to threatened and endangered species, wildlife species that do not have state or federal designations also use the managed pond habitats. Many of these species are waterfowl or shorebirds, which have different habitat requirements. The trade-offs between these habitat types needs to be considered in the restoration decisions.

Each of these risks should be considered and addressed early in the design processes in order to minimize delays in the permitting process and limit comments on the EIS/EIR.

Existing, available data in combination with the results and reports of ongoing studies is believed to be mostly sufficient for preparing the 10% conceptual designs and NEPA/ CEQA document. However, the following information may be needed:

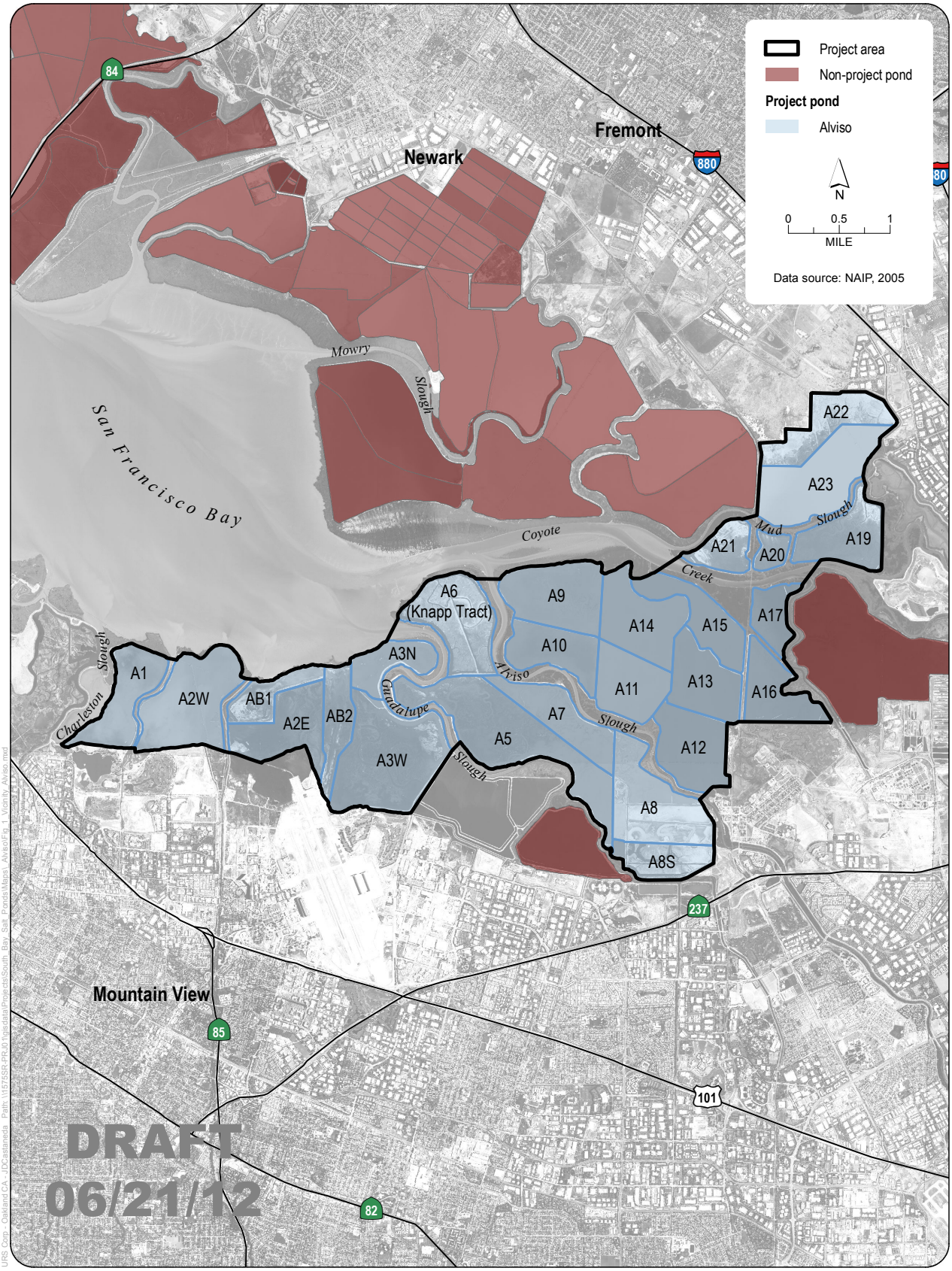
- Hydraulic calculations to evaluate breach locations and sizes.
- Calculations of required levee heights for flood protection following breaching. Evaluation of sea level rise study results. Although the design will not be driven by SLR concerns, a discussion of how the design may respond under future SLR conditions should be included.
- Quantities or estimates of tidal and storm surge-delivered sediment to inform understanding of likely accretion rates in breached ponds
- Information on available dredged material and upland material for reuse (to be done under URS and Moffatt & Nichol scopes)
- Results from ongoing or new SBSP-sponsored priority studies that may be available or become available
- Latest information on bird use of ponds
- Jurisdictional wetland delineation report and eventual verification by the USACE (to be done under URS scope)
- Cultural resources desktop records review and field surveys for artifacts that may need mitigation
- Reconnaissance site visits to confirm or update the most recent externally developed data on biological resources such as habitats for listed species (to be done under URS scope)
- The existing LiDAR/topography data (with 1-ft or less accuracy) needs to be reviewed and incorporated
- Geotechnical studies may be needed as the design progresses
- Quality (and quantity available) of sediment to be imported
- Specific preferences for trail corridor and interpretive center locations
- Public feedback on proposed restoration design options

Table 1. Opportunities and Constraints Matrix

Item #	Pond Number	Management Action	Effect of action on main goals (3 = action provides strong support for goal; 2= moderate support for goal; 1 = action provides weak support for goal; 0 = action provides no support for goal or the goal is N/A; -1 = action may have negative impact on goal)			Opportunities	Constraints	Key Details of Action	Next Steps and Other Notes
			Habitat	Flood Mgmt	Recreation / Access				
1	A1	Tidal restoration through breach(es) in levee between Charleston Slough and A1	3	1	0	Will accelerate aggradation of marsh plain through increased sediment delivery. An inexpensive source of fill (upland and dredge materials) is available. Might combine with Mountain View's 53 acres of marsh restoration (required mitigation) at Charleston Slough. Has slight flood wave attenuation benefit because of increased capacity of storage basin, but this would diminish somewhat if ecotone in place and as southern end transitions to desired upland habitat for SMHM, WSP, and CA clapper rails over time. Could add constructed islands to A1 to provide upland refugia and/or nesting habitat. Could add ecotone along the landward side of this pond, using available upland or dredged material. Potential exists for accelerating sediment delivery to the ponds by lowering or installing tidal sills in the Bay-side of these levees.	Must protect landfill liner. Must address water supply & pumping issues for Shoreline Lake. Flood control must be maintained - backside levee may need to be raised or improved. Levee b/w Charleston Slough and A1 may need to be improved. It may be necessary to link in with Palo Alto Flood Control basin operations and the levees around it. Breaches would make trail development more difficult and expensive (but increased habitat values and quality of recreational experiences may justify it). Dissolved oxygen levels a potential problem if only tidal sills are implemented; breaches should improve current DO situation. Potential for import of mercury should be assessed. Effect of breaching on sediment transport competence of existing sloughs shoudl be evaluated.	Breach(es) would not be on bay-facing levee, but along levee bordering Charleston Slough or possibly at NW corner. The levee between Charleston Slough and A1 is not currently required for flood control. But if it is breached, it would need to be improved (unless other measures are taken). Upland transition habitat possible. Free fill may be available by summer 2012, and thereafter.	Determine breach location options for maximum rate of accretion without deleteriously impacting sediment transport function or prior accretion. Dovetail this action with breach analysis for A2W using Mt View Slough and Stevens Creek as supply source.
2	A1 and A2W	Tidal restoration through breach(es) in levees between Ponds A1 & A2W and surrounding Charleston Slough, Mt. View Slough, and Stevens Creek	3	1	0	As above, but also includes A2W and Mt. View Slough and Stevens Creek. Consistent with goal of providing full tidal circulation through the ponds. Could add constructed islands to A1 and/or A2W to provide upland refugia and/or nesting habitat. Could add ecotone along the landward side of these ponds, using available upland or dredged material. Flood protection could be somewhat increased through addition of storm runoff capacity.	See above. But also: Loss of pond habitat for dabbling and diving ducks, PG&E towers (access and possible retrofit requirements).	As above, but would involve additional breaches. Upland transition habitat creation timeframe accelerated, especially if free fill available during life of project. Expanded window of fill acceptance will greatly increase chance of receiving and amount of fill.	As above, but with A2W involved. Best to combine analyses and planning/design since the breaches will affect each other.
3	A1 and A2W	Recreational Trail & Public Access Development	0 / -1	0	3	Bay Trail enhancement by creating new spur trail(s) on levee(s)from Bay Trail to Bay. Other ideas include a bridge over Mountain View Slough or an elevated viewing platform with interpretive signage. Potential to create spur trails into marshes on boardwalks and along existing levees. Add or improve trail on southern end of A2W; provide an overlook on the hill by Shoreline Amphitheater.	Must protect landfill. Burrowing owl habitat is present in Shoreline Park. Increased human presence could impact nesting birds. Dog prohibition must be enforced if visitor use is facilitated. Recreational use of existing trails would be temporarily disrupted by construction, upland or dredged material storage, etc.	Consider trade-offs between trail and sensitive-species habitat development.	The levees could be raised or otherwise improved to allow trail development on them. Similar trails near Charleston Slough are quite popular. If a trail on this levees is desired, bridges over the breaches would be needed.
4	Charleston Slough, A1, A2W	Integrate Charleston Slough Mitigation with Mountain View Ponds Restoration	1	2	1	Could allow for fully integrated and coordinated cooperation between City of Mountain View and SBSP to achieve City's mitigation requirements while reducing overall cost of flood control and pond restoration. City is about to undertake CIP to assess existing levees' preparedness for sea level rise and other dynamics.	There may be legal barriers (e.g., is a Nat'l Wildlife Refuge allowed to make these sorts of arrangements), financial issues (e.g., is cost-sharing even possible?), or other hurdles. These need to be more fully developed. Would add complexity to permitting process; existing permit conditions must be analyzed to ensure the compliance of potential actions.	While City and SBSP *could* act independently to pursue there separate goals, this action would formally integrate the efforts of these 2 institutions. The details of how this could work have yet to be developed.	Continue conversations between agencies, City of Mountain View, and SBSP Project Mgmt Team. Identify legal, financial, and political opportunities and hurdles.
5	A1 and/or A2W	Lower bayside levee(s) (and/or levees along sloughs) to create sills	3	Unknown; risky	0	Potential for increased sediment delivery, particularly during storm surges, but hardened sill at Bay boundary would be a necessary design element. Lowering the side levees (along Charleston Slough or Mountain View Slough) to just above marshplain elevation would allow high-tide or storm surge-carried sediment to deposit in the ponds and would speed the restoration of A1 and/or A2W.	Hardened sill would disrupt sediment behavior off-shore, possibly leading to scour. Could affect adjacent ponds as well. There is risk (to flood protection) to opening to the Bay, as the tidal dynamics are complicated and hard to model/predict.	The memo describes this as an add-on option to the primary action of restoring A1/A2W to tidal marsh. It is broken out here for more specificity.	Some risk may be averted by design, such as a hardened sill to protect against scour. The size of these ponds means tidal exchange would be large. The potential for scour increases with tidal volume; opening must be sized appropriately.

Table 1. Opportunities and Constraints Matrix

Item #	Pond Number	Management Action	Effect of action on main goals (3 = action provides strong support for goal; 2= moderate support for goal; 1 = action provides weak support for goal; 0 = action provides no support for goal or the goal is N/A; -1 = action may have negative impact on goal)			Opportunities	Constraints	Key Details of Action	Next Steps and Other Notes
			Habitat	Flood Mgmt	Recreation / Access				
6	A1 and A2W	Levee improvements to offset any lost protection from tidal marsh improvements	1	3	0	Satisfies the major program goal of maintaining flood protection. Could take advantage of upland material and/or dredged material. Larger levees and associatad ecotones may provide additional habitat for salt marsh harvest mouse.	Would divert some of the soil that could be used for habitat creation. Landfill cells must be protected, and contamination must be guarded against.	Depending on the restoration actions selected for implementation and whether/how Charleston Slough is incorporated into the SBSP Project, the locations and types of levee improvements would need to be selected.	Awaiting completion of Shoreline Study, City of Mountain View's levee analysis, and other project decisions.
7	A19, A20, and A21	Breach all 3 of these ponds on the Mud Slough (north) side	3	1	2; moderate support for goal	Could speed accretion and eventual completion of these marshes. Increase in habitat for aquatic and tidal marsh species. Works well with "Water Trail" into Mud Slough or Coyote Creek. Islands from breach material. Pilot channel and temporary berms. Tidal sill(s) are options instead of full breaches.	May not be necessary at A20 and A21. Involves bearing costs to only speed a process. Risks of increasing invasive fish species habitat. May interfere with already recovering fish populations.	Would breach all 3 ponds on northern sides along Mud Slough to speed sedimentation, make accretion more even within and among the ponds.	Consider whether the rate of restoration is important enough to spend money and effort on. Perform sediment analysis after reviewing existing data to determine if A19 should be breached first, and allowed to accrete before A20 and A21 are breached.
8	A19	Accelerate accretion rate by breaching only A19	3	1	2	As above but w/ reduced risks to fish populations.	Would reduce access to northern levees of A20 and A21 if they eventually need to be breached. Sediment dynamics for this action hard to predict and compare to breaching A20 and A21. The uncommon plant small spikerush was recently observed on/adjacent to the northern levee of A19 and should try to be avoided.	Would limit action to just the easternmost pond.	Consider whether the rate of restoration is important enough to spend money and effort on. Perform sediment analysis.
9	A19, A20, and/or A21	Add or Modify Breaches in Southern Levees	1	0	0	Would speed accretion and eventual completion of 1 - 3 of these ponds without needing to breach Mud Slough. Risks associated with those breaches would be avoided.	As above. Also, more breaches in levees may risk their stability; would need to be investigated.	Consider whether widening breaches or adding more of them to the southern levees is feasible and desirable.	As above.
10	A19, A20	Remove or breach the levee separating these two ponds	3	0	0	Could improve habitat's ecological functions and values above simple area gained. The one large pond that would result would provide more mixing, refugia for aquatic species, and more even sediment accretion. Material from breach or removal could be used for island or ecotones, or raise the bottom elevation.	Differences between the 2 ponds' water quality, sediment contamination, invasive species composition, predator density, etc. may cause problems if they were to be connected. If done in isolation, this action would not be likely to significantly increase sediment accretion rate in A19.	Could be done by breaching the levee in one or two places or by removing it entirely. No effect on flood potential.	Obtain scientific opinions and agency feedback on this novel idea.
11	A19, A20, and A21	Develop kayak/canoeing routing, signage, and possibly facilities to connect with Water Trail	0 / -1	0	3	This action meets program goal of increasing recreational opportunities for visitors. Would bring public into a fairly inaccessible and biologically sensitive area. Designating put-in and take-out areas would limiting resource damage from uncontrolled access. Signage would also help this and increase recreational experience. Funding from Department of Boating and Waterways may be available.	Increased visitation could increase disturbance to wildlife, particularly birds. Frequent disruptions during nesting season will increase nest abandonment and chick mortality.	Since access to the Island Ponds is difficult; may want to keep it that way to provide passive restrictions to human disturbance.	Solicit input from stakeholders and PMT.



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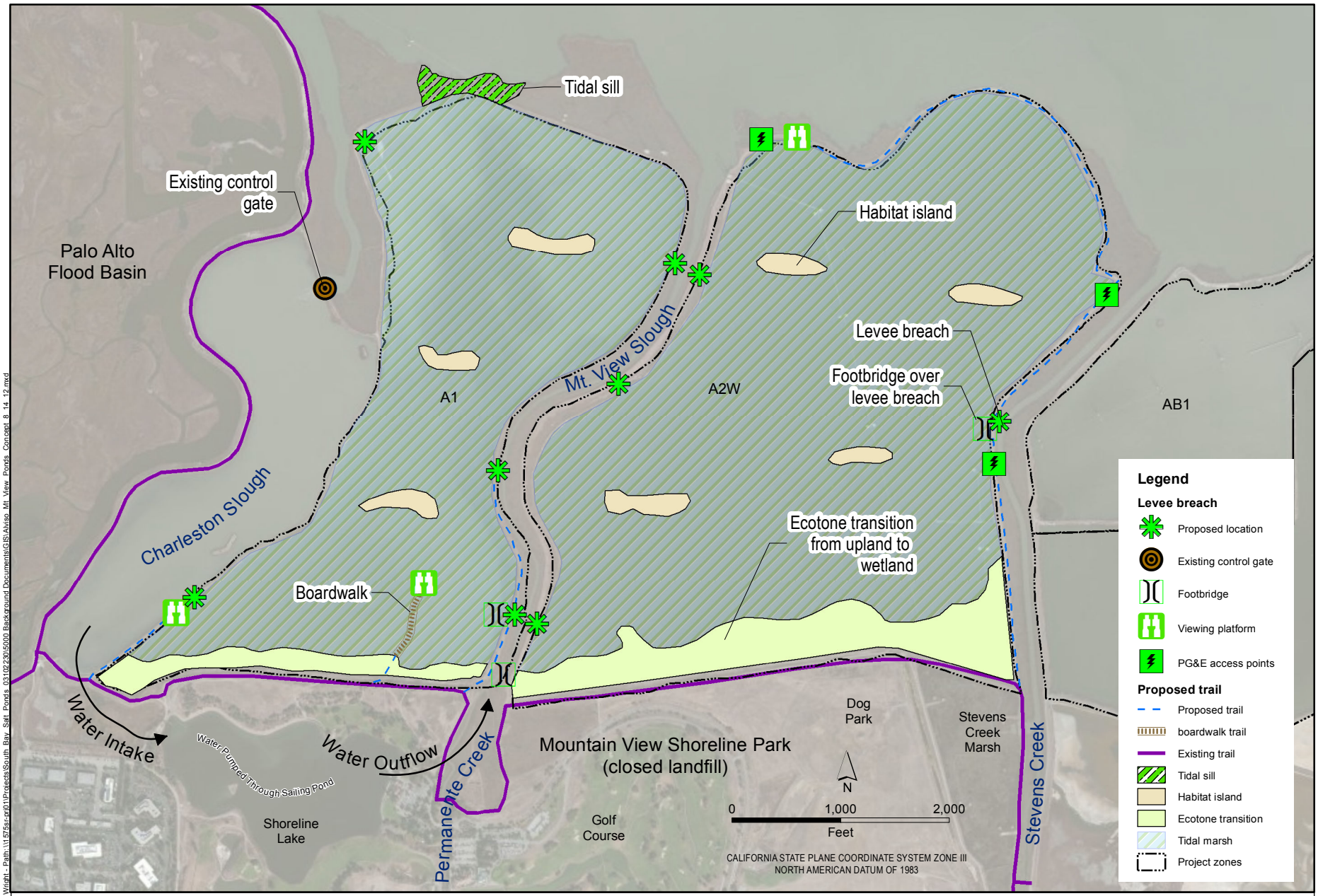
State Coastal Conservancy
South Bay Salt Ponds Project, Phase 2

Figure 1
Vicinity map - Alviso



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SOUTH BAY SALT PONDS
ALVISO: MT. VIEW PONDS
SANTA CLARA COUNTY, CA

DATE OF PREPARATION: 8/14/2012
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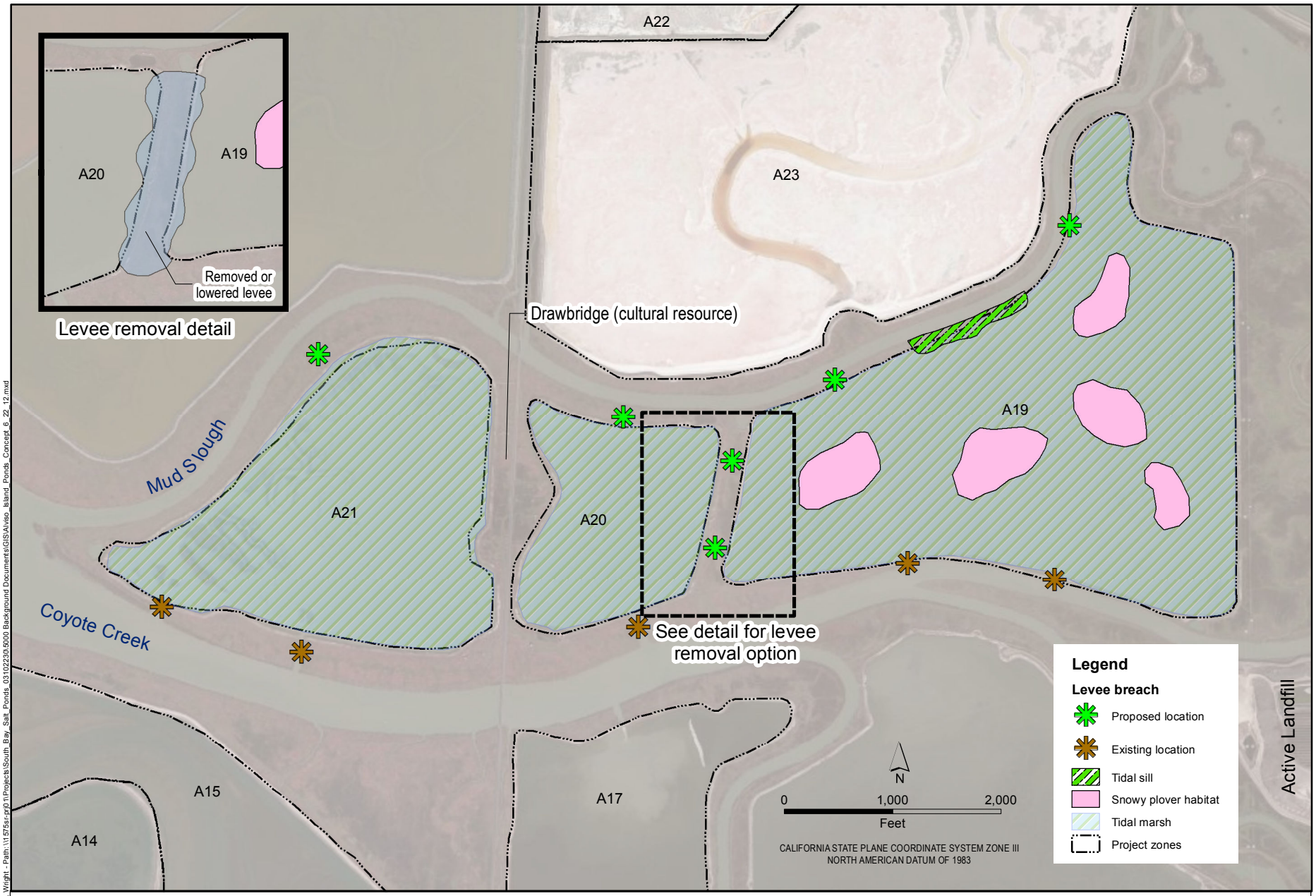
FIGURE 2
ACTIONS PROPOSED FOR FULL ANALYSIS AT ALVISO POND COMPLEX-
MT. VIEW PONDS



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SOUTH BAY SALT PONDS
ALVISO: ISLAND PONDS
ALAMEDA COUNTY, CA

DATE OF PREPARATION: 7/30/2012
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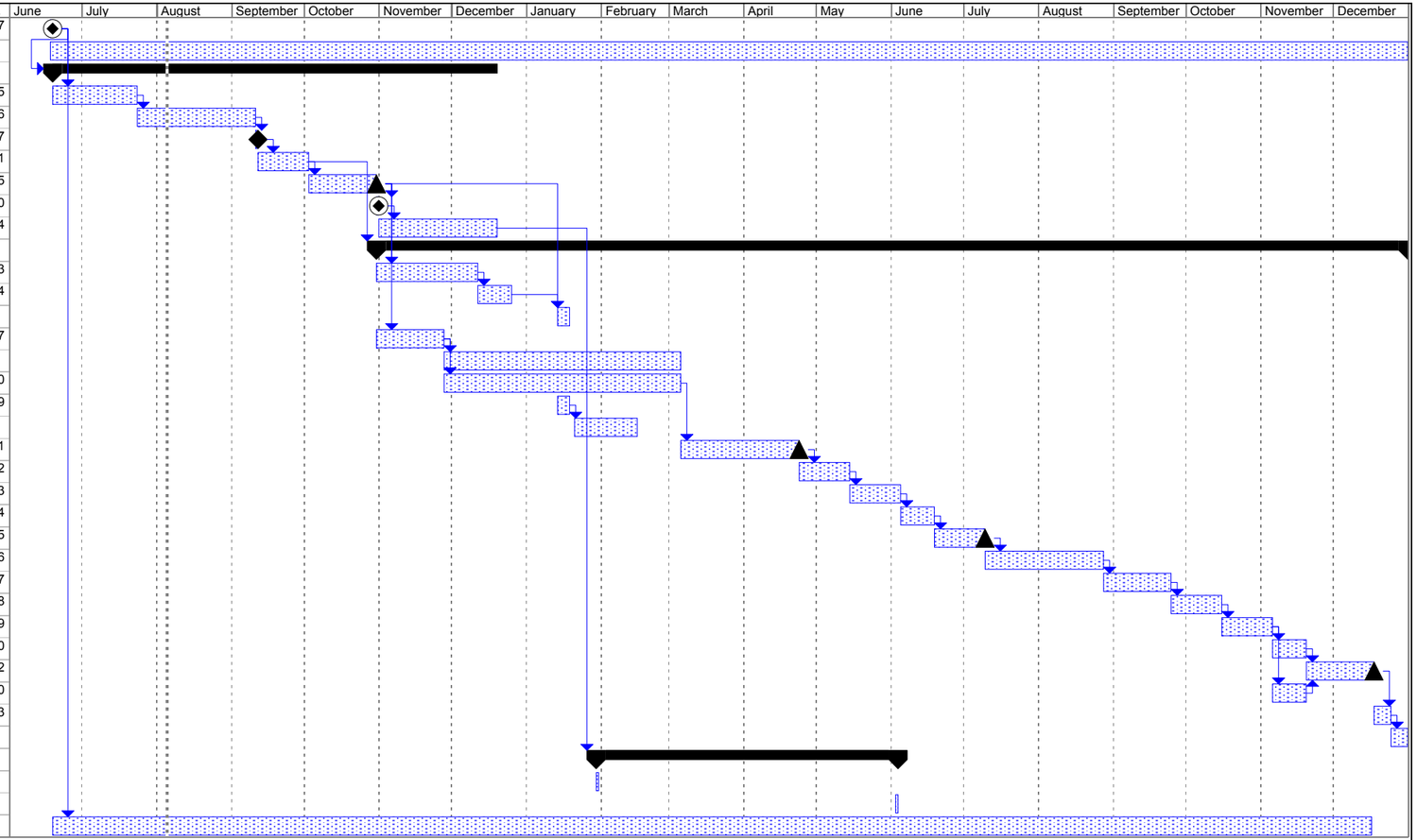
FIGURE 3
ACTIONS PROPOSED FOR FULL ANALYSIS AT ALVISO POND COMPLEX-ISLAND PONDS

ID	Task Name	Duration	Start	Finish	Predecesso	Successors
1	Notice to Proceed	1 day	Mon 6/18/12	Mon 6/18/12		4,3,37
2	Project Management	402 days	Mon 6/18/12	Tue 12/31/13		
3	**Alternatives Development and Conceptual Design**	**132 days**	**Tue 6/19/12**	**Wed 12/19/12**	**1**	
4	Review Phase II projects, AMP and Phase I Applied Stu	25 days	Tue 6/19/12	Mon 7/23/12	1	5
5	Develop Initial Concepts and Rank Project Features	35 days	Tue 7/24/12	Mon 9/10/12	4	6
6	PMT Meeting	1 day	Tue 9/11/12	Tue 9/11/12	5	7
7	Revise Preliminary Design concepts	15 days	Wed 9/12/12	Tue 10/2/12	6	8,11
8	Develop Alternatives Draft 10% Design memo	20 days	Wed 10/3/12	Tue 10/30/12	7	14,9,12,15
9	Constructability Review Workshop	1 day	Wed 10/31/12	Wed 10/31/12	8	10
10	Refine and Deliver Alternative Design Memo	35 days	Thu 11/1/12	Wed 12/19/12	9	34
11	**NEPA/CEQA Documenation (Ravenswood and Alviso)**	**305 days**	**Wed 10/31/12**	**Tue 12/31/13**	**7**	
12	Prepare Project Description / Alternatives Descriptions	30 days	Wed 10/31/12	Tue 12/11/12	8	13
13	Prepare and File NOP/NOI	10 days	Wed 12/12/12	Tue 12/25/12	12	14
14	Conduct Scoping Meetings	5 days	Mon 1/14/13	Fri 1/18/13	8,13	
15	Prepare Environmental Setting	20 days	Wed 10/31/12	Tue 11/27/12	8	16,17
16	Background and field data collection and analysis	70 days	Wed 11/28/12	Tue 3/5/13	15	
17	Prepare technical sections (impacts, mitigation measure	70 days	Wed 11/28/12	Tue 3/5/13	15	20
18	Wetland Delineation - Field Surveys	5 days	Mon 1/14/13	Fri 1/18/13		19
19	Prepare Wetland Delineation Report	20 days	Mon 1/21/13	Fri 2/15/13	18	
20	Prepare First Administrative Draft EIS/EIR	35 days	Wed 3/6/13	Tue 4/23/13	17	21
21	PMT Review	15 days	Wed 4/24/13	Tue 5/14/13	20	22
22	Prepare Second Admin Draft EIS/EIR	15 days	Wed 5/15/13	Tue 6/4/13	21	23
23	PMT Review	10 days	Wed 6/5/13	Tue 6/18/13	22	24
24	Prepare Public Draft EIS/EIR	15 days	Wed 6/19/13	Tue 7/9/13	23	25
25	Public Review	35 days	Wed 7/10/13	Tue 8/27/13	24	26
26	Prepare First Admin Final EIS/EIR	20 days	Wed 8/28/13	Tue 9/24/13	25	27
27	PMT Review	15 days	Wed 9/25/13	Tue 10/15/13	26	28
28	Prepare Second Admin Final EIS/EIR	15 days	Wed 10/16/13	Tue 11/5/13	27	31,29
29	PMT Review	10 days	Wed 11/6/13	Tue 11/19/13	28	30
30	Revise and Publish Final EIS/EIR	20 days	Wed 11/20/13	Tue 12/17/13	31,29	32
31	Prepare Findings/Record of Decision	10 days	Wed 11/6/13	Tue 11/19/13	28	30
32	File NOD and Publish ROD	5 days	Wed 12/18/13	Tue 12/24/13	30	33
33	Certify, Approve, NOD	5 days	Wed 12/25/13	Tue 12/31/13	32	
34	**Prepare Permit Applications (Ravenswood and Alviso)**	**89 days**	**Wed 1/30/13**	**Mon 6/3/13**	**10**	
35	Alternatives Feedback Meetings	1 day	Wed 1/30/13	Wed 1/30/13		
36	Regulatory Agencies Feedback Meeting	1 day	Mon 6/3/13	Mon 6/3/13		
37	**GIS Support**	390 days	Tue 6/19/12	Mon 12/16/13	1	



Project:South Bay Salt Ponds Restora

Task | Milestone | Project Summary | External Milestone | Progress

Split | Summary | External Tasks | Inactive Task | Deadline