

A Habitat Goals

According to the process adopted by the RMG, Project participants were to develop habitat goals only after assembling and analyzing many kinds of data about the baylands ecosystem. In this way, participants worked together for nearly two years before they began making habitat recommendations. It was hoped that this methodical approach would produce Goals that were appropriate and technically sound. The recommendations in this chapter are based on the best available information and the best professional judgment of the Project participants. They should be reviewed periodically in the coming years and modified as needed to reflect new understanding.

This chapter presents the Goals, first as a general regional perspective — or “big picture” — of how the baylands and adjacent habitats should appear in the coming decades. It then provides more detailed recommendations of the habitat changes for each of the four subregions.

Please remember that the regional perspective is a view of the distant future. It describes the general arrangement and kinds of wetlands and associated habitats that Project participants believe should exist. But it is not a precise prescription or blueprint that must be followed exactly. There are several, perhaps many, ways to provide a sufficient mix of tidal and diked habitats in each of the subregions. Likewise, the more detailed recommendations are flexible and not necessarily comprehensive. Anyone interested in restoring or enhancing the baylands ecosystem should use the Goals — and also the list of potential habitat improvement sites in Appendix E — as starting places, not end points, in their planning deliberations.

The recommendations in this chapter should not overshadow one fundamental tenet: there should be no additional loss of wetlands within the baylands ecosystem. Furthermore, as filled or developed areas within the baylands become available, their potential for restoration to wildlife habitat should be fully considered.

The Goals — A Regional Perspective

The main objective of the Goals Project was to provide a picture of the types, amounts, and distribution of wetlands and related habitats needed to restore and sustain a healthy baylands ecosystem. This section describes the habitats that should exist in and around the Bay within the next several decades. It attempts to address the competing habitat needs of the Estuary's many species, especially those species that are dependent on tidal marsh, salt ponds, or diked seasonal wetlands.

At the most general level, the baylands and adjacent areas should be a diverse mosaic of habitats. This mosaic should include:

- Many large patches of tidal marsh connected by corridors to enable the movement of small mammals and marsh-dependent birds.
- Several large complexes of salt ponds managed for shorebirds and waterfowl.
- Extensive areas of managed seasonal ponds.
- Large expanses of managed marsh.
- Continuous corridors of riparian vegetation along the Bay's tributary streams.
- Restored beaches, natural salt ponds, and other unique habitats.
- Intact patches of adjacent habitats including grasslands, seasonal wetlands, and forests.

This regional perspective embodies several ecological design considerations that are described in detail in Chapter 6. Key among these are that tidal marsh restoration should strive for large (1,000+ acres) connected patches of habitat that are centered, where possible, around existing populations of species of special concern (e.g., salt marsh harvest mouse and California clapper rail). Tidal marsh should be restored along the salinity gradients of the Estuary and its tributaries to enable species to follow shifts in habitat location due to variations in freshwater flows. Tidal marsh restoration should be emphasized along the Bay edge and where streams enter the baylands to maximize benefits for fish and other aquatic animals. Wherever possible, restored tidal marsh should include natural features such as pans and large tidal channels, as these significantly increase the habitat's ability to support large numbers of many species of fish, shorebirds, and waterfowl.

Where possible, natural transitions from tidal flat through tidal marsh to upland should be reestablished. There also should be natural transitions between diked wetlands and adjacent uplands. Restoring these natural transitions is critical for reestablishing bayland-edge plant communities. In all cases, buffers should be provided on undeveloped adjacent lands to protect habitats from disturbance.

Restoring large areas of tidal marsh will reduce the acreage of some other existing habitats, especially salt ponds, agricultural bayland, and managed marsh. To offset the loss of salt pond area, the remaining salt ponds should be managed to maximize wildlife habitat functions, particularly for shorebirds, waterfowl, and other water birds. There should be salt pond complexes in North Bay and in South Bay adjacent to important shorebird foraging areas. Each complex should be managed to maintain a range of salinities and water depths that favor the desired bird species. To offset the loss of agricultural bayland habitat, agricultural areas that are not restored to tidal marsh should be managed as seasonal pond habitat to

improve habitat functions for shorebirds, waterfowl, and other water birds. To offset the conversion of managed marsh habitat to tidal marsh, the remaining managed marshes should be managed more intensively.

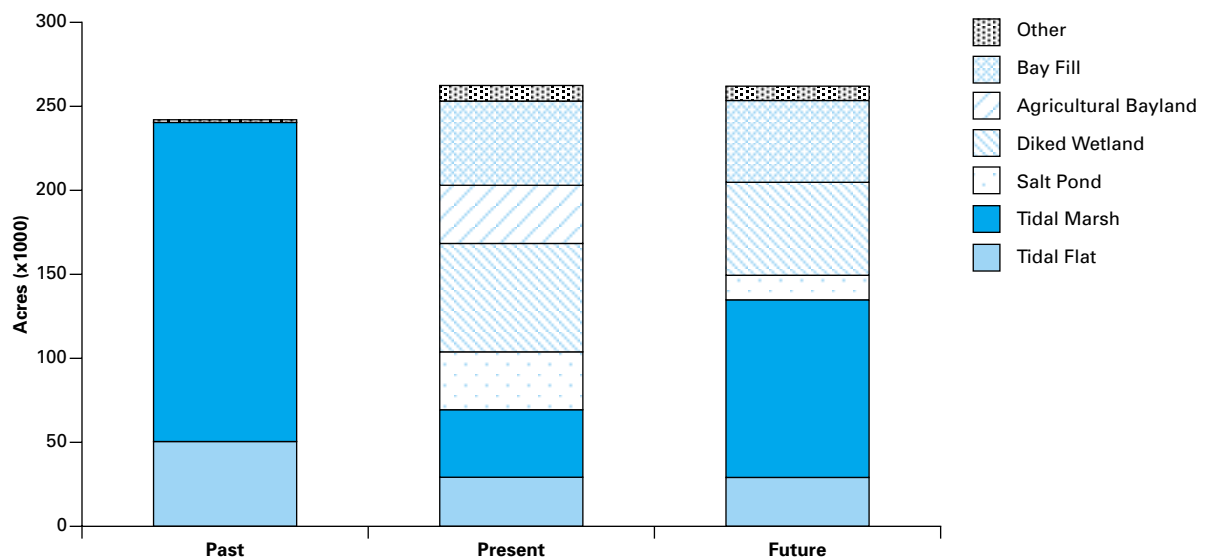
Although the Goals recommend reducing the acreage of some major habitat types in most of the subregions, they call for increasing the region’s overall ability to support shorebirds, waterfowl, mammals, and other wildlife. In essence, the Goals shift some habitat functions from one subregion to another.

Figure 5.1 shows the approximate regional acreage goals for the key bayland habitats, along with past and present acreage. As the figure indicates, the Goals call for increasing the total area of tidal marsh from the existing 40,000 acres to about 95,000 to 105,000 acres. This would entail reducing the area of all major diked habitats.

In each of the subregions except Central Bay, where the options for restoration are relatively limited, there is ample flexibility regarding habitat arrangement, Appendix D shows one possible example. The Goals include this kind of flexibility because the Project participants recognized that it will be necessary to accommodate implementation constraints such as land availability or construction or maintenance costs. Additional examples could be shown that would favor the support of one species or group of species over another. For example, more tidal salt marsh would provide additional support for species of small mammals at the expense of salt ponds managed for shorebirds and waterfowl. The Goals strive to strike a balance between the needs of the various species.

Achieving the Goals regionwide would have major environmental benefits. A primary anticipated benefit would be the recovery of the baylands many species of special concern. For example, if the tidal marsh restoration goals were achieved, populations of the salt marsh harvest mouse and the California clapper

FIGURE 5.1 Past, Present, and Recommended Future Bayland Habitat Acreage for the Region



rail would be expected to rebound, removing the need to protect them as endangered species. If the diked marsh enhancement goals were realized, the regional and subregional support of migratory birds would be enhanced because of improved habitat quality and availability. In addition to the many benefits for wildlife, restoring large amounts of tidal marsh also would improve the Bay's natural filtering system and enhance water quality.

Subregional Habitat Recommendations

This section presents the Goals in greater detail. It includes recommendations for each of the four subregions and for portions, or segments, of each subregion. There are 20 segments and each is identified alphabetically (**Figure 5.2**). The subregional recommendations are more specific than those presented in the preceding section, but they are still fairly general. The segment recommendations, however, are quite specific.

Each segment presentation includes maps of past and present conditions, a description of major or unique features, unique restoration opportunities and benefits, and a list of possible constraints. Unique restoration opportunities describe the kinds of habitat changes that may be possible, given a segment's past and present conditions; as used in this chapter, the term "opportunity" is meant to imply ecological potential. Although there are many kinds of constraints to habitat restoration, the "possible constraints" listed for each segment are primarily infrastructure constraints.

The habitat acreage goals for each subregion are presented as bar graphs. They were derived from the recommendations described below and from the integration map in Appendix D. To put these acreage goals into perspective, the bar graphs are shown beside similar graphs of past and present habitat acreage. Please note that the graphs of habitat goals depict general acreage targets and do not represent the same level of certainty as do the graphs of the past and present habitats.

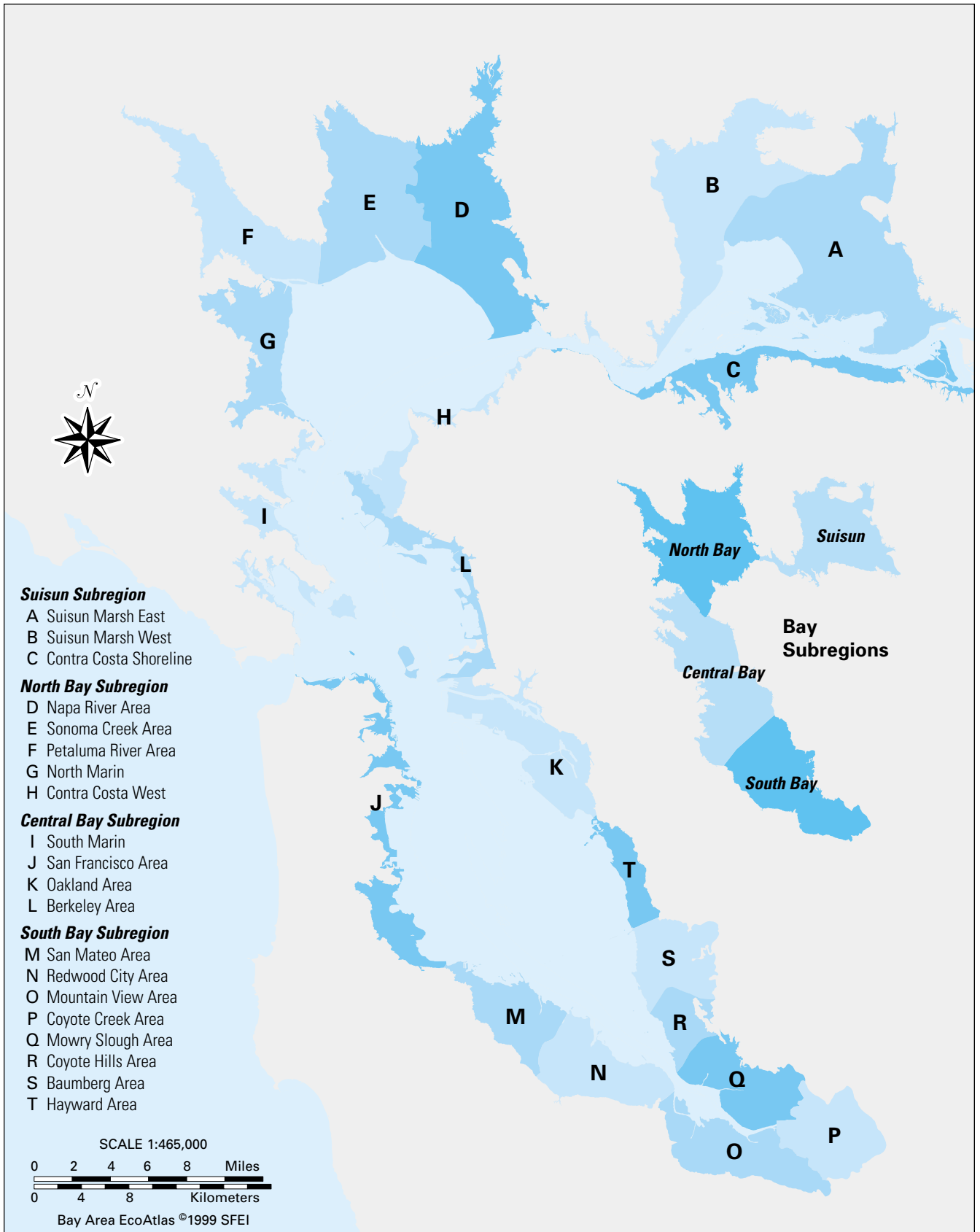
Appendix E lists 124 sites that have some potential for habitat improvement. This list and the accompanying maps do not represent all potential sites, but they indicate places where projects should at least be considered.

Suisun Subregion

The overall goal for this subregion is to restore tidal marsh on the northern and southern sides of Suisun Bay, Grizzly Bay, and Honker Bay, and to restore and enhance managed marsh, riparian forest, grassland, and other habitats.

In Suisun Marsh, there should be a continuous band of restored tidal marsh from the confluence of Montezuma Slough and the Sacramento/San Joaquin rivers to the Marsh's western edge. This band of tidal marsh should extend in an arc around the northern edge of the Marsh and should blend naturally with the adjacent grasslands to provide maximum diversity of the upland ecotone, especially for plant communities. A broad band of tidal marsh also should be restored along the southern edge of Suisun Marsh and around Honker Bay, in large part to improve fish habitat.

FIGURE 5.2 Project Area with Subregions and Segments



On the majority of lands within Suisun Marsh, the long-standing practice of managing diked wetlands primarily for waterfowl should continue. These brackish marshes should be enhanced, through protective management practices, to increase their waterfowl carrying capacity. On the periphery of the Marsh, moist grasslands with vernal pools should be enhanced, as should riparian vegetation along the tributary streams.

On the Contra Costa shoreline, full tidal action should be restored to many of the marshes that currently are diked or that receive muted tidal flow. Restoration should incorporate broad transition zones to foster a higher diversity of plant communities and associated animals, and buffers to protect these populations from adjacent disturbance. Also, riparian vegetation should be restored along as many stream corridors as possible.

In the northern part of this subregion, achieving the Goals will depend largely on the willingness of private duck club owners to convert managed marsh to tidal marsh. On the Contra Costa shoreline, achieving them will depend on the willingness of corporate, military, and private landowners to restore many marshes to full tidal action.

Figure 5.3 shows the approximate acreage goals for the key bayland habitats in this subregion, along with past and present acreage. As the graphs indicate, the Goals recommend significant changes in habitat acreage. In general, the Goals for the subregion call for increasing the area of tidal marsh from about 13,000 acres to about 30,000 to 35,000 acres, while maintaining approximately 32,000 to 37,000 acres of diked wetlands. With this change, about 65% of the existing managed marsh acreage would be retained.

The Suisun subregion consists of Segments A, B, and C. Recommendations for achieving the Goals in each of these segments are described beginning page 100.

FIGURE 5.3 Past, Present, and Recommended Future Bayland Habitat Acreage for Suisun Subregion

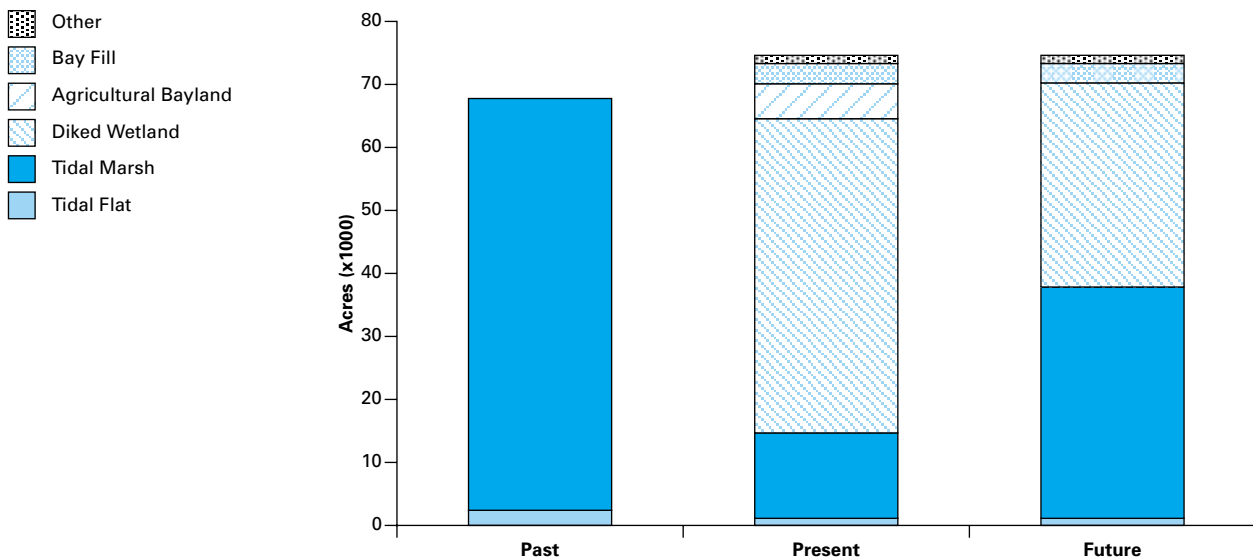
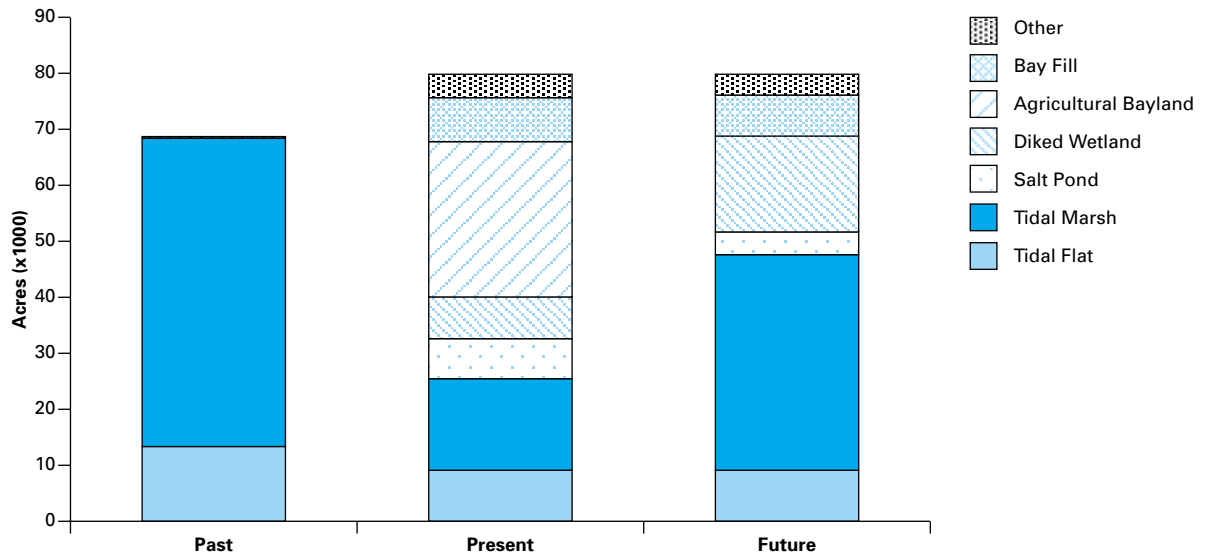


FIGURE 5.4 Past, Present, and Recommended Future Bayland Habitat Acreage for North Bay Subregion



North Bay Subregion

The overall goal for North Bay is to restore large areas of tidal marsh and to enhance seasonal wetlands. Some of the inactive salt ponds should be managed to maximize their habitat functions for shorebirds and waterfowl, and others should be restored to tidal marsh. Tributary streams and riparian vegetation should be protected and enhanced, and shallow subtidal habitats (including eelgrass beds in the southern extent of this subregion) should be preserved or restored.

Tidal marsh restoration should occur in a band along the bayshore, extending well into the watersheds of the subregion’s three major tributaries — Napa River, Sonoma Creek, and Petaluma River. Seasonal wetlands should be improved in the areas that currently are managed as agricultural baylands. All remaining seasonal wetlands in the uplands adjacent to the baylands should be protected and enhanced.

In much of this subregion, achieving the Goals will depend on the willingness of farmers to convert agricultural baylands to tidal marsh and to allow the remaining areas to be managed as seasonal pond habitat.

Figure 5.4 shows the approximate acreage goals for the key bayland habitats in this subregion, along with past and present acreage. In total, the Goals for the North Bay subregion call for increasing the area of tidal marsh from the existing 16,000 acres to approximately 38,000 acres, and creating about 17,000 acres of diked wetlands managed to optimize their seasonal wetland functions.

The North Bay subregion includes Segments D through H. Actions for achieving the Goals in each of these segments are described beginning on page 106.

Central Bay Subregion

The overall goal for Central Bay is to protect and restore tidal marsh, seasonal wetlands, beaches, dunes, and islands. Natural salt ponds should be restored on the East Bay shoreline. Shallow subtidal habitats (including eelgrass beds) should be protected and enhanced. Tributary streams and riparian habitats should be protected and enhanced.

Tidal marsh habitats should be restored wherever possible, but particularly at the mouths of streams (where they enter the baylands) and at the upper reach of dead-end sloughs. Tidal marsh restoration in urban areas is encouraged.

Although topography and urban and industrial development limit the potential for large-scale habitat restoration in this subregion, there are many opportunities to restore relatively small tidal marshes and other habitats, and these should be pursued. Even small disconnected patches of tidal marsh would provide habitat islands for migrating native wildlife species and improve overall habitat conditions. Even the smallest restoration efforts should try to incorporate transitions from intertidal habitats to adjacent uplands, as well as upland buffers. Shorebird roosting sites should be protected and enhanced.

Of particular importance in this subregion, especially in the southern half, is the need to control smooth cordgrass. This issue is described in greater detail in Chapter 6.

In this subregion, achieving the Goals will depend largely on the willingness of many private and public landowners to undertake habitat restoration and enhancement in the most urbanized portion of the baylands.

Figure 5.5 shows the approximate acreage goals for the key bayland habitats in this subregion, along with past and present acreage. Given the limitations of this subregion, the Goals recommend only a few hundred acres of tidal marsh restoration.

FIGURE 5.5 Past, Present, and Recommended Future Bayland Habitat Acreage for Central Bay Subregion

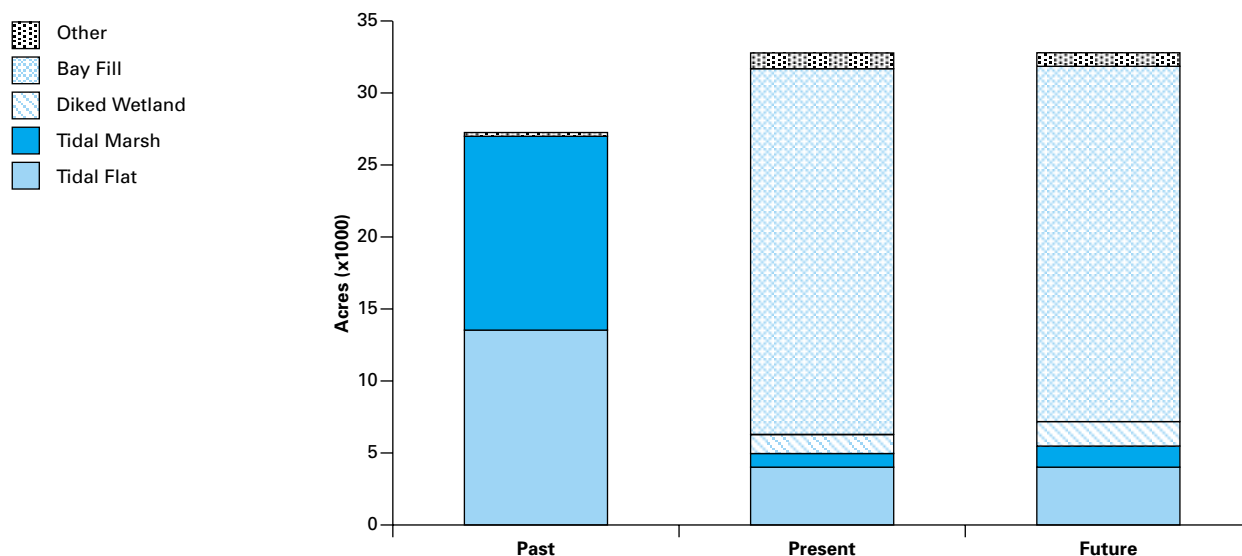
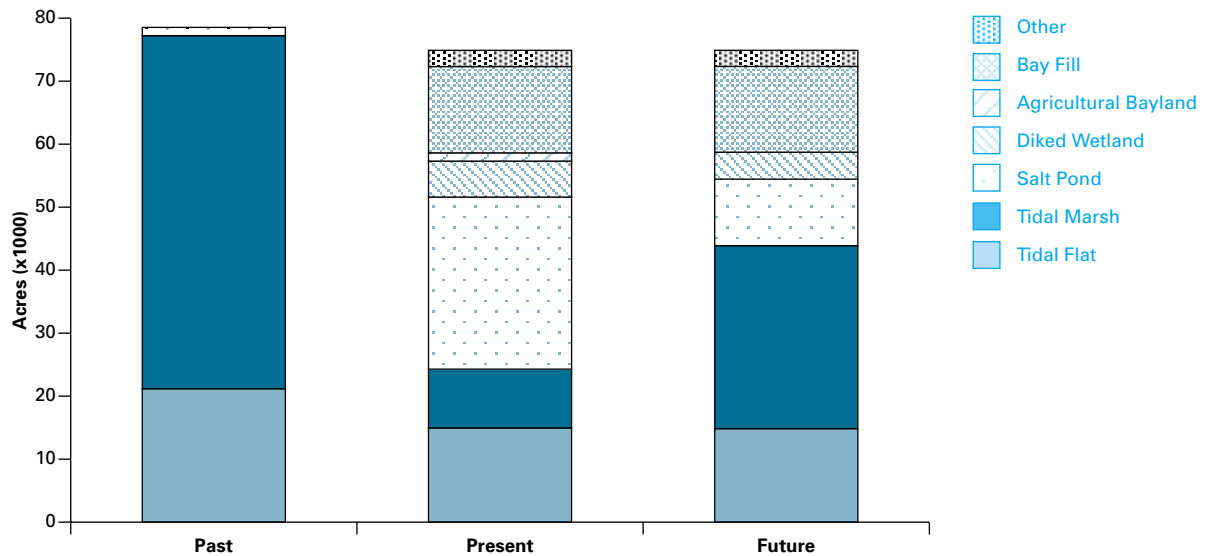


FIGURE 5.6 Past, Present, and Recommended Future Bayland Habitat Acreage for South Bay Subregion



The Central Bay subregion includes Segments I through L. Actions for achieving the Goals in each of these segments are described beginning on page 116.

South Bay Subregion

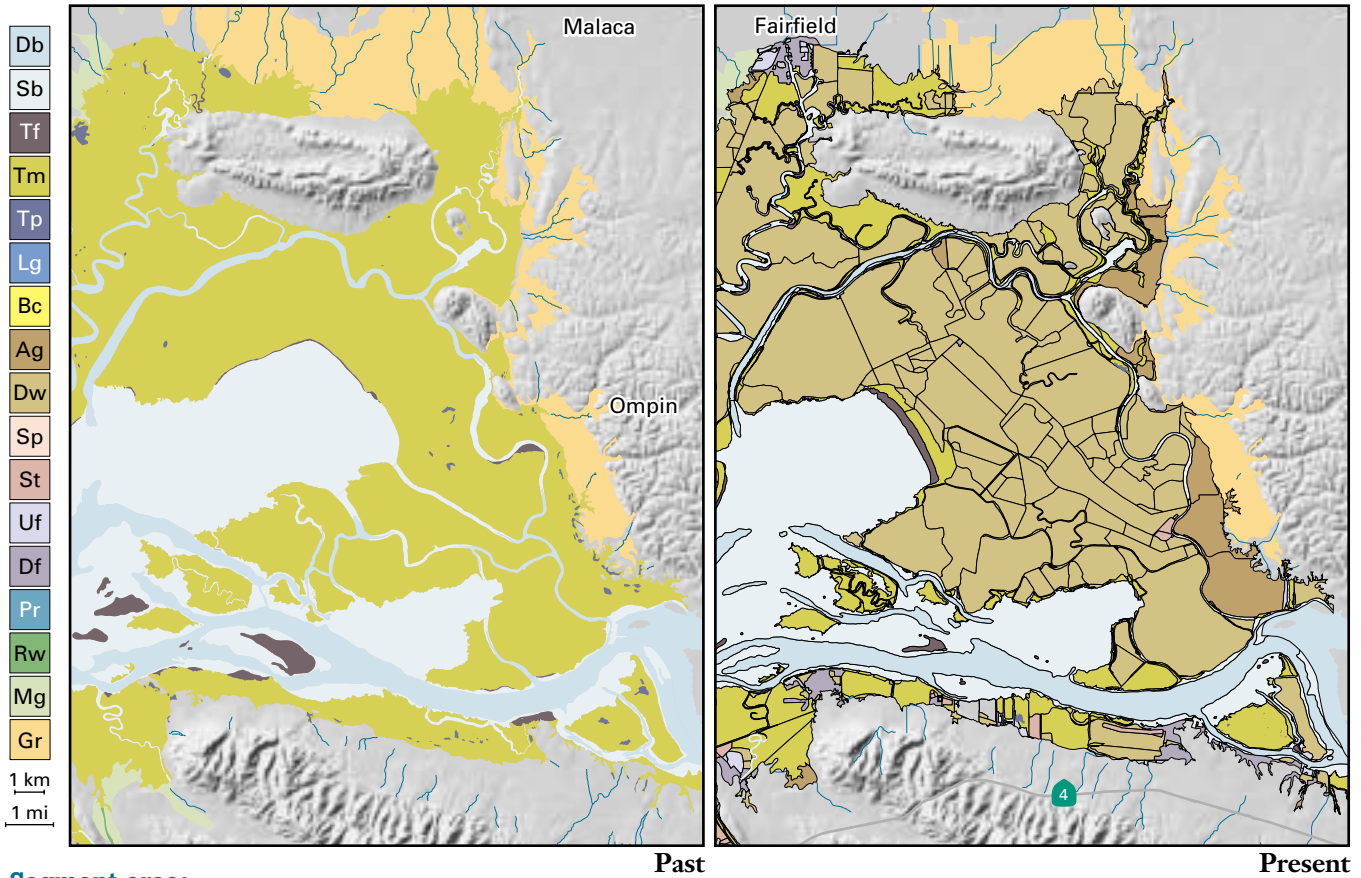
The overall goal in the South Bay subregion is to restore large areas of tidal marsh connected by wide corridors of similar habitat along the perimeter of the Bay. Several large complexes of salt ponds, managed to optimize shorebird and waterfowl habitat functions, should be interspersed throughout the 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, 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.

Of particular importance in this subregion, especially in, Segments R, S, and T, is the need to control smooth cordgrass.

In this subregion, achieving the Goals will depend largely on the willingness of the Cargill Salt Division to undertake major changes in its operations or to cease commercial salt production. It also will depend on the efforts of many other private and public landowners.

Figure 5.6 shows the approximate acreage goals for the key bayland habitats in this subregion, along with past and present acreage. As the graphs indicate, the Goals call for increasing the area of tidal marsh from about 9,000 acres to between 25,000 and 30,000 acres. They also recommend managing for wildlife somewhere between 10,000 acres and 15,000 acres of salt pond habitat.

The South Bay subregion consists of Segments M through T. Recommendations for achieving the Goals in each of these segments are described beginning on page 124.



Segment area:
38,538 acres

Segment A — Suisun Marsh East

Subregion: Suisun

Location: Eastern portion of Suisun Marsh.

Major or Unique Features: Historically, this area was predominantly tidal fresh and brackish marsh, arrayed as low-lying islands in Suisun Bay and as wide plains between the Bay and the adjacent uplands. Inside this broad expanse of marshes were sloughs, channels, ponds, and small bays. Except for parts of Suisun Bay, the segment had relatively few areas of tidal flat. Adjoining the baylands, especially along Montezuma Slough and near Potrero Hills, were extensive areas of moist grasslands with vernal pools. The relatively steep topography of Potrero Hills provided a unique and narrow marsh/upland transition.

Today, this segment is one of the least developed areas of the baylands ecosystem. There are extensive tidal flats in Grizzly Bay. Most of the marshes are diked and are managed as duck clubs, but some tidal marsh occurs in Suisun Bay, along the edge of Grizzly Bay, and in many of the sloughs. There are alkaline/saline vernal pool complexes in the surrounding grasslands that grade into the upper tidal marsh zone. Water salinity throughout the diked areas and in many of

The maps for this and other segments use an abbreviated legend. To see the full legend, please refer to the inside front cover.

the sloughs is managed in ways that reduce natural variability of marsh salinity. For example, the salinity control gates in Montezuma Slough are operated to maintain channel salinity levels similar to levels that would have occurred before the start of water diversions from the Delta. There is considerable localized freshwater influence from Denverton Creek in the northeast corner.



Unique Restoration Opportunities: This segment's large size, current protected status, and relative isolation make it an ideal location for habitat protection, enhancement, and restoration. Because of its location in the upper reach of the estuary, this segment offers a good opportunity to restore large areas of tidal marsh along the full salinity gradient.

Restoring tidal marsh at the periphery of Suisun Marsh would provide opportunities to reestablish the range of the endangered soft bird's-beak. There also are opportunities to restore vernal pools with tadpole shrimp in the adjacent uplands. Many diked wetlands in this segment are well suited for continued management for waterfowl and other species.

Recommendations:

- Restore tidal marsh at sites adjacent to Honker Bay, along the eastern side of Montezuma Slough, in the Nurse Slough area, and near Denverton Creek.
- Provide a tidal marsh corridor along the base of Potrero Hills between Nurse Slough and the marshes to the west.
- Provide natural transitions to adjacent uplands (with protective buffers wherever possible) for all existing and restored tidal marshes.
- Protect and enhance existing vernal pools and other seasonal wetlands adjacent to Montezuma Slough, in the Nurse Slough area, and north of Potrero Hills.
- Enhance managed marshes in the Grizzly Island area to improve and diversify managed wetlands.

Unique Restoration Benefits: Restoring tidal marshes in this segment would benefit black rail, Suisun song sparrow, and other tidal marsh species. It also would increase detrital input to this very productive part of the estuary and increase habitat for aquatic organisms including Delta smelt, striped bass, out-migrating salmon, and other fishes. Restoring large amounts of tidal marsh along the Montezuma and Suisun sloughs would increase tidal flow and thus improve water circulation and reduce the need for dredging. Expanding tidal marsh along the tidal/upland ecotone would provide opportunities for restoring plant communities. Enhancing vernal pools and other seasonal wetlands on the periphery of the Marsh would help restore their declining plant and animal communities. Improving managed marsh would benefit waterfowl, other water birds, songbirds, and a variety of mammals.

Possible Constraints: Flood control considerations, levee maintenance, sedimentation of tidal creeks, water salinity management, and water quality impacts.



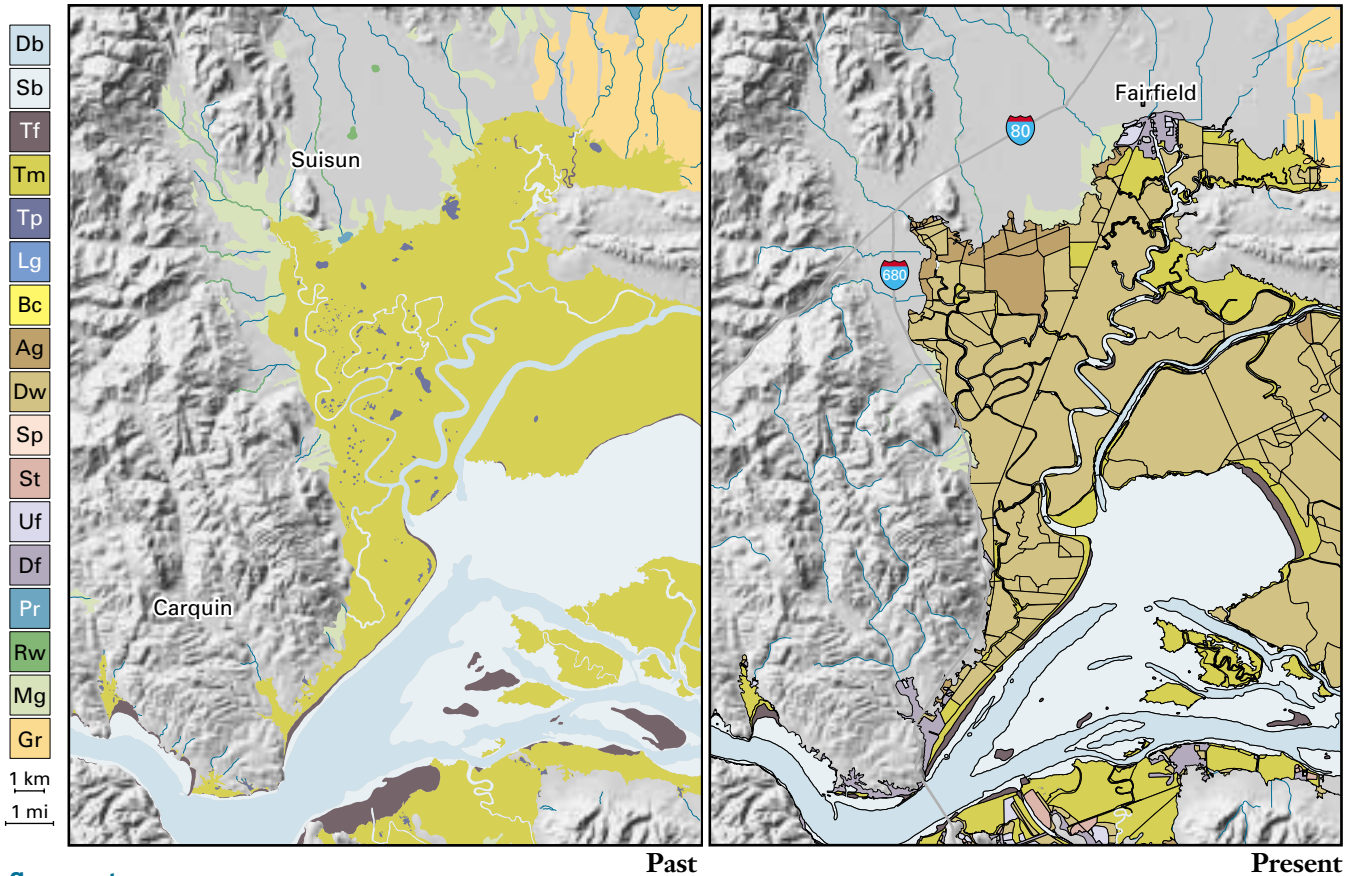
Herb Lingl



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Segment area:
25,353 acres

Segment B — Suisun Marsh West

Subregion: Suisun

Location: Western portion of Suisun Marsh.

Major or Unique Features: Historically, this part of Suisun Marsh was relatively fresh to brackish marsh, with marsh conditions more saline in the western portion. The marshland extended from Potrero Hills westward to the upper end of Carquinez Strait. Myriad channels and sloughs meandered through the marsh, and along the western side there were many large tidal marsh pans. Adjacent to the tidal marshes north of Potrero Hills were large areas of moist grassland with vernal pools; scattered patches of moist grassland occurred along the base of the hills to the west. Riparian forest lined several of the larger creeks that flowed into the marshes from the north. Like the eastern part of Suisun Marsh, this segment had few areas of tidal flats.

Today, this segment is nearly all diked wetland that is managed as seasonal waterfowl habitat. An area in the northwestern portion is agricultural bayland and is managed primarily for pheasant hunting. Tidal marshes are limited and are generally confined to areas along Hill, Peytonia, Montezuma, Suisun, and Cutoff sloughs and to First and Second Mallard Branch. None of the historical marsh ponds remain, except in low areas in diked baylands, and the tidal channels have

narrowed markedly or disappeared. Water regimes are highly managed, primarily to regulate salinity. Only remnants of the moist grasslands and areas of vernal pools remain, and most have been degraded by years of grazing. The area is a stronghold for endangered soft bird's-beak and the site of the only known population of Suisun thistle.



Unique Restoration Opportunities: This segment provides opportunities to restore large patches of tidal marsh adjacent to areas of moist grasslands and vernal pools and to provide wide natural transitions between these habitat types. There is an opportunity to expand an existing large tract of tidal marsh at Rush Ranch. There also are opportunities to restore and enhance riparian vegetation along streams, several of which support steelhead, that flow into the Marsh from the north. There are opportunities to improve management of diked wetlands for waterfowl and other water birds. As with the Marsh's eastern segment (Segment A), this area's large size, current protected status, relative isolation, and location on the estuarine salinity gradient all increase its overall restoration value.

Recommendations:

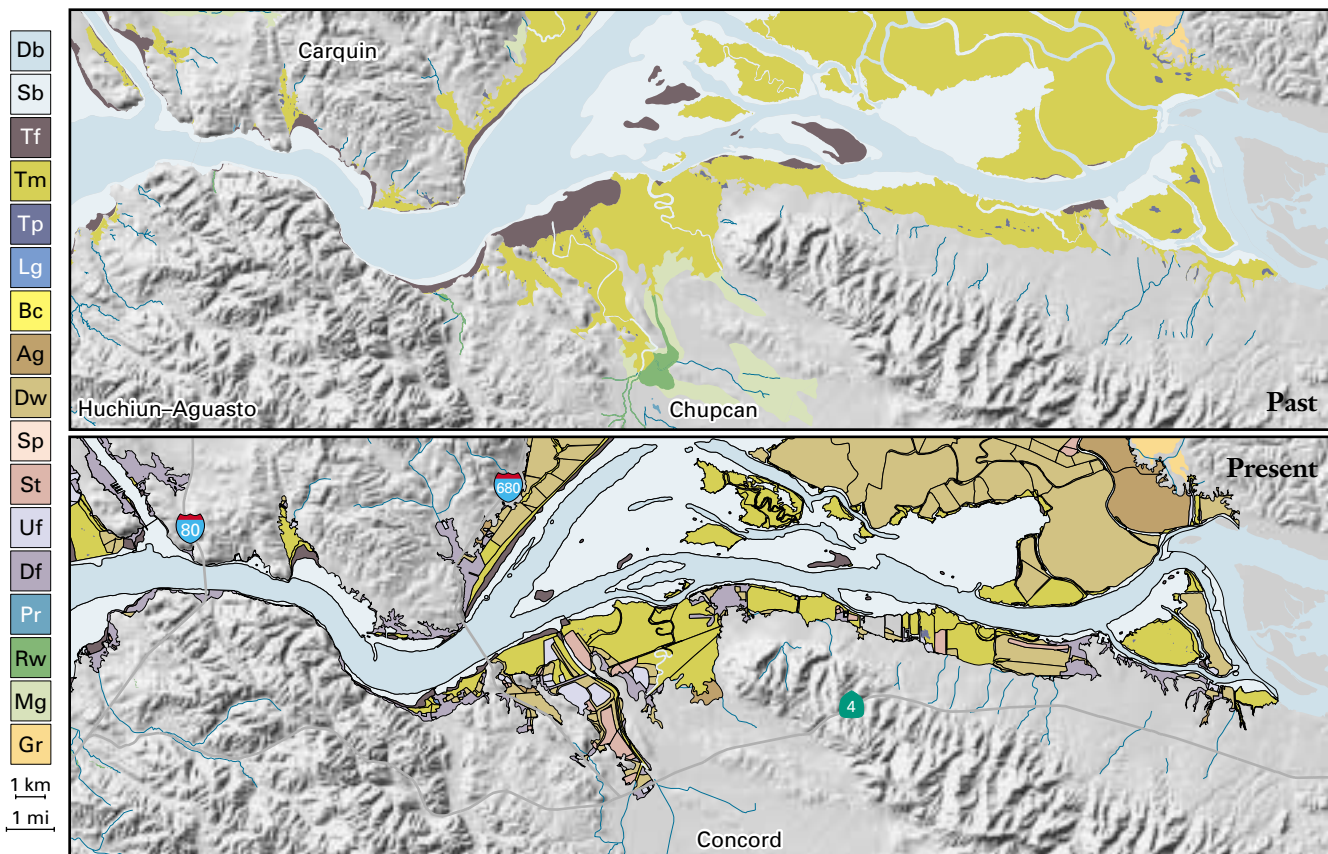
- Restore large areas of tidal marsh in the Hill Slough and upper Suisun Slough areas, and on Morrow Island south of the confluence of Goodyear Slough and Suisun Slough.
- Connect these large areas of restored tidal marsh with a tidal marsh corridor. The location of this corridor is highly flexible, but establishing it along Cordelia Slough probably would facilitate water management on duck clubs in the area.
- Provide natural transitions to adjacent uplands, with protective buffers wherever possible.
- Enhance managed marsh areas that are not restored to tidal marsh to improve waterfowl habitat.
- Protect and restore tidal marsh at Southampton Bay.

Unique Restoration Benefits: Restoring tidal marshes in this segment would benefit many estuarine and anadromous fish species, including Chinook salmon, steelhead, and Delta smelt. It also would benefit the California clapper rail. Restoring natural marsh/upland transitions would improve conditions for endangered plant species such as the soft bird's-beak and Suisun thistle, especially along the segment's northern edge. Mammals that depend on transition areas for high water escape habitat also would benefit. The lower elevation tidal marshes would provide habitat and food web support for aquatic invertebrates, and habitat for diving ducks such as canvasback and redheads. The remaining managed marshes would continue to provide waterfowl and shorebird habitat, and habitat for small mammals. Restoring tidal action to the upper reaches of Cordelia Slough would enhance habitats, improve channel flood control capacity, and improve water conveyance to duck clubs.

Possible Constraints: Southern Pacific railroad tracks, industrial areas in southwest portion, flood control considerations, levee maintenance, sedimentation of tidal creeks, water salinity management, and water quality impacts.



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Segment area:
11,051 acres

Segment C — Contra Costa North

Subregion: Suisun

Location: Southern edge of Suisun Bay between Carquinez Bridge and Broad Slough/San Joaquin River.

Major or Unique Features: Historically, there was tidal brackish marsh along nearly the entire length of this segment except for a portion downstream along the Carquinez Strait. These tidal marshes extended into the lower reaches of several local streams, including Hastings Slough, Alhambra Creek, and Pacheco Creek. Tidal flats occurred near the mouth of Pacheco Creek and at a few locations on the shoreline upstream toward the Delta. Within the Walnut Creek watershed were several areas of moist grassland and large stands of willow groves and riparian forest.

Today, most of the tidal marsh in this segment has been diked, and there are several cities, numerous industrial plants, and a military facility on or near the shoreline. However, many tidal marshes remain, especially near Martinez and near Pittsburg. Although most of these are degraded, some have significant populations of soft bird's-beak and salt marsh harvest mouse. Only a few remnants of riparian forest remain.

Unique Restoration Opportunities: Many of the shoreline’s historical tidal marsh areas, although degraded by years of grazing, agriculture, and other activities, are restorable to full tidal action. Likewise, several of the seasonal diked wetlands are suitable for tidal restoration or enhancement. Lands adjacent to many of the streams are still undeveloped and have high potential for riparian restoration and enhancement.



Recommendations:

- Restore large areas of tidal marsh in diked and muted tidal marsh areas.
- Where tidal marsh cannot be restored, improve water management to enhance diked wetlands.
- Ensure natural transitions between marshes and adjacent uplands, and protect and expand adjacent buffers where possible.
- Restore riparian vegetation along small and large streams.

Unique Restoration Benefits: Implementing these recommendations would improve habitat conditions for a variety of plants and animals. Restoring tidal marsh along the shoreline of Suisun Bay would improve habitats for estuarine and anadromous fishes, and would increase detrital input to the null zone. Restored marshes also would provide improved habitat for California clapper rail, black rail, and salt marsh harvest mouse. Restoring the marsh/upland ecotone would benefit populations of soft bird’s-beak, Mason’s lilaopsis, and Delta tule pea. Reestablishing riparian vegetation along streams would provide corridors for amphibians, small mammals, and birds, thereby improving the ecological connections between the baylands and the adjacent watersheds.

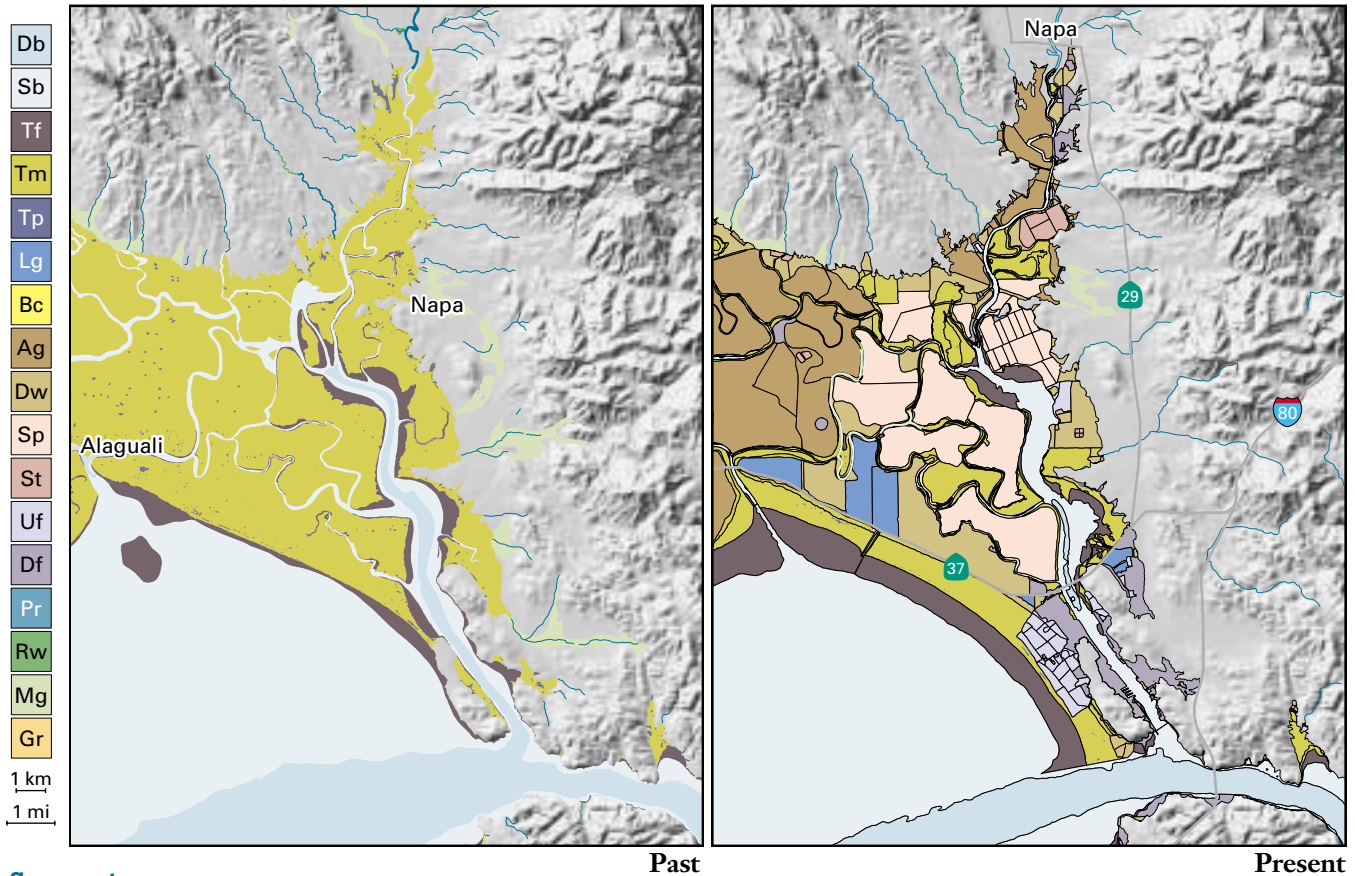
Possible Constraints: Railroads and roadways, major pipelines, sewer lines, Concord Naval Weapons Station, adjacent heavy industry (e.g., Pacific Gas and Electric Company’s Pittsburg power plant), and on-site contaminants.



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Segment area:
25,710 acres

Segment D — Napa River Area

Subregion: North Bay

Location: Northern side of San Pablo Bay extending from the Carquinez Bridge westward to the salt pond intake channel.

Major or Unique Features: Historically, this area was nearly all tidal salt marsh and tidal brackish marsh dominated by the hydrology of the lower Napa River. Extensive sloughs and channels connected it to the lower portion of Sonoma Creek to the west. Tidal salt marsh extended to the Bay, but there was very little bordering tidal flat except along the Napa River. Many of the tidal marshes along the eastern side of the Napa River reached into small valleys and swales and were bordered with moist grasslands.

Today, this segment remains relatively undeveloped, except for agriculture, and the inactive salt ponds on the western side of the Napa River dominate its landscape. Narrow strips of tidal marsh exist on the outboard sides of the levees that border these salt ponds, and also at several sites along the Napa River. The high salt marsh on the southern side of Highway 37 supports the largest population of salt marsh harvest mouse in North Bay. Significant populations of California clapper rail and black rail exist at Fagan Slough, Coon Island, and White Slough. Extensive tidal flats border the salt marsh south of Highway 37.

There are diked wetlands along the northern side of Highway 37 and along the base of the hills near Huichica Creek. At the bayland edge are many localities of rare or extirpated species of high marsh plants.



Unique Restoration Opportunities: This segment presents an excellent opportunity to restore several large patches of tidal marsh adjacent to a large riverine system. It also is a place where marsh can be restored around a major intact remnant historic tidal marsh (e.g., Fagan Slough and Coon Island). It is the only place in North Bay where inactive salt pond habitat can be improved for waterfowl, especially diving ducks. Along the bayland edge are opportunities (e.g., eastern side of Napa River near American Canyon) to ensure natural transitions between restored tidal marsh and the adjacent uplands. Also along the periphery of the segment, on both sides of the Napa River, are opportunities to improve seasonal wetlands.

Recommendations:

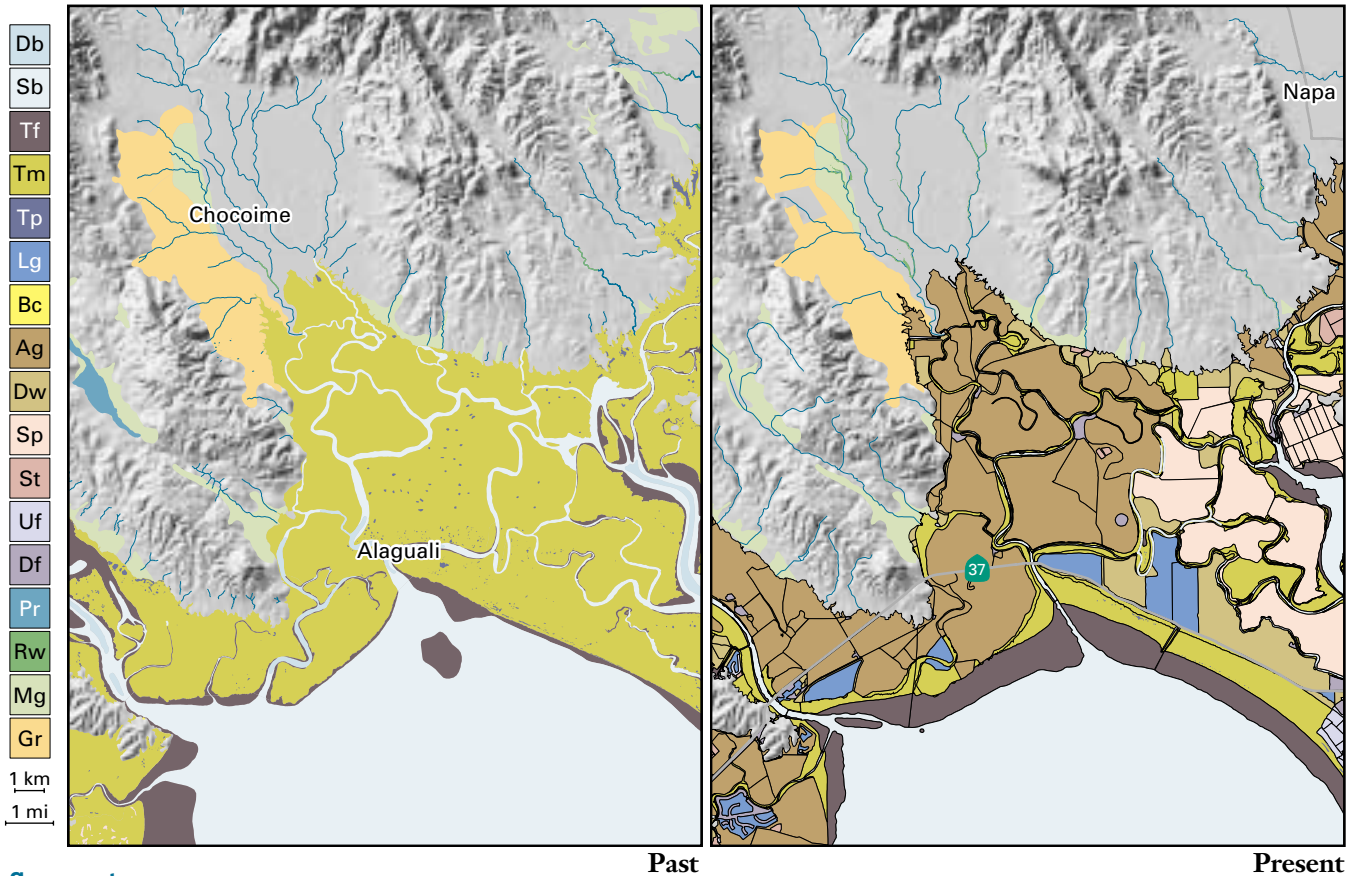
- Restore large areas of tidal marsh along both sides of the Napa River. This will entail restoring about half of the inactive salt ponds and Cullinan Ranch to tidal marsh.
- Manage the remaining acreage of inactive salt ponds on both sides of the Napa River as salt pond or shallow open water habitat to support waterfowl.
- Restore a continuous band of tidal marsh along the bayshore, and enhance existing marsh patches by improving tidal circulation.
- Manage diked wetlands and seasonal wetlands in the adjacent uplands to improve seasonal ponding.
- Where possible, enhance riparian vegetation and marsh/upland transitions and provide upland buffers.
- Enhance seasonal wetlands at the Mare Island dredged material disposal ponds to improve habitat for shorebirds.

Unique Restoration Benefits: Implementing these recommendations would improve habitat conditions for tidal marsh-dependent species, such as the salt marsh harvest mouse and California clapper rail, throughout the segment. It also would improve habitats for species associated with seasonal wetlands. Large-scale restoration would widen and deepen many of the tidal channels, and this would benefit fishes and diving ducks, as well as water circulation. Improving salt pond habitat also would provide valuable deepwater foraging and resting habitat for diving ducks. Restoring riparian vegetation would benefit many amphibians, birds, and small mammals. Enhancing marsh/upland transitions would improve conditions for several rare plants.

Possible Constraints: California Northern railroad tracks, Highway 37, communication cables and Pacific Gas and Electric Company power lines, discharge or disposal of salt and bittern from inactive salt ponds, and levee maintenance (including salt pond levees isolated from land-based access).



Herb Lingf



Segment area:
23,319 acres

Segment E — Sonoma Creek Area

Subregion: North Bay

Location: Northern side of San Pablo Bay extending from salt pond intake channel to just west of Tolay Creek.

Major or Unique Features: Nearly all of the lands within this segment once were tidal salt marsh or tidal brackish marsh. There were some limited areas of moist grasslands to the north and west, along upper Sonoma Creek, and in the drainages around and below Lake Tolay. A large area of vernal pool soils existed on the western side of upper Sonoma Creek.

Today, this segment is relatively undeveloped and most of the baylands are farmed. There are several managed diked wetlands along the periphery of the segment, especially near the hills to the north and adjacent to Highway 37. Tidal marsh is limited to the Bay edge near Sonoma Creek and along the outboard sides of levees along the remaining channels. There are some muted tidal lagoons adjacent to Highway 37 and Tolay Creek. Spawning Chinook salmon have been observed in Sonoma Creek.

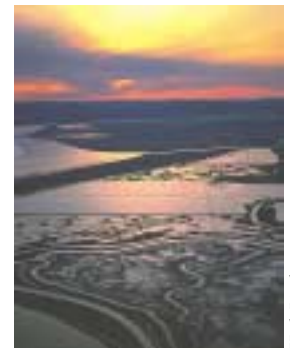
Unique Restoration Opportunities: This segment provides an excellent opportunity to restore large patches of tidal marsh, some as isolated marsh islands and others with natural transitions to the adjacent uplands. Also, there are large areas that are well suited to be managed as diked wetlands for shorebirds and waterfowl.

Recommendations:

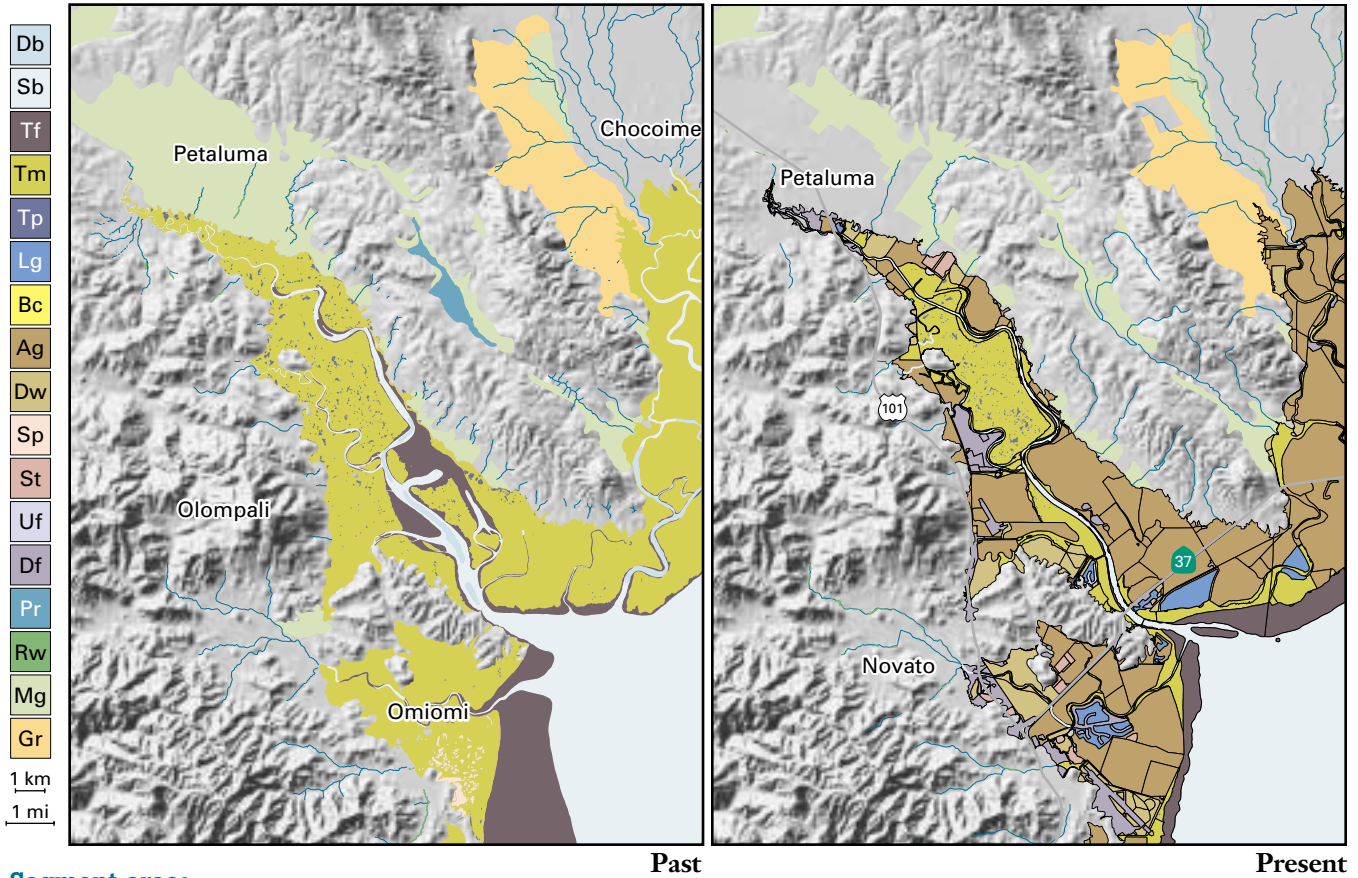
- Restore large patches of tidal marsh along the entire shoreline of San Pablo Bay, particularly near the mouths of sloughs and major streams.
- Upstream of Highway 37, restore a broad plain of tidal marsh on both sides of Sonoma Creek. There is considerable flexibility in this area regarding the desired location of tidal and diked habitats; seasonal diked wetlands should be located in close proximity to tidal flats to provide high tide roosting habitat for shorebirds.
- Establish managed marsh or enhanced seasonal pond habitat (especially for shorebirds) on agricultural baylands that are not restored to tidal marsh. Landowners who wish to continue farming or grazing practices on the baylands in this segment are encouraged to consider implementing the recommendations on page 157.
- Enhance riparian habitat along Sonoma Creek in the Schellville area and upstream, and protect and restore Tolay Creek.
- Where possible, enhance marsh/upland transitions and provide buffers.

Unique Restoration Benefits: Restoring tidal marsh in this segment would greatly enlarge the area of shallow channel habitat for many fish species. Increased tidal prism would also enlarge existing deep channels to the benefit of fish and diving ducks. Increasing the area of tidal marsh would expand suitable tidal marsh habitat for endangered tidal marsh species such as the California clapper rail and the salt marsh harvest mouse. Restoring marsh at the periphery of the baylands, where natural transitions to adjacent uplands could develop, would benefit several rare plants, as well as birds, mammals, and amphibians that depend on the marsh/upland transition zone. Large amounts of tidal marsh can reestablish the hydrological gradients between Sonoma Creek and the Napa River, greatly improving water circulation. Large areas of managed diked wetlands would provide important roosting and foraging habitat for shorebirds and waterfowl.

Possible Constraints: Northwestern Pacific railroad tracks, Pacific Gas and Electric Company transmission lines, Highway 37 and other highways, levee maintenance, and flood control considerations.



Herb Lingl



Segment area:
15,647 acres

Segment F — Petaluma River Area

Subregion: North Bay

Location: Northwestern edge of San Pablo Bay and lands in the lower Petaluma River drainage.

Major or Unique Features: Tidal marsh once was the dominant habitat type in this segment. Salt marsh existed near the mouth of the Petaluma River, and became brackish upstream. There were relatively small tidal flats at the river mouth, but several large areas upstream at False Bay. Small patches of moist grassland occurred along the northeastern edge of the baylands, and a very large area of this habitat existed near Petaluma.

Today, this segment remains relatively undeveloped, and it contains the largest intact tidal marsh within the estuary, Petaluma Marsh. This marsh exhibits many of the features that were characteristic of the estuary's historical marshes — pans, a system of extensive channels, and natural transitions to adjacent uplands — but which are not readily apparent in most other Bay marshes. Adjacent to the baylands, the landscape retains much of the historical character of moist grassland bordered by oak woodland. The segment receives freshwater flows from San Antonio Creek, which supports extensive riparian habitat, and the Petaluma River and Adobe Creek, which support runs of steelhead.

Unique Restoration Opportunities: This segment provides opportunities to restore extensive tidal marsh and natural marsh/upland transitions near the subregion’s largest brackish marsh. It also provides opportunities to expand remnant populations of rare plants, such as Point Reyes bird’s-beak, into restored tidal marsh areas. There is the unique opportunity to enhance the stream/marsh ecotone between San Antonio Creek and tidal habitats, one of the few places where such restoration can take place. Opportunities also exist to significantly increase and enhance seasonal wetland habitat in the diked baylands and adjacent uplands, particularly on the eastern side of the Petaluma River. This segment also provides opportunities to restore and enhance tidal marsh/upland transitions, particularly with oak woodlands.



Recommendations:

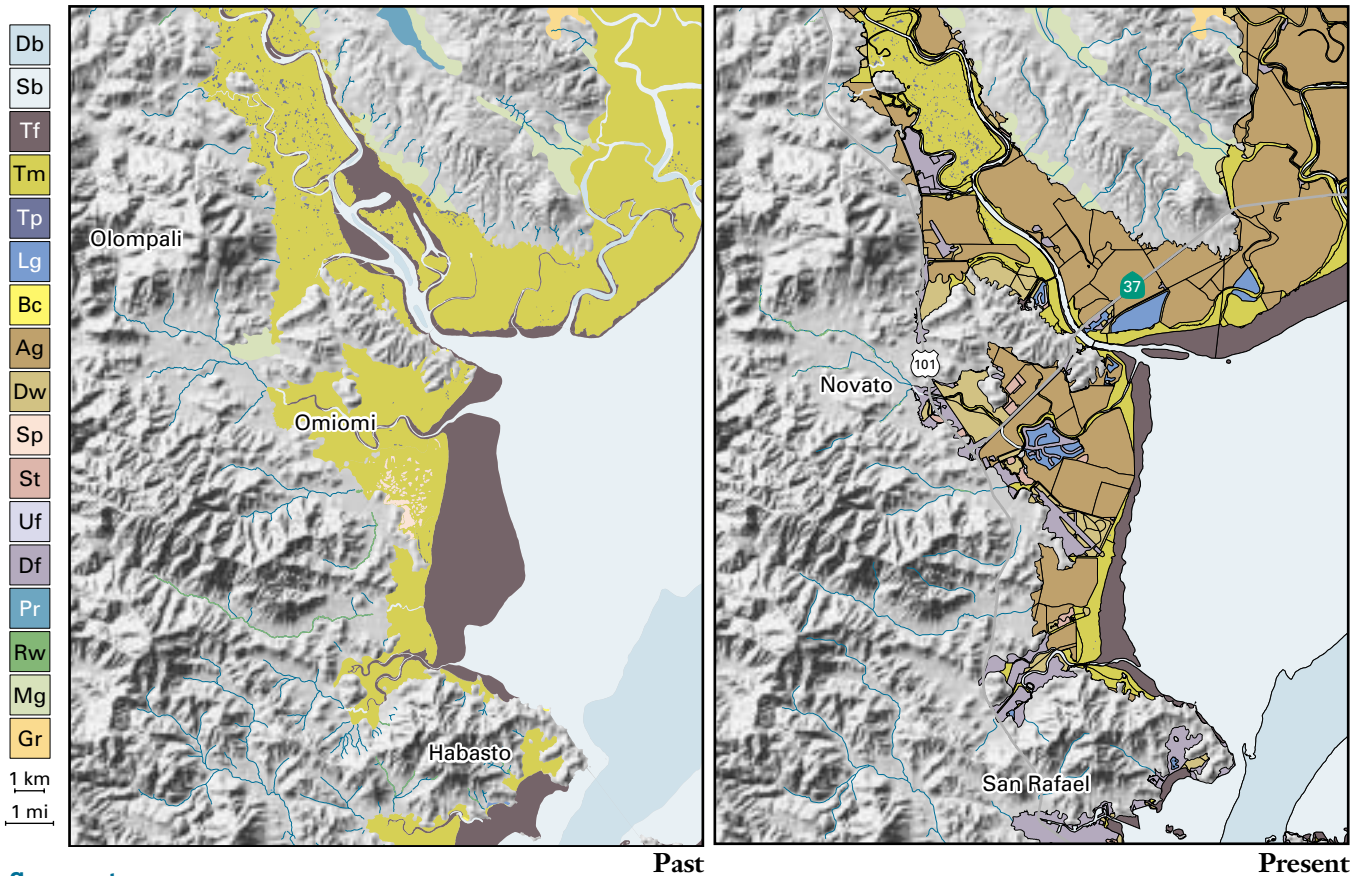
- Restore a continuous, wide band of tidal marsh along the bayshore from Tolay Creek to the Petaluma River.
- Restore tidal marsh on both sides of the Petaluma River, particularly on the eastern side, between Highway 37 and False Bay.
- Establish managed marsh or enhanced seasonal pond habitat on agricultural baylands that are not restored to tidal marsh. Landowners who wish to continue farming or grazing practices on the baylands in this segment are encouraged to consider implementing the recommendations on page 157.
- Provide natural transitions at the marsh/upland ecotone and buffers in the adjacent uplands.
- Encourage seasonal wetlands and managed marsh creation at Burdell Ranch around Gness Airfield, and in areas constrained by infrastructure along the Highway 37 corridor between Sears Point and the Petaluma River.
- Protect and enhance moist grassland habitats on the eastern portion of this segment.
- Control pepper grass invasions in otherwise intact tidal brackish marsh to prevent loss of high marsh plant diversity.

Unique Restoration Benefits: Significant benefits for tidal marsh species such as the California clapper rail, black rail, and salt marsh harvest mouse, could be achieved in this segment. Restoring tidal marsh also would improve nursery habitat for salmon, steelhead, starry flounder, Dungeness crab, and other aquatic species. Restoring and enhancing fluvial/riparian/tidal marsh transitional habitats along San Antonio Creek and possibly Adobe Creek would benefit fish, amphibians and plants. Restoring tidal marsh/upland transitions would improve conditions for rare high marsh and ecotonal plant species.

Possible Constraints: Highway 37 corridor and Lakeville Highway east of the Petaluma River, Highway 101 west of the Petaluma River, Northwestern Pacific Railroad tracks, Pacific Gas and Electric Company transmission lines, subsidized baylands, Gness Air Field, and flood control considerations.



USCS 1860



Segment area:
11,555 acres

Segment G — North Marin

Subregion: North Bay

Location: Western side of San Pablo Bay extending from the mouth of the Petaluma River to Point San Pedro.

Major or Unique Features: This segment supported large areas of tidal marsh that were bordered by extensive mudflats. These flats composed the majority of the mudflats in San Pablo Bay. Several tributary streams, the largest of which were Novato and Gallinas creeks, fed the marshes. These streams supported riparian habitats through which passed steelhead and possibly coho salmon. Upslope of the marshes, oak woodlands dominated the landscape. Large pans in the tidal marshes near present-day Novato supported abundant waterfowl populations.

Currently, much of the area near the Bay is cultivated for oat hay, and there are residential developments at Bel Marin Keys, at Hamilton Field (along with other military base infrastructure), and at several sites to the south. A fairly large remnant marsh remains at the mouth of Gallinas Creek, including China Camp, which supports what appears to be the largest population of clapper rails in North Bay. Large, permanent, freshwater emergent marshes are found along the western side of Novato Creek north of Highway 37 and at the Ygnacio Pond.

Unique Restoration Opportunities: This segment provides an opportunity to enhance tidal marsh in areas where natural marsh/upland transitions can be restored. It has areas to expand and reintroduce populations of rare plant species, such as Point Reyes bird's-beak and johnny-nip. It also has potential for major expansion of California clapper rail into very wide marshes, remote from predator outposts and corridors. Tidal marsh restoration could be used to enhance flood protection in the Novato Creek area by expanding tidal prism to maintain and enhance the existing channel which is currently dredged to maintain capacity. There are opportunities to restore riparian habitat along Gallinas and Novato creeks. Presence of treated wastewater provides the opportunity to develop freshwater managed wetlands for waterfowl in the area. Stream and riparian habitat could be enhanced on tributary streams for fish and amphibians.



Recommendations:

- Restore a wide, continuous band of tidal marsh along the bayfront between Black Point and Gallinas Creek, and along Gallinas Creek and Novato Creek. Ensure a natural transition to uplands throughout and provide an upland buffer outside the baylands boundary.
- Protect oak woodlands and mixed evergreen forest along the entire ridge and hillslopes from Black Point to Rush Creek, and protect the ecotone at the base of the slopes. Also protect oak woodlands at Deer Island and Hanna Ranch.
- Establish managed marsh or enhanced seasonal pond habitat on agricultural baylands that are not restored to tidal marsh. Landowners who wish to continue farming or grazing practices on the baylands in this segment are encouraged to consider implementing the recommendations on page 157.



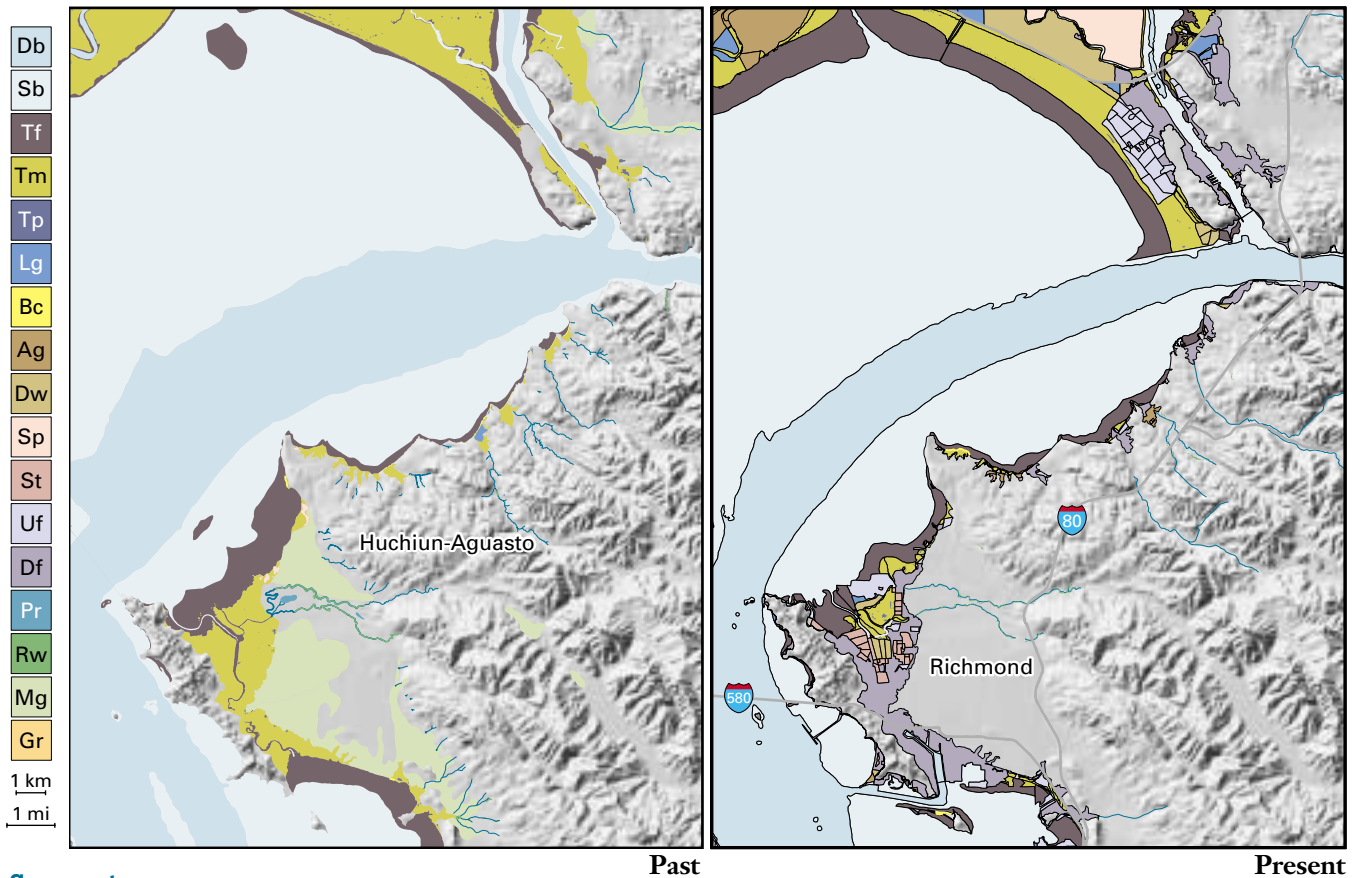
Herb Lingl

Unique Restoration Benefits: Restoring tidal marshes on the bayshore and along lower reaches of streams would expand suitable habitat for many tidal marsh species, particularly California clapper rail. Providing wide transitions between these marshes and adjacent uplands would benefit many rare plant species. Restoring and improving tidal marsh along Novato Creek would improve flood protection and expand habitat for sensitive tidal marsh species. Protecting oak woodlands and mixed evergreen forest would ensure habitat for the many species of wildlife that utilize these areas and the adjacent baylands.



Herb Lingl

Possible Constraints: Flood protection considerations, Novato wastewater discharge, railroad right-of-way, and Hamilton Field.



Segment area:
4,223 acres

Segment H — Contra Costa West

Subregion: North Bay

Location: Southeastern edge of San Pablo Bay between Point San Pablo and the Carquinez Bridge.

Major or Unique Features: A broad tidal flat once bordered most of the portion of this segment north of Point Pinole, except along the steep shoreline near Carquinez Strait. A string of small tidal marshes existed in small coves along this shoreline and at the entrances to Garrity, Pinole, Refugio, and Rodeo creeks. A large tidal marsh spanned much of the area between the San Pablo Peninsula and Point Pinole and extended the length of lower Castro Creek. There were extensive areas of moist grasslands bordering the upland edge of this tidal marsh.

Today, there is considerable industrial development in this segment. The Union Pacific railroad tracks lie within a few yards of the shore for the entire distance north of Point Pinole, and almost no tidal marsh remains in this area. Most of the tidal marsh in the Castro Creek basin has been filled for heavy industry (oil refinery and rail yard) and the Richmond sanitary landfill. Some tidal marshes remain to the north and south of this landfill at the mouths of San Pablo and Wildcat creeks. Tidal flats still exist throughout most of their historical distribution, and there are several sandy barrier beaches and lagoons. Some vernal pools remain in the adjacent uplands.

Unique Restoration Opportunities: There is potential to restore a corridor of tidal marsh between Wildcat Marsh and San Pablo Marsh, as well as riparian vegetation along the streams that flow into these marshes. There are opportunities to restore the lagoon on the eastern side of San Pablo Peninsula and vernal pools near the Bruener property. There also are opportunities to restore populations of tidal marsh plants, including soft bird's-beak, johnny-nip, and possibly Point Reyes bird's-beak near Point Pinole.

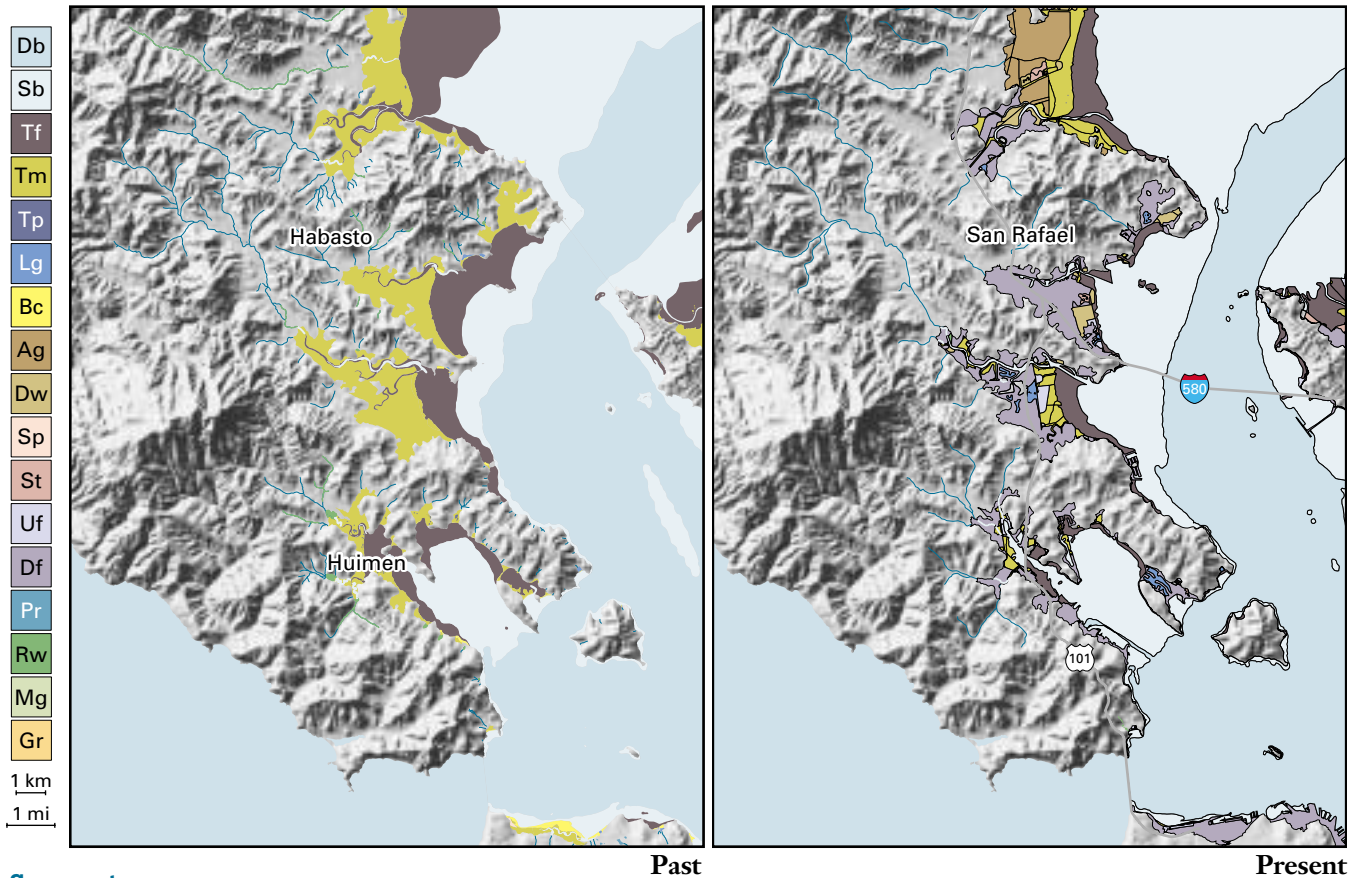


Recommendations:

- Protect and enhance existing tidal marshes, beaches, lagoons, and uplands.
- Restore a tidal marsh corridor along the eastern edge of the Richmond landfill to reconnect Wildcat Marsh and San Pablo Marsh.
- Protect and restore tidal marsh south of the Point Pinole Regional Shoreline at the Bruener property, and connect to Giant Marsh.
- Restore vernal pools in the adjacent uplands.
- Control rampant spread of pepper grass in rare high marsh plant associations, and prevent reemergence of invasive non-native Chilean cordgrass at Point Pinole.

Unique Restoration Benefits: Implementing these recommendations would improve habitat conditions for tidal marsh-dependent small mammals, such as the salt marsh harvest mouse. Many species of Bay fishes that use tidal marsh habitat also would benefit from any tidal marsh improvements in this segment. Reestablishing a tidal marsh corridor between the Wildcat and San Pablo marshes would link these existing areas, increase tidal marsh acreage, and reduce the isolation of small mammal populations. Restoring and improving high marsh/upland transitions would benefit populations of several rare plants.

Possible Constraints: Union Pacific railroad tracks, Richmond landfill, flood control considerations, and on-site contaminants.



Segment area:
6,309 acres

Segment I — South Marin

Subregion: Central Bay

Location: Western edge of Central San Francisco Bay extending from Point San Pedro to the Golden Gate.

Major or Unique Features: Historically, this segment’s relatively steep bayshore topography limited large areas of tidal marsh to the lower reaches of San Rafael and Corte Madera creeks, and to the western part of Richardson Bay. In all of these areas, there also were broad expanses of tidal flats.

Today, much of the baylands within this segment is developed for urban, transportation, and residential uses. Only a few remnants of the original tidal marshes remain. Several of these marshes are muted, and some are adjoined by diked wetlands. Very little tidal flat remains. There are populations of rare Point Reyes bird’s-beak near Mill Valley and Sausalito, and possibly elsewhere in this segment. There also may be populations of Marin knotweed near Corte Madera and Greenbrae.

Unique Restoration Opportunities: This segment provides opportunities to restore and improve tidal marsh and diked wetlands. Harbor seals use the Corte Madera Marsh and Strawberry Spit areas for resting and pupping, and these sites are among a few places in the Bay where these habitats can be enhanced. In or near

Richardson Bay are suitable sites for restoring and enhancing habitat for the endangered Point Reyes bird's-beak. On offshore islands, potential exists for enhancing colonial bird nesting areas.

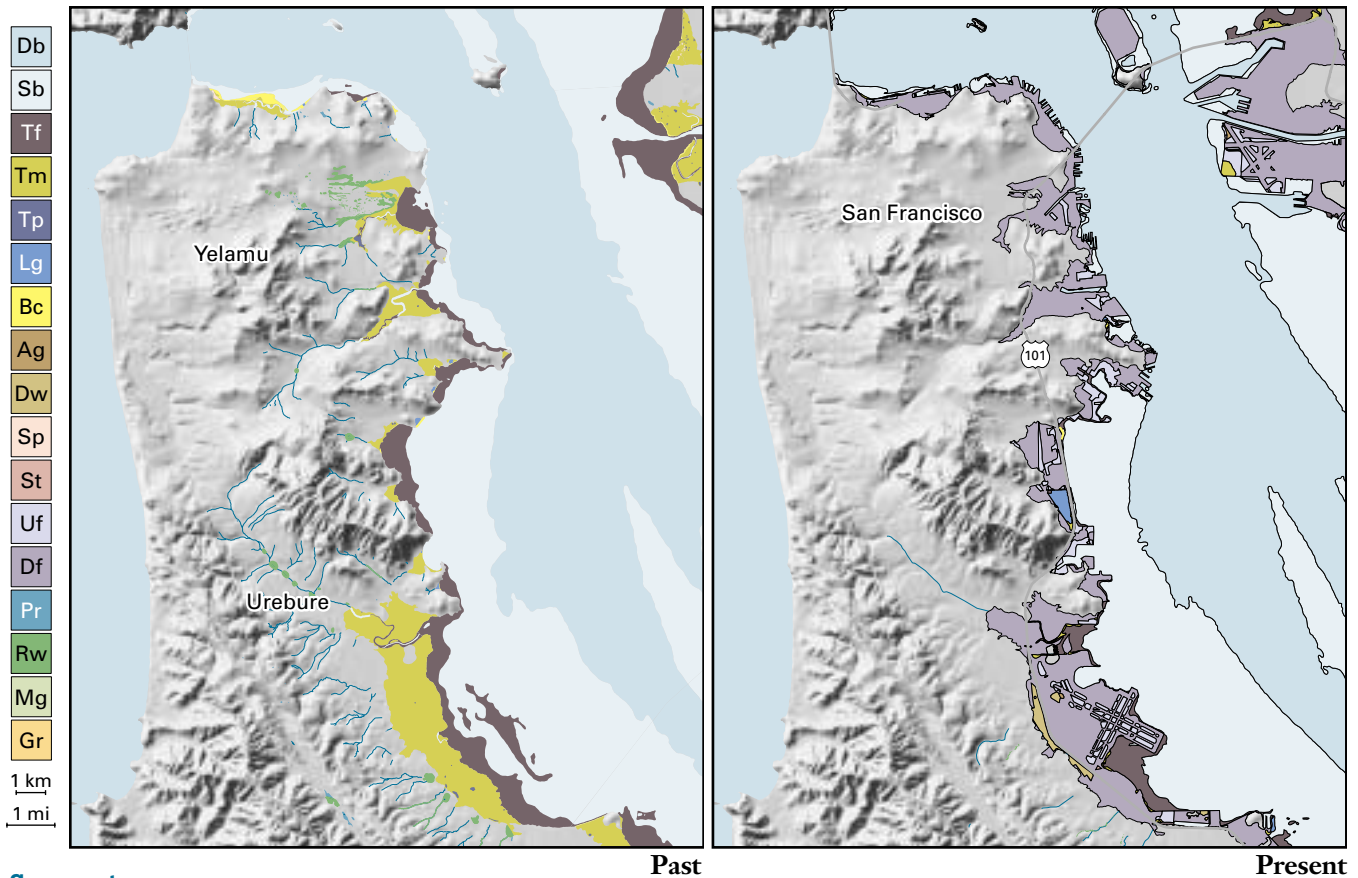


Recommendations:

- Restore and enhance tidal marsh wherever possible.
- In the Corte Madera and San Rafael marshes, enhance seasonal wetland features in the marsh/upland transition zone and establish or improve upland buffers. Eradicate non-native cordgrass along Corte Madera Creek.
- Restore high marsh near populations of rare and uncommon salt marsh plants to enable their expansion.
- Enhance colonial nesting bird habitat on East and West Marin Islands.
- Protect and enhance harbor seal haul-out and pupping sites in Corte Madera Marsh and at Strawberry Spit.
- In Richardson Bay, restore and enhance fringing marsh along the northwest edge for Point Reyes bird's-beak.
- Enhance riparian and instream habitats on Corte Madera Creek.
- Control pepper grass to prevent its invasion into rare plant habitat.

Unique Restoration Benefits: Implementing the recommendations for this segment would improve habitat support for harbor seals, salt marsh harvest mice, and other mammals. Improving tidal salt marsh/upland transitions would benefit Point Reyes bird's-beak. Protecting and enhancing valuable nesting habitat on the Marin islands would benefit colonial birds, such as the double-crested cormorant, gulls, and egrets. Enhancing seasonal wetlands would provide improved high-tide roosting habitat for shorebirds. Enhancing riparian and instream habitats would benefit migratory songbirds and steelhead.

Possible Constraints: Highway 101, Northwestern Pacific railroad tracks, flood control considerations, and extensive stands of dense-flowered cordgrass in Corte Madera Creek.



Segment area:
9,976 acres

Segment J — San Francisco Area

Subregion: Central Bay

Location: Western side of Central San Francisco Bay between the Golden Gate and Coyote Point.

Major or Unique Features: Historically, there were many kinds of habitats in this segment. Barrier beaches and marshes existed in small coves between local headlands, and often in connection with the mouths of streams. Tidal marsh also occurred here, and along the lower reaches of streams and in several small embayments at sites, such as China Basin, Islais Creek, and Hunters Point. A wide band of tidal marsh extended from near Candlestick Point southward to Coyote Point. This area was one of the major historical localities of California sea-blite, now regionally extinct.

Today, most of this segment is intensively developed — cities, military bases, industrial sites, and port facilities line much of the shore. San Francisco International Airport is in the middle of a former, large tidal marsh. West of the airport is an area of seasonal wetlands and permanent freshwater marsh. At several sites along the modern shoreline, shell and sand beaches have re-formed naturally. The segment is a major center of spread for the non-native invasive smooth cordgrass.

Unique Restoration Opportunities: This segment provides an opportunity to restore beach and sand dune habitats. There also are opportunities to restore or enhance tidal marshes at several sites south of San Francisco and to reestablish locally extirpated California sea-blite and associated rare or uncommon high marsh plant species. West of the airport, there are opportunities to enhance freshwater marshes and adjacent seasonal wetlands for the San Francisco garter snake and red-legged frog.

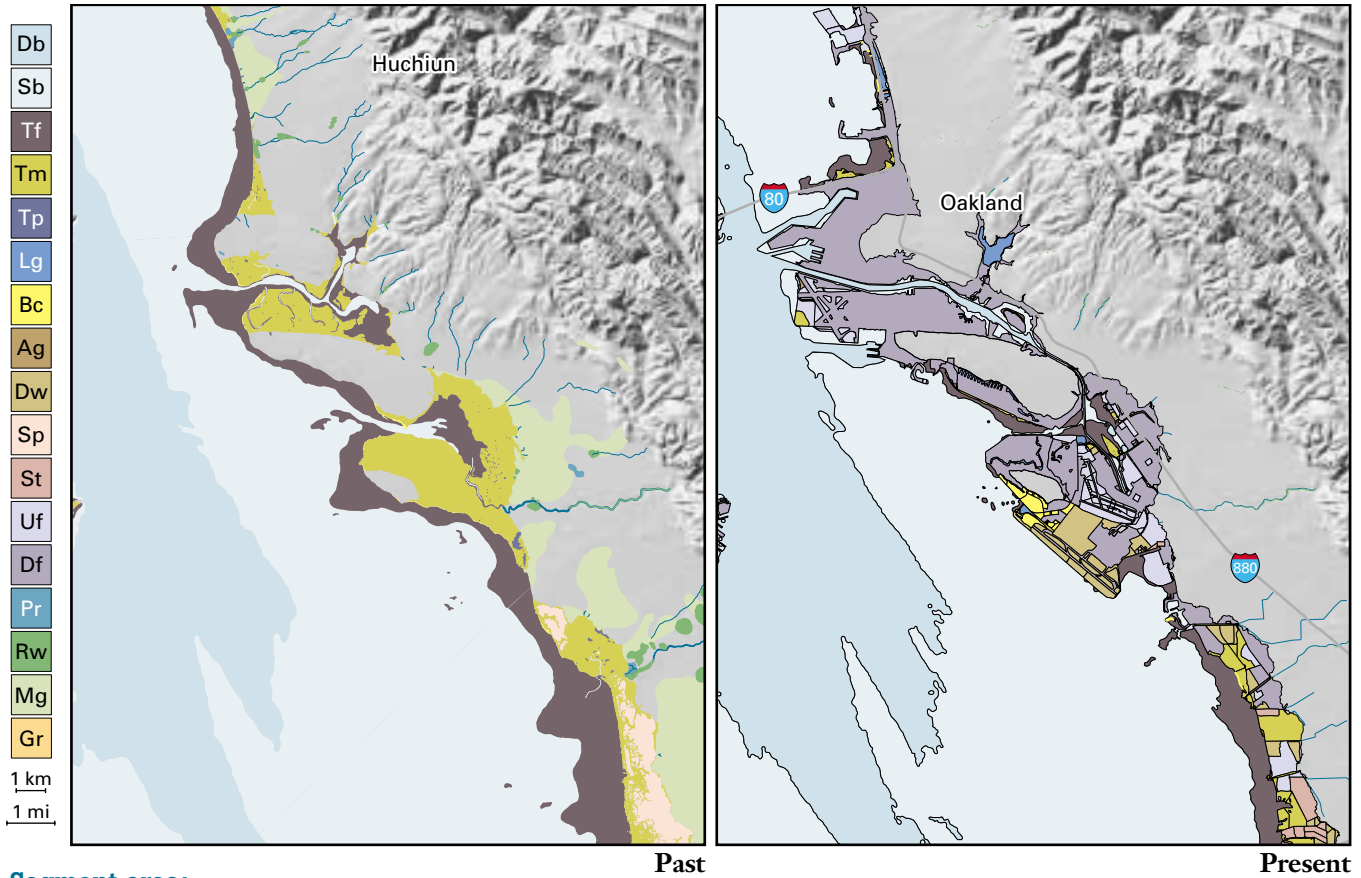


Recommendations:

- Restore beach, sand dune, and tidal marsh habitats at Crissy Field.
- Restore “pocket” tidal marshes along the Bay shoreline from China Basin southward using sandy berms and barrier beaches at several sites.
- Reestablish California sea-blite and associated high salt marsh plant species on the sandy edges of these areas.
- Enhance the existing freshwater marsh and seasonal wetland complex west of Highway 101 near the airport.
- Eradicate core populations and advancing-edge populations of smooth cordgrass.

Unique Restoration Benefits: Implementing these recommendations would improve habitat diversity throughout the segment by restoring beach, dune, and tidal marsh habitats. Restoring tidal marsh would facilitate the dispersal of tidal marsh-dependent birds, such as California clapper rail and black rail by providing roosting and foraging habitat. Restoring tidal marsh/upland transitions would benefit several plant species. Enhancing the habitats west of Highway 101 near the airport would benefit the San Francisco garter snake and red-legged frog. Eradicating smooth cordgrass in this segment would reduce its potential to spread to other areas.

Possible Constraints: Extensive urban infrastructure including port and military facilities, Highway 101, wastewater treatment facilities, San Francisco International Airport, Union Pacific railroad tracks, many large shoreline fills, on-site contaminants, utility corridors, exotic predators (e.g., rats and foxes), and smooth cordgrass.



Segment area:
11,570 acres

Segment K — Oakland Area

Subregion: Central Bay

Location: Eastern edge of Central San Francisco Bay between the San Leandro Marina and Oakland Outer Harbor.

Major or Unique Features: Historically, this area was predominantly tidal flat and tidal salt marsh. Most of the baylands in the Oakland estuary were tidal flat, tidal wetlands fringed by sandy beaches, or open bay. The estuary extended well into the current site of Lake Merritt. Most of the area surrounding Bay Farm Island was tidal flat and tidal wetlands fringed by sandy beaches. Oakland, Alameda, and Bay Farm Island were major strongholds for the now-extinct California sea-blite. Large areas of oak woodland existed on the higher lands near the estuary, and moist grassland bordered the tidal marsh in the southern half of the segment. Perennial ponds, riparian zones, and willow groves also occurred here.

Today, this segment is highly developed with urban, industrial, and transportation uses, and many of its historical and unique habitat features are gone. Most of the tidal flats and marshes along the bayshore have been filled to allow the development of railroad, military base, port, shipyard, and other facilities. Lake Merritt is an urban wildlife refuge, ringed by concrete walkways. Water levels in Lake Merritt are controlled with tide gates, and the Lake is managed primarily as

a flood retention basin. The marshes and other habitats near Bay Farm Island have been filled and are the site of the Oakland Airport.



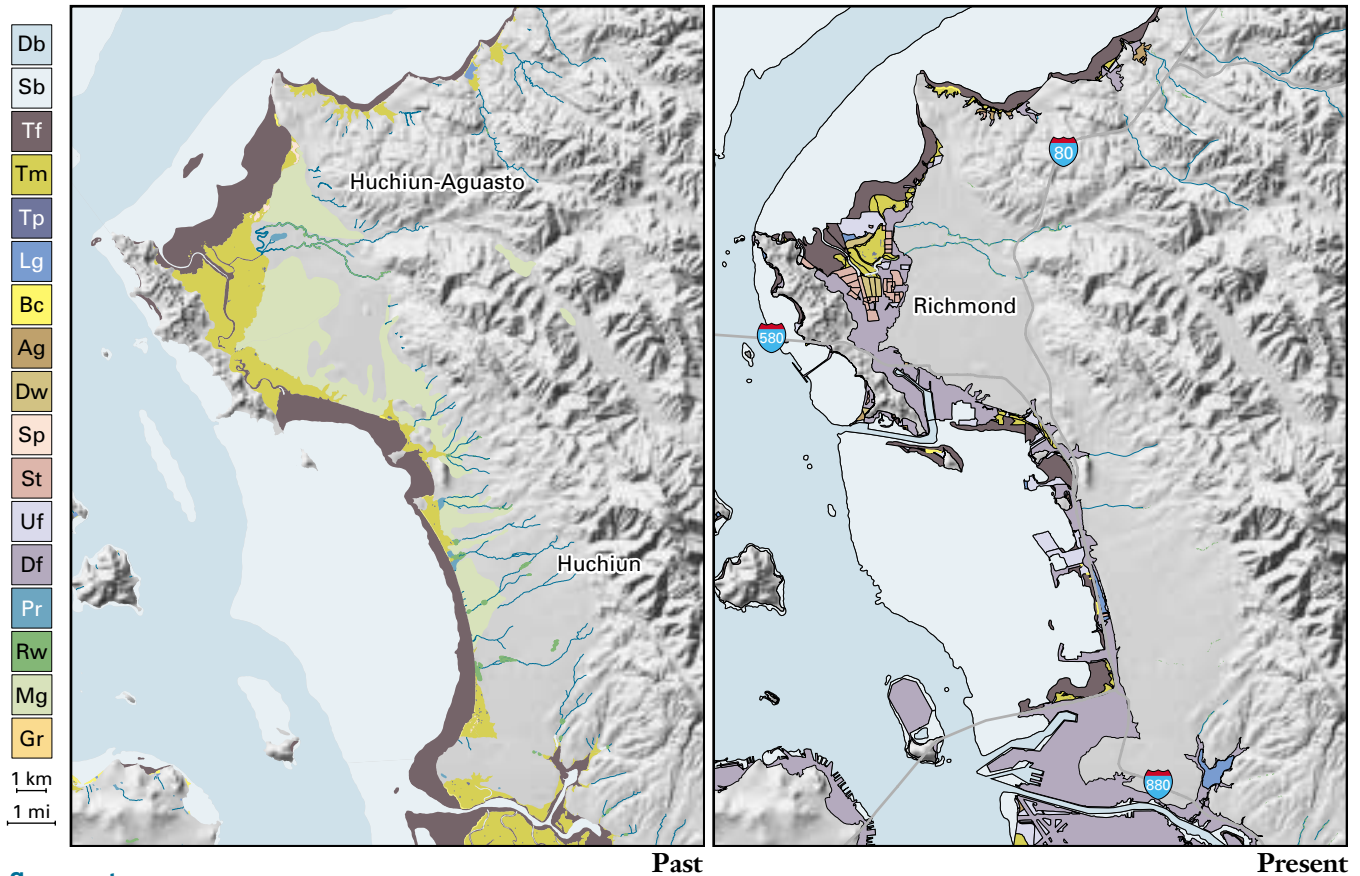
Unique Restoration Opportunities: This segment provides the opportunity to create additional nesting habitat for California least terns, to enhance degraded nesting habitat for Caspian terns, and to restore tidal wetlands in several areas. Conditions at some sites are potentially amenable to eelgrass restoration, and there is an existing eelgrass bed near Bay Farm Island that could be enhanced. Lake Merritt provides a unique opportunity to educate the public about wildlife habitat needs.

Recommendations:

- Enhance and expand tidal and diked habitats at all potential areas throughout the segment, for example, on Alameda Island, on Bay Farm Island, and in the vicinity of the Oakland Airport.
- Protect and enhance the eelgrass bed near Bay Farm Island.
- Enhance and protect suitable habitat (e.g., barren or sparsely vegetated areas protected from predators) for snowy plover and least tern at Alameda Naval Air Station, Oakland Airport, Bay Farm Island, and other locations.
- Restore beach dune and marsh in the sanctuary on the southern end of Alameda Island.
- Increase habitat in and around San Leandro Bay for harbor seals and develop extensive and connected segments of tidal marsh for small mammals.
- Restore pockets of low-lying sand beaches in sheltered sites to support reintroduced colonies of California sea-blite.
- Enhance Lake Merritt by improving tidal action and restoring tidal marsh along the lakeshore and the channel that connects the Lake to the Oakland Inner Harbor.
- Enhance riparian corridors along streams throughout the segment and reconnect tributary streams to the Bay.

Unique Restoration Benefits: Implementing the recommendations for this segment would restore and enhance habitat for many populations of key fish, amphibian, reptile, insect, mammal, and bird species. Expanding habitat for California least terns at the former Alameda Naval Air Station airfield could double the species' breeding population size, and expanding tidal wetlands at Alameda Point would provide additional habitat for wintering waterfowl and nesting shorebirds. Restoring low-lying sand beaches would provide suitable conditions for California sea-blite. Improving tidal habitats at Lake Merritt would help restore some of the area's estuarine functions, including natural water filtration and the restoration of local anadromous fish populations.

Possible Constraints: Large urban population, extensive fill along the shoreline, railroad tracks and spurs, major highways, exotic predators (e.g., rats and red fox), smooth cordgrass, and on-site contaminants.



Segment area:
6,723 acres

Segment L — Berkeley Area

Subregion: Central Bay

Location: Eastern edge of San Francisco Bay between the Oakland Outer Harbor and Point San Pablo.

Major or Unique Features: Historically, this segment was characterized by a narrow shoreline band of small tidal marshes, sand dunes, beaches, and extensive tidal flats. The adjacent uplands supported extensive areas of moist grassland and were dissected by numerous small streams that originated in the hills to the east. Some of these streams were bordered by riparian corridors and provided spawning and rearing habitat for steelhead. Some had lagoons at their mouths, and others terminated in willow groves.

Today, this segment is highly developed with cities, industrial areas, ports, and transportation corridors. Landfills, hotels, and other developments exist at many sites that once were tidal flat or marsh. Several relatively small isolated tidal flats, adjoining marshes, and other features continue to provide important habitat functions. Examples of good habitat in this segment are the tidal marsh and mudflats at the Emeryville Crescent and the small marshes and extensive mudflats north of Point Isabel. Shallow subtidal areas support eelgrass beds.

Unique Restoration Opportunities: There are several opportunities to restore and enhance tidal habitats in this segment. Examples include Hoffman Marsh, Emeryville Crescent, and the mouth of Codornices Creek. There also are opportunities to protect and restore other habitats such as eelgrass beds, moist grassland/seasonal wetlands at the Richmond Field Station and at Berkeley Meadows, and several roosting sites.

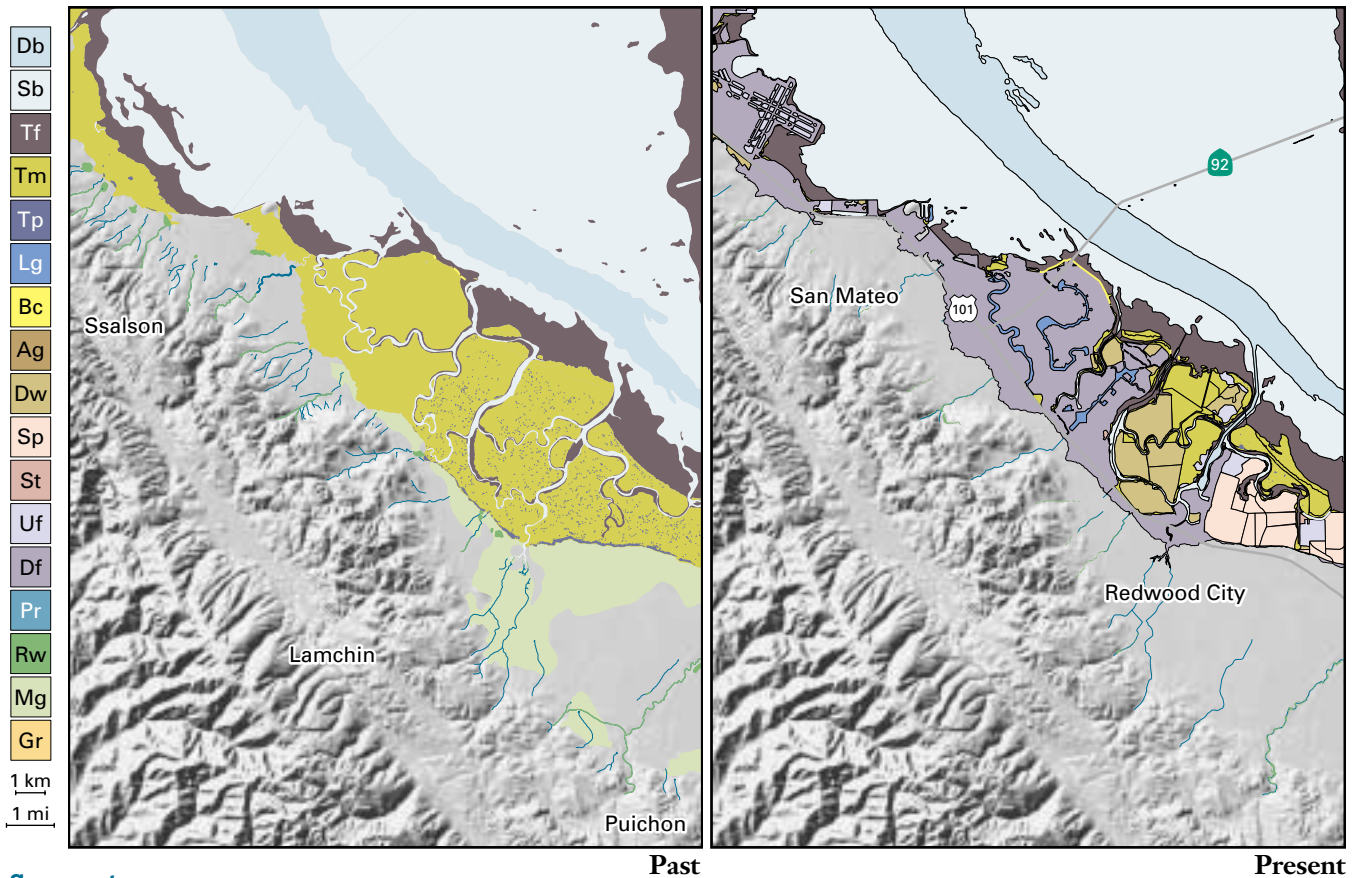


Recommendations:

- Restore, enhance, and protect a diversity of habitats, including tidal marsh, shorebird roosting sites, and seasonal wetlands.
- Restore and enhance the tidal marsh between the Hoffman Marsh and the Richmond Marina by removing fills that fragment the area.
- Restore riparian vegetation along Codornices Creek. Also enhance wetland/upland transitions in this area.
- Protect gull, tern, and egret nesting habitat at Brooks Island, Red Rock, and Castro Rocks.

Unique Restoration Benefits: Protecting the existing remnant wetlands in the area would provide habitat for a wide array of wildlife and fish species. Restoring beach habitat could improve conditions for sensitive plant species. Protecting islands would assure suitable sites for colonial nesting birds. Protecting and enhancing eelgrass beds would benefit several fish species.

Possible Constraints: Large urban population seeking access to the shoreline, extensive shoreline development, highways, and on-site contaminants.



Segment area:
9,247 acres

Segment M — San Mateo Area

Subregion: South Bay

Location: Western edge of San Francisco Bay between Coyote Point and Steinberger Slough.

Major or Unique Features: Most of this segment was once tidal marsh, and the marshes in this relatively flat area of the baylands included a transition of varying width into the coastal hills. Many of the tidal marshes had oyster shell ridges or beaches along their foreshores. Tidal flats and moist grassland were limited, as they are today.

Today, most of the former wetlands are developed urban/industrial areas (Foster City, Redwood City, and San Mateo). The wetlands that remain are fragmented narrow marshes, mostly along sloughs. Bird Island and the adjacent strip marshes along the levees are the most significant tidal wetlands in the segment. Small areas of diked marsh and seasonal wetlands persist in some of the developed areas (Area H and Redwood Shores Ecological Reserve in Redwood City, and Sun Cloud Park in Foster City). This segment was recently the invasion front of smooth cordgrass, which has since spread southward.

Unique Restoration Opportunities: This segment offers opportunities to protect and enhance the remaining tidal marshes and to enhance diked wetlands. There are potential reintroduction sites around sheltered shell beaches for California sea-blite and associated rare high marsh plant species.



Recommendations:

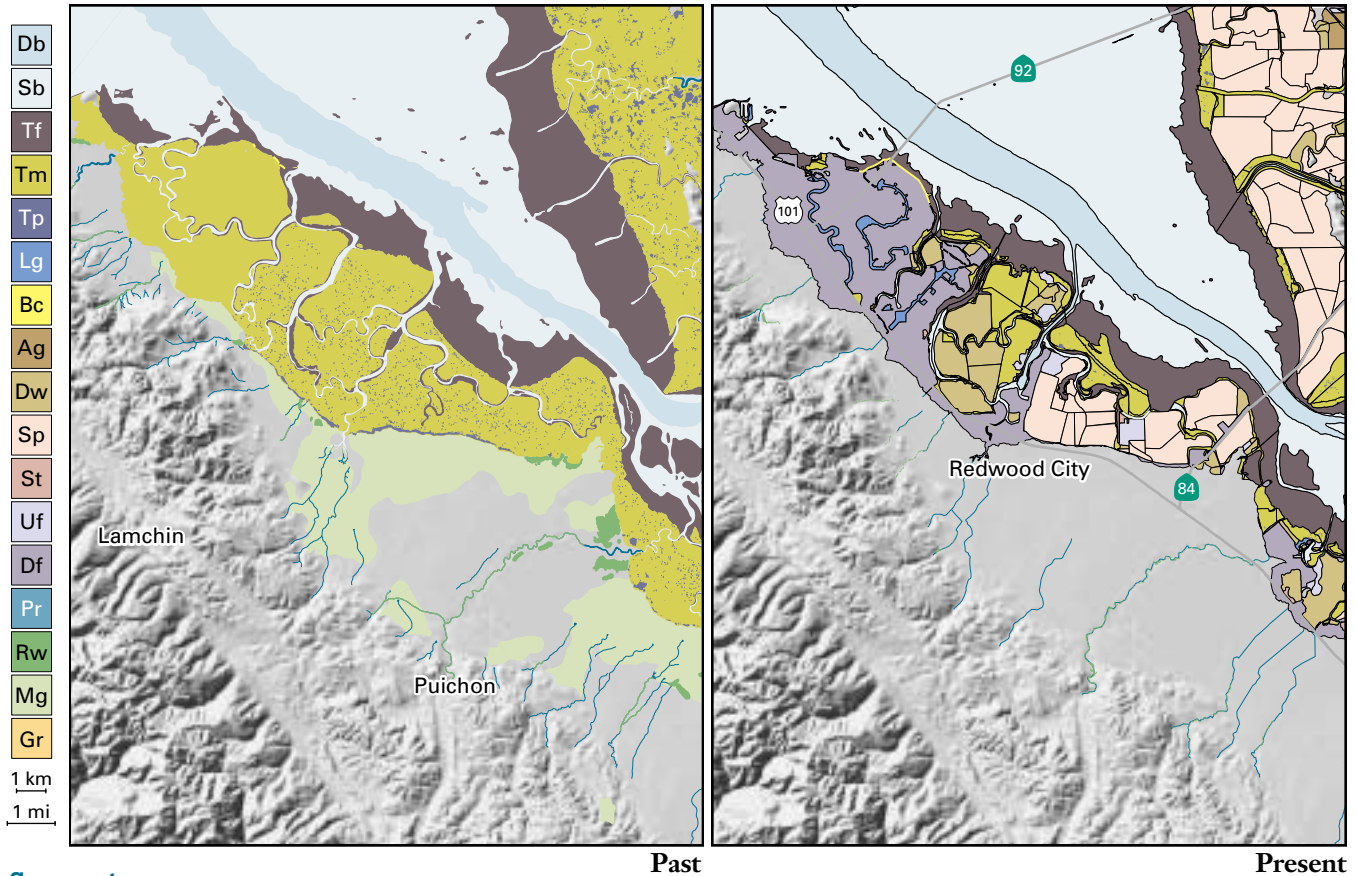
- Maintain and enhance tidal marsh where possible.
- Protect and enhance diked marsh and seasonal wetland areas for shorebirds and waterfowl.
- Protect and improve oyster shell ridges near Foster City and on the Redwood Shores Peninsula.
- Improve the Foster City and Redwood Shores canal systems for fish and wildlife.
- Enhance seasonal wetlands at the Redwood Shores Ecological Reserve.
- Restore tidal marsh in the dredged material disposal lagoons at Coyote Point Marina.

Unique Restoration Benefits: Restoring oyster shell ridges would enhance habitat for some unique and rare plants and would provide roost sites for shorebirds. Providing an enlarged tidal marsh corridor would facilitate the dispersal of California clapper rails northward from population centers in Segment N to the south.

Possible Constraints: Large urban interface with heavy public access, numerous predator corridors and limited opportunity for predator management, smooth cordgrass, major transportation corridors, and flood control considerations.



Herb Ling



Segment area:
11,540 acres

Segment N — Redwood City Area

Subregion: South Bay

Location: Western edge of San Francisco Bay between Steinberger Slough and the Dumbarton Bridge.

Major or Unique Features: Historically, this area was mostly tidal marsh with moist grassland habitat on the adjacent lands to the west. Large, well-developed channels and associated slough systems and numerous tidal marsh ponds characterized the tidal marshes in this segment. Outboard of the marshes were oyster shell beaches, large expanses of tidal flats, and oyster beds.

Today, this area is highly developed and many of the historical tidal marshes have been converted to salt ponds and urban uses. Greco Island is the largest contiguous tidal marsh on the western side of the Bay and is relatively protected from human disturbance; it is one of the main population centers of California clapper rail in South Bay. Currently, there is a large gap in tidal wetland between Greco Island and the Palo Alto tidal marshes in Segment O to the south. The large isolated channels in the Corkscrew Slough area provide haul-out areas for harbor seals, and the Bay's extensive tidal flats continue to provide excellent foraging habitat for shorebirds. Nearly all of the moist grassland areas have been urbanized. Until recently, uplands on outer Bair Island supported a large egret and heron rookery.

Unique Restoration Opportunities: This area has high potential for tidal marsh restoration and enhancement of seasonal wetlands and salt ponds for shorebirds and waterfowl. This segment contains Bair Island, the largest former tidal wetland currently available for restoration. Large-scale tidal marsh restoration would maintain and enhance extensive areas of channels and associated subtidal habitat and mudflats. The Redwood City crystallizers and associated salt ponds offer the opportunity to maintain and enhance shorebird and waterfowl habitat in close proximity to the large tidal flats that are so important for foraging shorebirds. Creating salt pan habitat would provide nesting habitat for the snowy plover.



Recommendations:

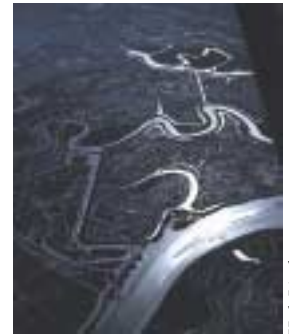
- Restore large areas of tidal marsh, providing a continuous band along the bayfront for the entire length of the segment.
- Restore most of Bair Island to tidal marsh and enhance oyster shell ridges in the intertidal zone.
- Restore tidal marsh along Westpoint Slough and Redwood Creek, but modify the salt crystallizers adjacent to Redwood Creek as salt pan habitat managed for shorebirds and waterfowl.
- Retain a complex of salt ponds near Ravenswood Slough, while assuring a wide band of tidal marsh around Ravenswood Point to the Dumbarton Bridge.
- Reintroduce rare and uncommon high marsh plant species at sheltered shell ridges.
- Restore dredged material disposal sites on outer Bair Island and at Deepwater Slough as marsh/upland ecotones, including seasonal ponds for plants and shorebirds.
- Restore egret and heron nesting habitat on Bair Island by removing red fox.

Unique Restoration Benefits: Implementing the recommendations would provide a large tidal salt marsh core area that would maintain and enhance the associated channel system. This would benefit harbor seals and several fish species. The tidal salt marsh restoration would directly benefit the salt marsh harvest mouse. It also would increase habitat for a major source population of the California clapper rail. Enhancing the salt ponds would benefit shorebirds and waterfowl and would provide an opportunity to improve snowy plover nesting habitat.

Possible Constraints: Smooth cordgrass, Pacific Gas and Electric Company transmission lines and other utility corridors, flood protection for urbanized areas and associated infrastructure, and ongoing salt production precludes restoring tidal marsh along Westport and Ravenswood sloughs.



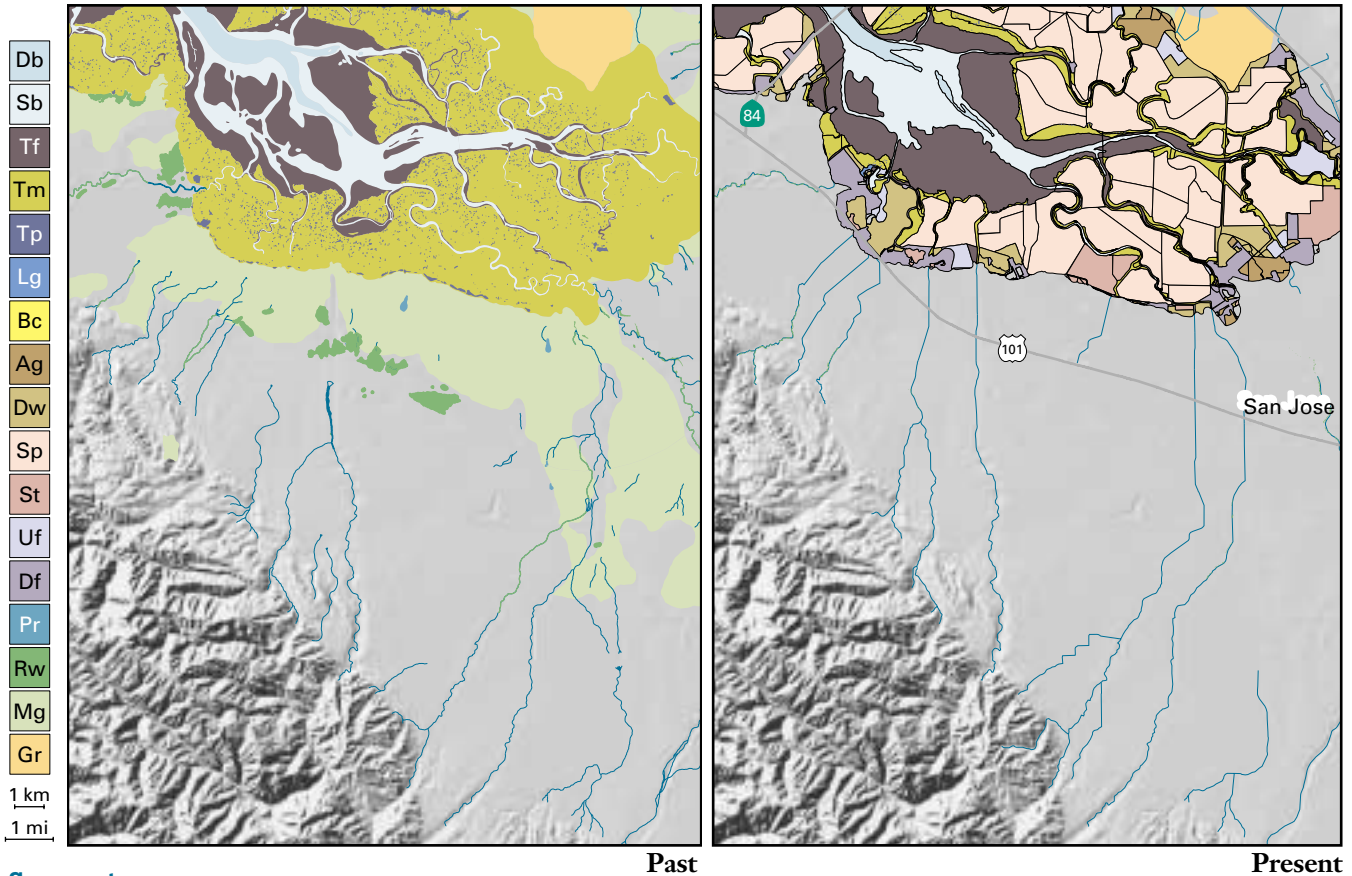
Herb Lingt



Herb Lingt



Herb Lingt



Segment area:
12,526 acres

Segment O — Mountain View Area

Subregion: South Bay

Location: Western edge of San Francisco Bay between Dumbarton Bridge and Alviso Slough.

Major or Unique Features: Historically, this segment contained large expanses of tidal flats. Adjacent to these flats were tidal salt marshes that intergraded into moist grasslands in the adjacent uplands. These marshes supported extensive channel systems and an abundance of tidal pans. Many of the marshes had backshore pans along the marsh/upland transition edge. Much of the moist grassland habitat supported seasonal ponding in the rainy season. Streams that drained the coastal hills were bordered with riparian vegetation. Many of the streams did not reach the Bay, and there were willow groves and some ponds where the streams terminated near the baylands. Limited zones of brackish marsh were present along the tidal reaches of San Francisquito Creek and the Guadalupe River, both of which supported steelhead runs.

Today, most of the segment is salt ponds, sewage treatment ponds, or urban development, except for a few tidal marshes in the Palo Alto area. These tidal marshes are limited in extent, but they are the most productive and densely

populated marshlands in the Bay Area for California clapper rails. These marshes are essentially “islands” isolated from other tidal marshes by salt ponds and human development. The mudflats along the Bay margin in this segment provide important feeding and resting habitat for shorebirds. The salt ponds in this area provide post-breeding habitat for least terns and foraging and roosting habitat for shorebirds and waterfowl. Some salt ponds also provide nesting habitat for snowy plovers, other resident shorebird species, and terns.



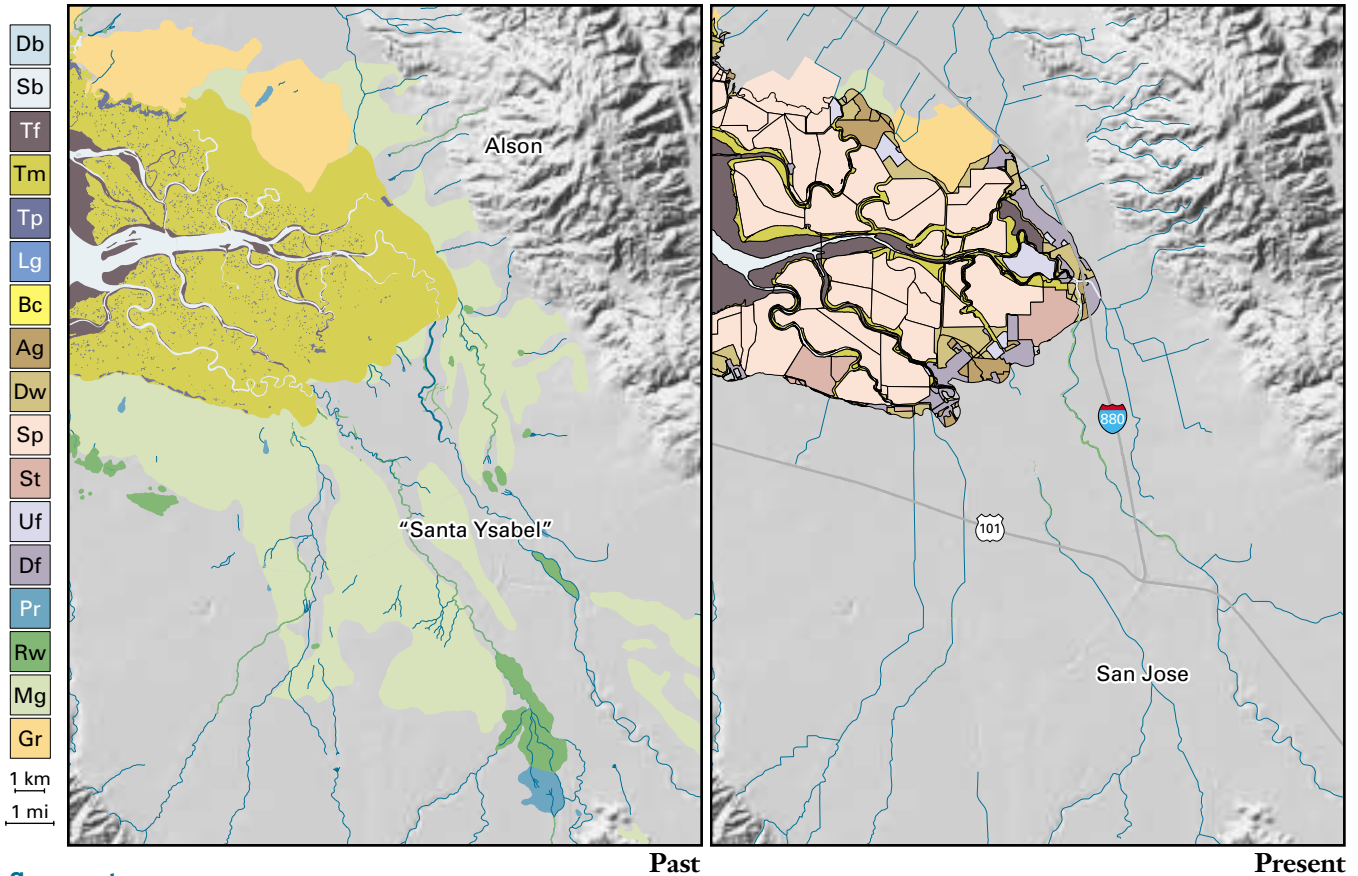
Unique Restoration Opportunities: In this segment, there is an opportunity to enlarge existing marshes and to provide dispersal corridors (where none now exist) linking the eastern and western parts of South Bay for tidal marsh-dependent species. There is the potential for managing salt ponds for the benefit of large numbers of shorebird species which forage on nearby mudflats. Retaining and modifying salt ponds would also benefit nesting snowy plovers, post breeding least terns, and waterfowl. Enhancing tributary streams, such as San Francisquito Creek and the Guadalupe River, could benefit riparian-dependent species and could help restore steelhead runs.

Recommendations:

- Restore large areas of tidal marsh and provide a continuous corridor of tidal marsh along the bayshore.
- Provide more and wider buffers to tidal marshes, and improve management to reduce human intrusion and predators.
- Modify and manage two or three complexes of salt ponds, including the pond adjacent to the Dumbarton Bridge, for shorebirds, waterfowl, and post-breeding least terns.
- Enhance the seasonal wetlands and burrowing owl habitat in the Sunnyvale baylands.
- Reestablish native vegetation and otherwise enhance the riparian corridor along San Francisquito Creek, Guadalupe River, and other tributary streams.

Unique Restoration Benefits: Maintaining salt ponds would provide high tide foraging and roosting habitat for shorebirds. This also would provide post-breeding foraging habitat for least terns, and nesting habitat for the snowy plover and other resident shorebirds and terns. Linking the eastern and western portions of South Bay would facilitate dispersal of California clapper rails (and other tidal marsh species) while minimizing predation and decreasing this species’ vulnerability to local extinction. Riparian restoration and enhancement of tributary streams would improve stream and riparian habitat and benefit anadromous fishes, amphibians, small mammals, and birds.

Possible Constraints: Pacific Gas and Electric Company transmission lines and other utility corridors, flood protection considerations, historical land subsidence, freshwater outflow from wastewater treatment facilities, operation and maintenance of salt ponds in absence of salt production, and smooth cordgrass.



Segment area:
11,220 acres

Segment P — Coyote Creek Area

Subregion: South Bay

Location: Southern end of San Francisco Bay between Alviso Slough and Albrae Slough.

Major or Unique Features: Historically, most of this segment was tidal marsh. There were numerous sloughs and ponds throughout the marshes, but there was very little adjacent tidal flat habitat. Salinity was strongly influenced by high seasonal freshwater flows through Coyote Creek, one of the major tributaries to the subregion. On the northern edge of the segment was the only large area of vernal pools in South Bay. Moist grasslands bordered much of the eastern side of the segment.

Today, much of this segment is developed. Active salt ponds dominate the landscape, along with large landfills and a sewage treatment facility. Some narrow strips of tidal marsh occur outboard of the salt pond levees, and year-round sewage treatment plant discharges cause many of these to be brackish. This segment is the southern limit of the non-native smooth cordgrass invasion in the East Bay. Although the Warms Springs vernal pool area still exists, nearly all of the moist grassland in this segment has been developed for light industry or housing.

Unique Restoration Opportunities: This area provides excellent opportunities to develop large patches of tidal salt marsh along a major salinity gradient. This is one of few South Bay segments where it is possible to restore tidal brackish marsh. It is the only segment in South Bay where there is the potential to restore a large area of vernal pools near the baylands. It also is the only area where a wide transitional ecotone can be re-created between restored tidal marsh and a complex of vernal pools.

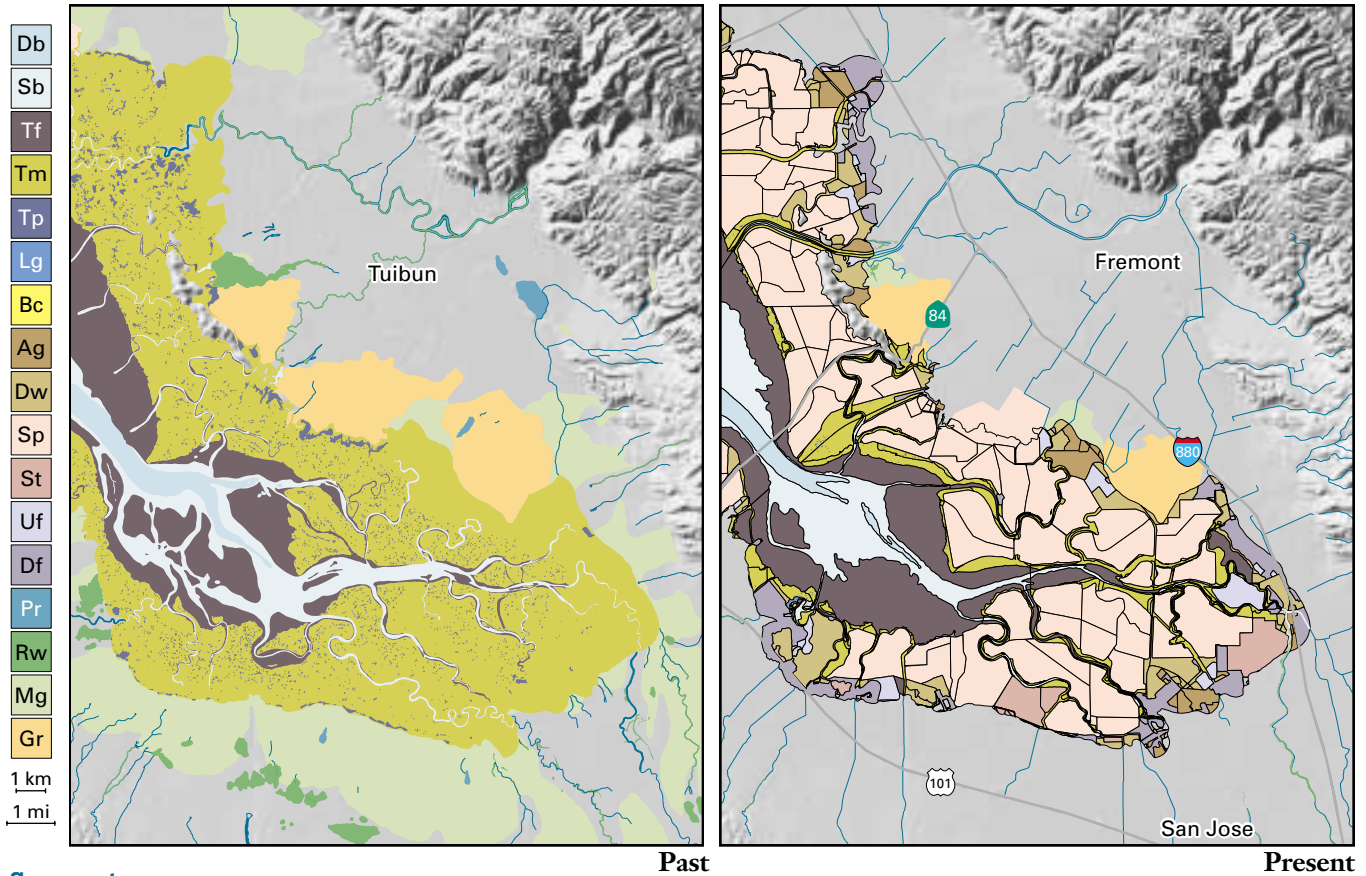


Recommendations:

- Restore tidal marsh throughout most of the segment, providing a continuous corridor of tidal marsh along the bayshore. The type of tidal marsh created (salt or brackish) will be dependent on the amount and proximity to local freshwater outflows. Restoration should emphasize reestablishing a natural transition between tidal marsh and adjacent wetlands and upland habitats, as well as transitions between salt and brackish tidal marsh.
- Modify and manage a large complex of salt ponds for shorebirds and waterfowl.
- Restore or enhance vernal pools in the adjacent undeveloped uplands.
- Reestablish native riparian vegetation and otherwise improve the riparian corridor along Coyote Creek.
- Manage discharges from the San Jose treatment plant to limit adverse environmental impacts, especially to tidal salt marsh habitat. Consider using recycled water to augment flows in Coyote Creek or for other habitat enhancements.

Unique Restoration Benefits: Implementing the recommendations would increase rare plant species populations by enhancing the tidal marsh/moist grassland transition zone and vernal pools in the Warm Springs area. This would benefit the only remaining populations of California tiger salamander and tadpole shrimp near the baylands. Restoring tidal marsh along the bayshore would provide dispersal corridors (where none now exist) for California clapper rail and salt marsh harvest mouse, allowing these species to move between neighboring segments while minimizing predation and decreasing vulnerability to local extinction. Enhancing in-stream conditions in Coyote Creek could benefit steelhead populations. Freshwater discharges from the San Jose treatment facility should be managed to minimize large-scale conversion of saline/brackish tidal marsh while maintaining the large heron and egret rookery in Artesian Slough.

Possible Constraints: Pacific Gas and Electric Company transmission lines and other utility corridors, flood protection considerations, historical land subsidence, freshwater outflow from wastewater treatment facilities, operation and maintenance of salt ponds in absence of salt production, and smooth cordgrass.



Segment area:
11,196 acres

Segment Q — Mowry Slough Area

Subregion: South Bay

Location: Eastern edge of San Francisco Bay between Albrae Slough and Highway 84 (Dumbarton Bridge).

Major and Unique Features: Nearly all the wetlands within this segment were historically tidal salt marsh. These marshes supported extensive channel systems and numerous tidal marsh pans, including backshore pans along the marsh/upland ecotone. The mudflats outboard of the tidal marshes in the segment were moderate in size, with channel and shallow bay habitat more abundant than today. Extensive areas of poorly drained moist grasslands that supported vernal pools occurred in the adjacent uplands. Few streams entered the Bay in this area; consequently, riparian habitat was limited. Alameda Creek may have variously entered the Bay north of Coyote Hills, or south, in the vicinity of present-day Plummer Creek.

Today, the majority of the area is composed of diked salt ponds. However, this segment does contain the largest acreage of natural tidal marsh that exists in South Bay. These marshes at Dumbarton Point and the mouth of Mowry Slough

are centers for populations of California clapper rail and salt marsh harvest mouse. They currently support as much as one-third of the entire population of clapper rails remaining in South Bay. Mowry Slough provides an isolated haul-out area for harbor seals. The mudflats in this segment are important foraging areas for shorebirds.



Unique Restoration Opportunities: This segment provides the opportunity to restore and enlarge the Dumbarton/Mowry marsh complex of tidal wetlands, potentially expanding available habitat for a core population of the California clapper rail. There is the potential for modifying and managing salt ponds for the benefit of large numbers of shorebird species that forage on nearby mudflats. There are opportunities to restore historic tidal marsh/upland transitional habitat and associated vernal pool habitat at the upper ends of Newark, Plummer, Mowry, and Albrae sloughs. Another unique opportunity is the use of freshwater discharge from the San Jose wastewater treatment facility in Segment P to dilute bittern in the salt ponds.

Recommendations:

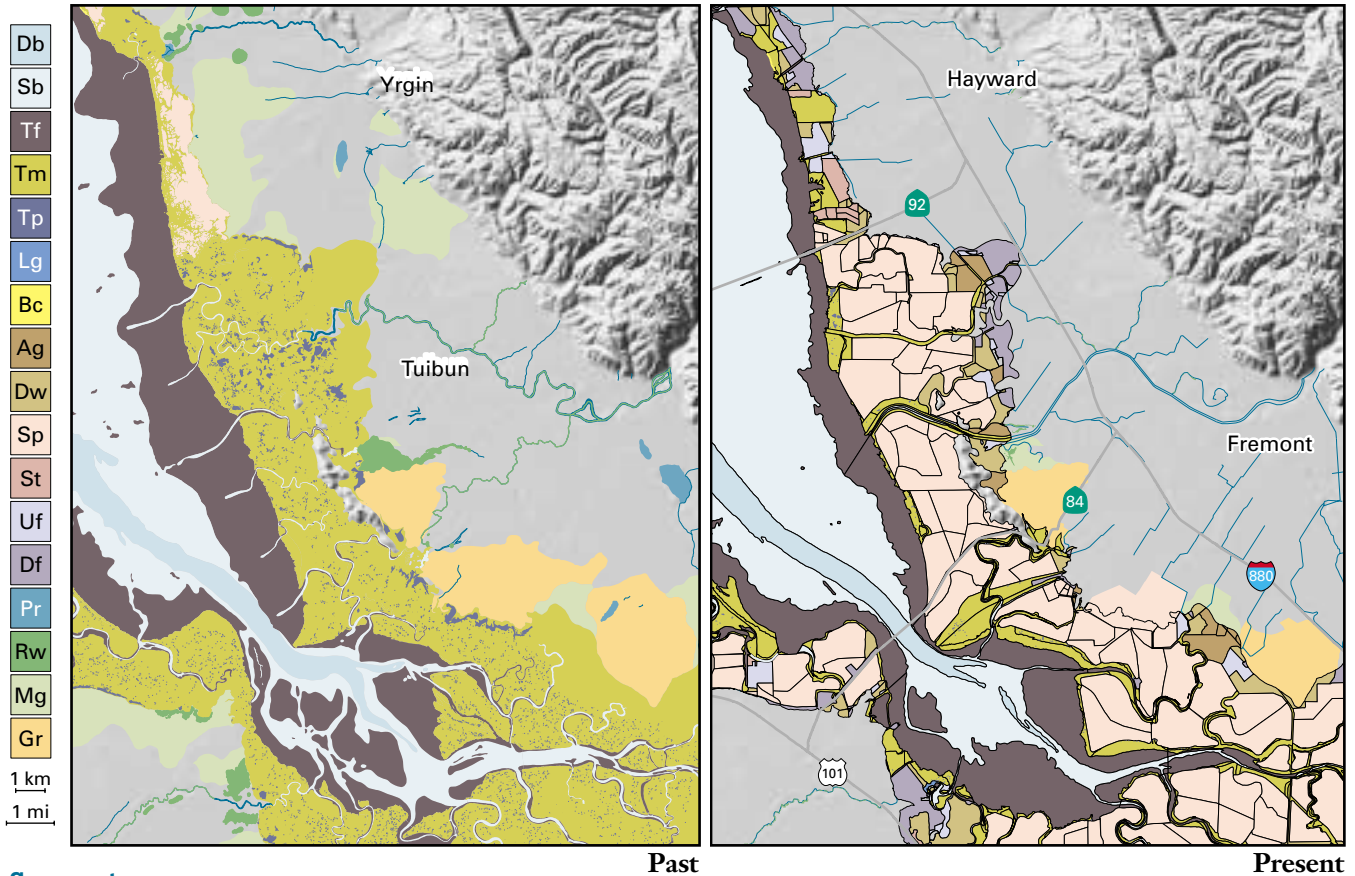
- Enlarge the Dumbarton, Mowry, and Calaveras Point tidal marshes, and provide a corridor of tidal marsh along the bayshore.
- Modify and manage for shorebirds and waterfowl a complex of salt ponds adjacent to and including the crystallizer complex between Mowry Slough and Newark Slough.
- Protect and enhance the tidal marsh/upland transition at the upper end of Mowry Slough and in the area of the Pintail duck club. Similar habitat can be protected and restored at the upper ends of Newark, Plummer, and Albrae sloughs.
- Protect the area of harbor seal haul-out along lower Mowry Slough.
- Consider, among other possible alternatives, using treated wastewater from the San Jose wastewater treatment plant to dispose of bittern.

Unique Restoration Benefits: Dumbarton and Mowry marshes contain a large source population of California clapper rail. This species would colonize any restored tidal marsh in this segment (California clapper rails have colonized several small diked wetlands that were recently restored to tidal action in the upper reaches of Newark Slough). One of the contributing factors to the health of clapper rail populations in this segment is that the marshes are large and have not been fragmented by levees. This makes them relatively resistant to dispersal of mammalian predators due to the absence of main travel corridors. Modifying and managing a system of salt ponds would increase snowy plover nesting habitat.

Possible Constraints: Union Pacific railroad tracks; Pacific Gas and Electric Company transmission lines, Hetch Hetchy Aqueduct, and other utility corridors; flood control considerations; operation and maintenance of salt ponds in absence of salt production; and current use of levees and salt pans by nesting snowy plovers.



Herb Lingl



Segment area:
4,703 acres

Segment R — Coyote Hills Area

Subregion: South Bay

Location: Eastern edge of San Francisco Bay between Highway 84 and Alameda Flood Control Channel.

Major or Unique Features: This area is dominated by Coyote Hills. Historically, the majority of the segment was tidal marsh. The marshes were expansive with well-developed channels and abundant tidal marsh pans. The marshes encircled Coyote Hills except to the east where moist grassland bounded the upper margin of the marsh. These grasslands were characterized by springs and seeps, willow groves, seasonal ponds, and a permanent freshwater pond at the foot of the eastern slope of the hills. Alameda Creek may have variously entered the Bay south of Coyote Hills, in the vicinity of present-day Plummer Creek, or just north of this segment. Outboard of the marshes were extensive tidal flats that continued north through Segments S and T.

Currently, most of the former tidal marsh is salt ponds. Coyote Hills and the large Alameda Creek Flood Control Channel are unique features. The diked baylands east of Coyote Hills support the largest remaining willow groves in the baylands ecosystem, seasonal and diked wetlands, and a permanent freshwater pond. The realignment of Alameda Creek through the northern portion of this

segment has dramatically altered the hydrology of the area. Inactive salt ponds, salt pond beaches, and levees currently provide important snowy plover nesting habitat. Most of the snowy plover nesting in the South Bay subregion occurs in this segment and in Segments S and T to the north. The mudflats in this segment are very important foraging areas for shorebirds. This segment supports the largest population of non-native smooth cordgrass.



Unique Restoration Opportunities: This segment provides an opportunity to restore a corridor of tidal marsh along the bayshore. This corridor would connect the Dumbarton Marsh with the existing marsh to the north, along the Alameda Flood Control Channel. There also are opportunities to manage salt ponds for water birds adjacent to the restored marshes. This segment has excellent possibilities for restoring a natural marsh/upland ecotone on the western edge of Coyote Hills. On the eastern side of Coyote Hills, there are seasonal wetlands and willow grove habitat that could be restored or enhanced.

Recommendations:

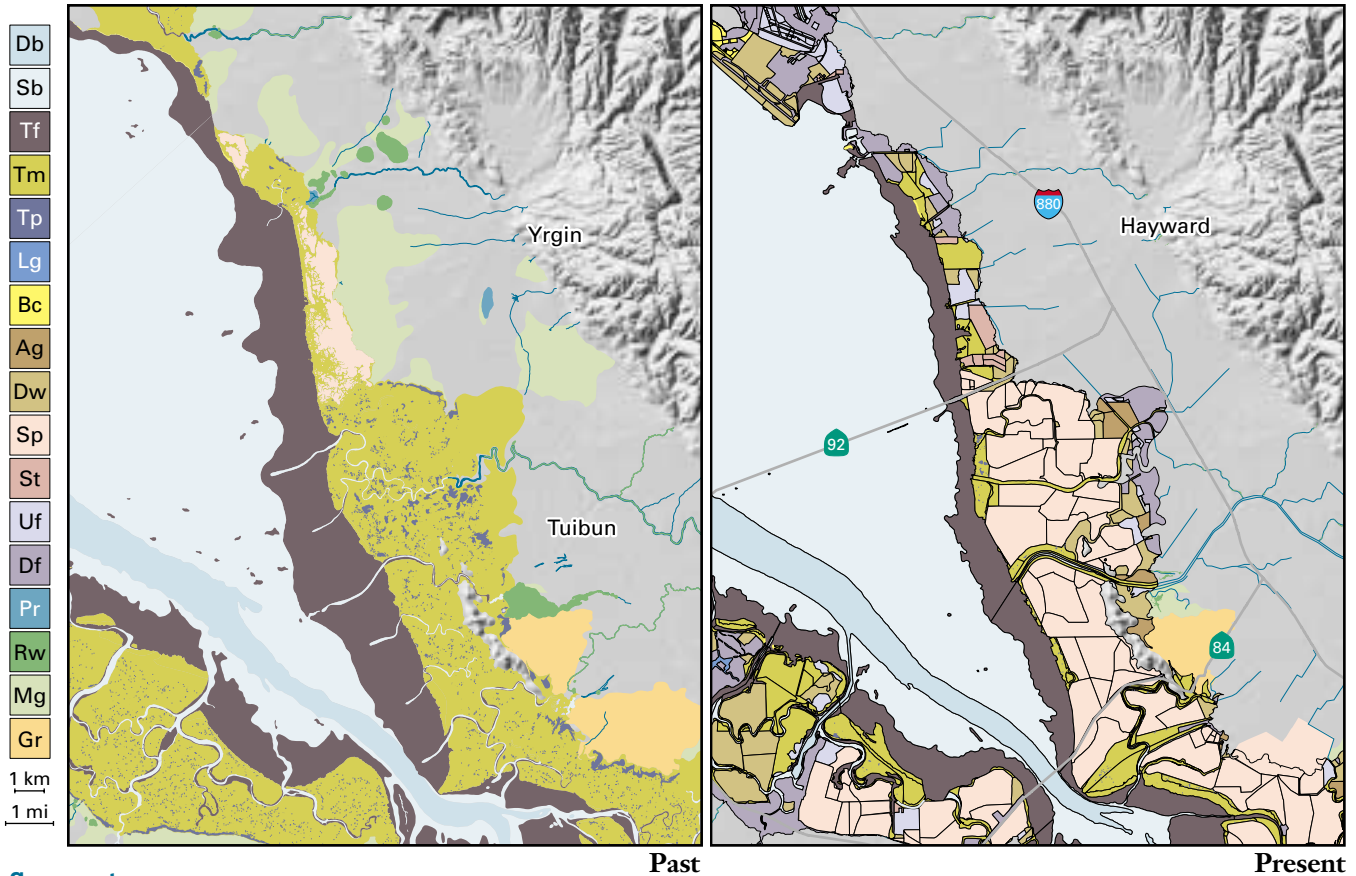
- Maintain and manage a complex of salt ponds for shorebirds and waterfowl in the southern part of the segment and restore the remaining area to tidal marsh. Restoration should emphasize natural transition of tidal marsh/uplands at Coyote Hills and a continuous corridor of tidal marsh around Dumbarton Point.
- On the eastern side of Coyote Hills, enhance and expand muted tidal areas with improved water management.
- Protect and enhance existing willow groves and seasonal wetlands.
- Consider reintroducing coyotes into Coyote Hills to restore natural predator/prey relationships and to control the introduced red fox.
- Consider removing the flood control levees in the lower reaches of the Alameda Creek Flood Control Channel as part of restoration planning for this area.
- Control smooth cordgrass before restoring large diked areas to tidal marsh.

Unique Restoration Benefits: Restoring tidal wetland along the bayshore west of Coyote Hills would provide a dispersal corridor for California clapper rails between Dumbarton and Ideal marshes and the marshes north of the Alameda Creek Flood Control Channel. Restoring the tidal marsh/upland transition would provide high tide refugia for tidal species and increase habitat for rare plants. Maintaining and managing a system of salt ponds would provide snowy plover nesting habitat and roosting and foraging habitat for shorebirds and waterfowl. Controlling smooth cordgrass would minimize the spread of this species to neighboring, newly restored marshes.

Possible Constraints: Smooth cordgrass, flood protection considerations, predator corridor along Alameda Flood Control Channel, operation and maintenance of salt ponds in absence of salt production, and current use of levees and salt pans by nesting snowy plovers.



Herb Lingel



Segment area:
9,933 acres

Segment S — Baumberg Area

Subregion: South Bay

Location: Eastern edge of San Francisco Bay between Alameda Flood Control Channel and Highway 92.

Major or Unique Features: Most of this segment was historically tidal marsh. These tidal marshes were very broad, with well-developed channels and abundant and large tidal marsh pans, including some backshore pans in the Baumberg area. Outboard of the tidal marsh were large areas of tidal flat. At the upland boundary of the marshes were grasslands, a limited amount of which was moist grassland capable of supporting seasonal ponding; the majority of this habitat was associated with the backshore pans near Baumberg. Alameda Creek, a major tributary to South Bay, entered the Bay in this segment. Due to its size, the Creek provided a significant zone of brackish tidal marsh. The Creek also supported well-developed riparian habitat and a run of steelhead. Turk Island, a northern extension of Coyote Hills, is in the southern portion of the segment.

Today, almost all of the tidal marsh has been converted to salt ponds. The largest extant tidal marsh is Whale’s Tail Marsh, which was diked for salt production but abandoned in the 1920s. The other tidal marsh in the segment is just north of the Alameda Creek Flood Control Channel. This area was a salt pond restored with dredged material from the construction of the flood control

channel. Inadvertently, the restoration created a tidal marsh/upland transition by placing fill material above the intertidal zone on the eastern end of the site. Most of the snowy plover nesting in the South Bay Subregion occurs in this segment and in Segment T to the north and in Segment R to the south. The salt ponds in this area are important foraging and roosting habitat for shorebirds that use the nearby tidal flats.



Unique Restoration Opportunities: There are opportunities to restore tidal marsh to provide a dispersal corridor for California clapper rails where none currently exists. It also is possible to restore backshore pan habitat as part of tidal restoration in the Baumberg Tract. Opportunities exist for modifying and managing salt pond complexes to provide shorebird foraging/roosting habitat.

Recommendations:

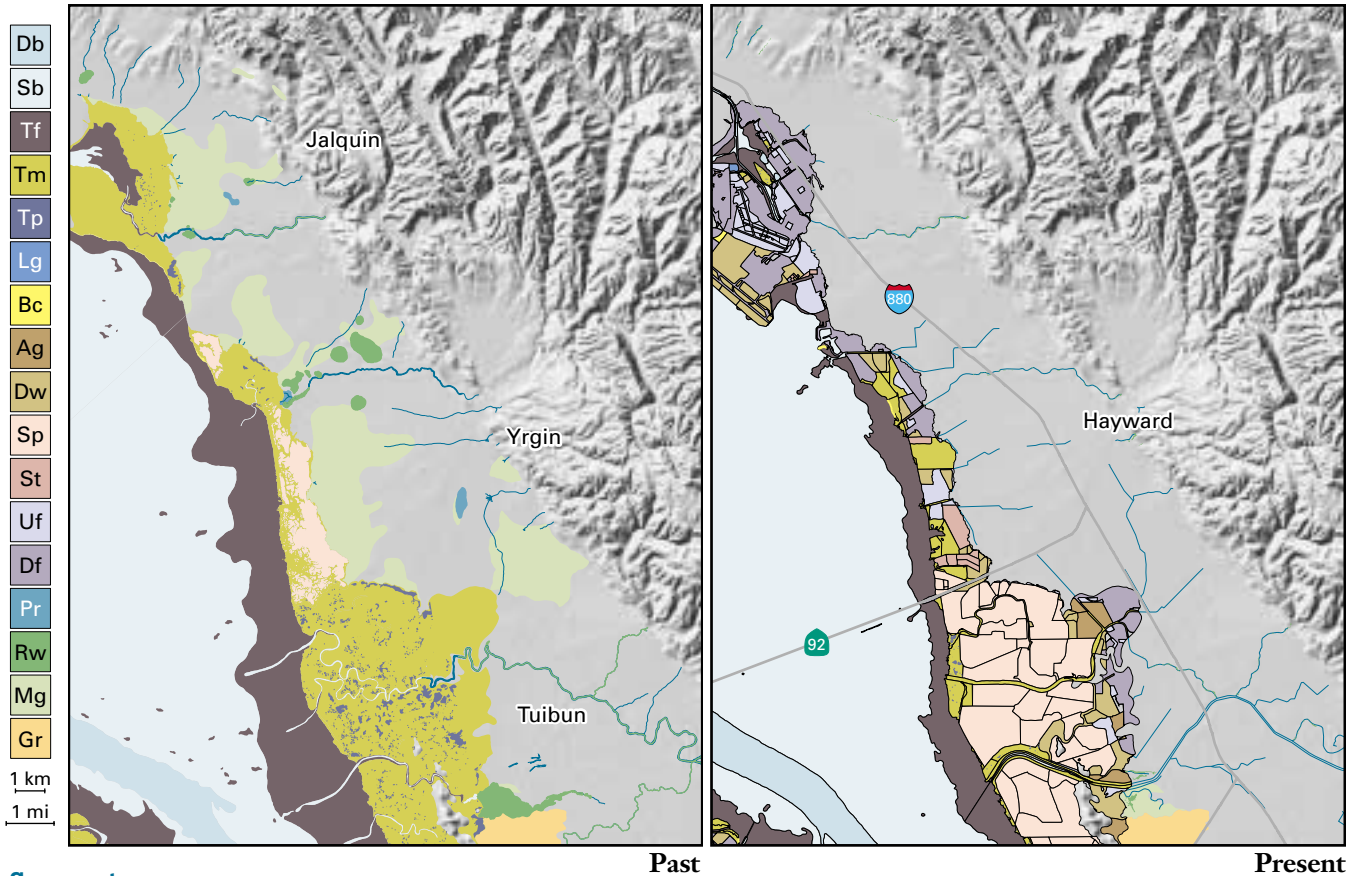
- Modify and manage for shorebirds and waterfowl two complexes of salt ponds — one in the Turk Island area and one in the Baumberg Tract area (including the southern Oliver Brothers ponds).
- Restore the remaining areas to tidal marsh, ensuring a continuous corridor of tidal marsh along the bayshore, and incorporate shallow pans in the marsh designs.
- Enhance the Alameda Flood Control ponds in the Turk Island area as either tidal or muted tidal marsh.
- Maintain and enhance the existing willow grove and managed diked wetlands on the eastern side of the active salt ponds in the Turk Island area.

Unique Restoration Benefits: Restoration of tidal marsh and associated backshore pans could benefit sensitive plant species and provide refugia for tidal marsh species and shorebirds. Modified salt ponds would provide nesting habitat for snowy plovers and other resident shorebirds and terns; they also would provide waterfowl habitat.

Possible Constraints: Smooth cordgrass, flood protection considerations, East Bay Dischargers Authority waste water pipeline, Pacific Gas and Electric Company transmission lines and other utility corridors, major predator access corridor on Old Alameda Creek, operation and maintenance of salt ponds in absence of salt production, and public access and recreation.



Herb Lingl



Segment area:
4,584 acres

Segment T — Hayward Area

Subregion: South Bay

Location: Eastern edge of San Francisco Bay between Highway 92 and San Leandro Marina.

Major or Unique Features: This segment historically supported several unique features, including a large salt pond (Crystal Salt Pond), sandy berms, and barrier beaches. Along the foreshore of the Bay, there was a narrow but continuous band of mudflat. At the upland edge and in the adjacent lands, there were large areas of freshwater seeps and seasonal wetlands in the extensive moist grasslands. Several willow groves existed adjacent to Sulfur and San Lorenzo creeks.

Today, this segment's major features are the muted tidal marshes at Roberts Landing, Oro Loma Marsh (with its remaining natural connection to the adjacent uplands), Cogswell Marsh, Hayward Treatment Marsh, and Hayward Area Recreation District Marsh. Other features include the inactive Oliver Brothers Salt Ponds, stretches of sandy beach, and landfills. Cogswell Marsh supports a growing population of California clapper rail, but is dominated by smooth cordgrass. The Hayward Treatment Marsh provides nesting habitat for herons and egrets and for resident shorebirds and terns. This segment is the southern limit for California sea-blite on the Bay's eastern edge.

Unique Restoration Opportunities: This segment provides an opportunity to restore natural salt ponds or backshore pans, sandy berms, and barrier beaches. It also is an area where it may be possible to have natural transitions from tidal marshes into the adjacent uplands, particularly in the Roberts Landing area.

Recommendations:

- Restore sandy berms and barrier beaches along the shoreline.
- Restore natural salt pond or backshore pans in the diked marshes adjacent to the West Winton Avenue landfill area and in the old oxidation pond to the south.
- Establish or maintain a complex of managed salt ponds to the north of Highway 92, including shallow pans.
- Protect the wetlands adjacent to the Hayward Area Recreation District Marsh and enhance tidal influence to the entire marsh system.
- Control smooth cordgrass.
- Reintroduce California sea-blite and associated flora in suitably restored habitat.

Unique Restoration Benefits: Restoring sandy berms and barrier beaches would provide high tide roosting habitat for shorebirds and would facilitate the re-introduction of California sea-blite and other associated high marsh plant species. Restoring natural salt ponds or backshore pans and improving the existing salt ponds would provide more nesting habitat for snowy plover and other resident shorebirds, and would enhance foraging and roosting habitat for migratory shorebirds and waterfowl.

Possible Constraints: East Bay Dischargers Authority pipeline, extensive stands of smooth cordgrass, Pacific Gas and Electric Company transmission lines and other utility corridors, Southern Pacific railroad tracks, and flood control levees for adjacent areas.



