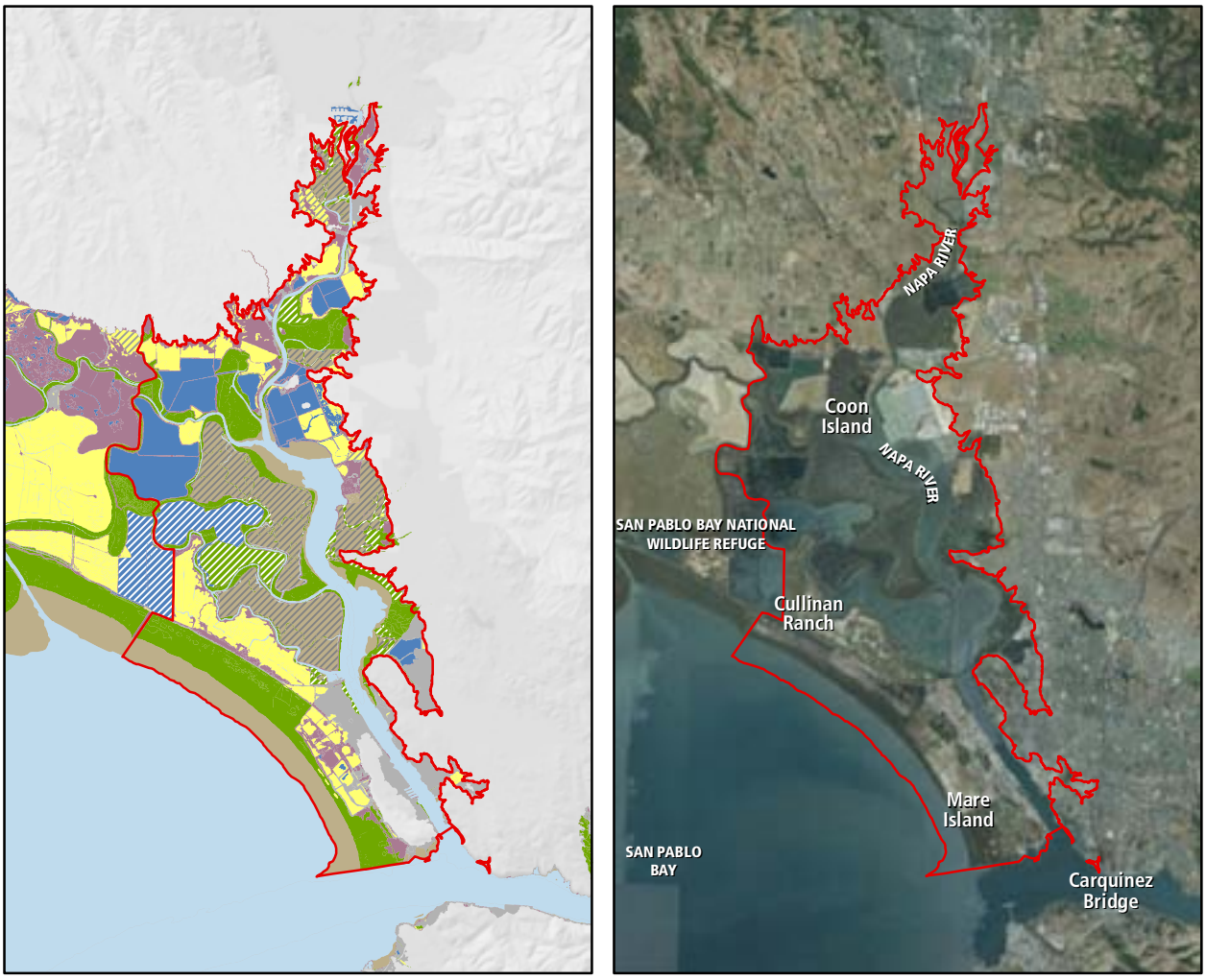
BAYLANDS SEGMENT D



NAPA RIVER AREA

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

Baylands 2009

- Bay/Channel
- Diked Wetland
- Salt Pond
- Managed Pond
- Tidal Flat
- Tidal Marsh
- Agriculture and Other Undeveloped Areas
- Developed Areas

Red line shows the boundaries of Segment D.

Hatching indicates areas where restoration activities had occurred as of 2009. For managed ponds this included habitat enhancement.

By: San Francisco Estuary Institute

Data: Wetland data from SFEI includes BAARI (v1, 2009) Baylands and Wetlands, NLCD 2006, and wetland tracker data.

Imagery: ESRI World Imagery (updated 2015)

0 2
Miles

N

Unique Opportunities

Segment D presents an excellent opportunity to restore several large patches of tidal marsh adjacent to a large riverine system—a vision that has largely been captured by the Napa-Sonoma Marsh Restoration Project. It is also a place where marsh can be restored around a major intact remnant of historic tidal marsh (Fagan Slough and Coon Island). Along the bayland edge are opportunities (e.g., the eastern side of Napa River near American Canyon) to ensure natural transitions between restored tidal marsh and the adjacent terrestrial areas. Also, along the periphery of the segment on both sides of the Napa River are opportunities to improve seasonal wetlands. Recycled water is already used in some ponds to maintain salinity gradients, and this use could be extended.

Segment Features and Setting

Historically, this segment was almost entirely 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. Managed ponds on the western side of the Napa River dominate its landscape. The Napa-Sonoma Marsh Restoration Project has seen significant progress since the 1999 Baylands Goals. The project has involved the restoration of nearly 10,000 acres of wetlands and associated habitats within the former Cargill salt pond complex in the North Bay. The first two phases were completed in 2006 and 2007, and the third is in progress. Phase I, completed in 2006, resulted in the opening of 3,000 acres of managed ponds (ponds 3, 4, and 5) to full tidal action. Phase II, completed in 2007, restored 1,700 acres (ponds 1/1A, and 2) to managed ponds to provide waterfowl and shorebird habitat. Phase III involves the restoration of the final 1,900 acres (ponds 6/6A, 7/7A, and 8) and bittern removal from pond 7. Narrow strips of tidal marsh lie on the outboard sides of the levees that border these managed ponds and also at several sites along the Napa River. Significant populations of Ridgway's rail and black rail inhabit Fagan Slough, Coon Island, and White Slough.

Extensive tidal flats border the salt marsh south of Highway 37. The Highway 37 Strip Marsh East lies on the outboard side of the highway near Mare Island and is part of the San Pablo Bay National Wildlife Refuge. The 1,400-acre strip marsh is recognized as one of the most ecologically significant tidal marshes in San Pablo Bay; until recently, its exceptionally dense, tall pickleweed vegetation of the high-marsh terrace supported what is likely the largest population of the endangered salt marsh harvest mouse in the North Bay. However, the marsh has experienced accelerating degradation over the past two decades due to artificial-drainage impediments that have caused prolonged flooding and extensive dieback of marsh vegetation. This intensified flooding has greatly reduced the ecological function of this important habitat area for the salt marsh harvest mouse.

Diked wetlands lie along the northern side of Highway 37 and along the base of the hills near Huichica Creek. At the bayland edge there are many localities of rare

or extirpated species of high-marsh plants. Eelgrass and oysters can be found near the mouth of the Napa River.

Implications of Drivers of Change

Without enhancement, existing tidal marshes may be unable to keep up as the rate of sea-level rise increases, resulting in greater inundation of the marsh plain. High marsh that is flooded only during spring tides may downshift to mid and low marsh that is regularly flooded, depending on sediment supply and accretion rates. Increasing tidal submergence coupled with wave erosion may ultimately result in the conversion of tidal marsh to mudflat and landward migration of the shoreline.

Considerations for Implementing the Actions

NEAR TERM (NOW TO MIDCENTURY, PRIOR TO SLR CURVE ACCELERATION)

The near term, as the Napa–Sonoma Marsh Restoration Project is completed and suspended-sediment concentrations are still sufficient to sustain marsh-building processes, presents significant opportunities to enhance and increase the resiliency of large areas of tidal marsh south of Highway 37. This site is a distinct marsh type—a high-marsh terrace sustained by wave overwash and episodic sediment deposition—and thus requires a new approach to establish natural, sustainable drainage patterns and high-marsh topography. Studies should explore the facilitation of drainage according to the natural morphology and provide elevation and drainage gradients within the prograded, wave-built marsh terrace.

Previous efforts to improve drainage and sedimentation have been temporary, as these channels rapidly filled with sediment. For example, breaches were cut in the natural levee; they headcut as expected, which resulted in massive sedimentation in the marsh interior. The cuts became unstable and were rapidly closed by wave sediment deposition within two years. Improved understanding of the distinctive morphology, drainage, and geomorphic processes operating at this wave-exposed high salt marsh should support practical management strategies to maintain it as a persistent major high salt marsh habitat. The Highway 37–Mare Island high-marsh terrace may provide a model for other similar sites and may be among the most resilient to sea-level rise during the coming century.

LONG TERM (LATTER HALF OF THE CENTURY, AFTER SLR CURVE ACCELERATION)

While improved drainage will enhance the marshes to the south of Highway 37 in the short term, the long-term maintenance of the supratidal marsh terrace (a modern salt marsh berm built by waves, despite the erosional morphology of its scarp) is probably at least as important for resilience to sea-level rise. This may be the first opportunity in the bay to get the right processes (high wave energy and high suspended sediment combined at the same location) identified in the context of managing a sustainable high salt marsh. Sediment demand from the restored Napa–Sonoma marshes north of Highway 37 will increase as sea levels rise. An important factor to consider while making such land-use decisions is whether it is possible to enhance the natural sediment transport from San Pablo Bay through Sonoma Creek and the Napa River and reestablish pathways from watersheds to tidal marsh areas to help maintain marsh elevations.

Recommended Actions

FOR HABITATS AND THE LANDSCAPE IN GENERAL

- Restore large areas of managed pond to tidal marsh (e.g., the Napa–Sonoma Restoration Project, Cullinan Ranch).
- Consider ways to increase sediment supply to the tidal baylands. For example, dredged sediments can be placed directly on adjacent mudflats to be reworked by wave and tidal action in order to increase local suspended-sediment concentrations and marsh-accretion rates. Improve sediment supply to the restored marshes north of Highway 37, and consider methods of increasing their trapping efficiency to increase accretion rates. Consider the beneficial reuse of dredged material to elevate restored ponds such as at Cullinan Ranch.
- Optimize the management of ponds for a diverse suite of waterbirds and consider relocating, reconfiguring, or enhancing ponds to accommodate sea-level rise. Revisit the acreage of ponds needed based on changes in the overall acreage of different habitat types (e.g., mudflats along Napa River).
- Enhance existing shoreline tidal marsh ecosystems and their function by reconnecting drainages that run parallel to the bay shore from Cullinan and the top of the centennial strip marsh, and by providing connectivity between strip-marsh units (Sonoma Creek and west units).
- Elevate Highway 37 to a causeway and remove other barriers to achieve unimpeded tidal and other hydrological connectivity.
- Enhance and restore transition zone habitat adjacent to tidal marsh, including natural levees on creeks.
- Enhance and restore eelgrass and oyster beds at the mouth of the Napa River and nearby areas.
- Facilitate the long-term maintenance of the supratidal marsh terrace of the Highway 37–Mare Island marsh by providing sufficient space and coarser sediment for the wave-built salt marsh berm to function and evolve.
- Increase the use of recycled water to improve salinity gradients.

FOR PARTICULAR WILDLIFE POPULATIONS

- Enhance seasonal wetlands at the Mare Island dredged-material-disposal ponds to improve shorebird habitats.
- Reduce the runoff of agricultural contaminants and nutrients from agricultural activities to improve water quality for the aquatic food web in the adjacent wetlands.
- Identify, conserve, and manage selected refugia for native bayland plants. Focus on unique or core populations of uncommon plants, especially in low marshes and in transition zones.
- Contain perennial pepperweed and eliminate populations in proximity to marsh–upland transition zones and in high-elevation marsh. In particular, exclude

pepperweed from mature brackish tidal marshes that are not yet heavily infested and from restoration areas soon to be opened to tidal influence. Use methods that do not jeopardize seed banks of desirable plant species by avoiding persistent soil-active herbicide. Prevent the spread of invasive species coincident with marsh migration.

- Continue to control invasive *Spartina* in Strip Marsh East–Mare Island.

Restoration Benefits

Implementing these recommendations would improve habitat conditions throughout the segment for tidal marsh-dependent species, such as the salt marsh harvest mouse, Ridgway's rail, and soft bird's-beak. 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 fish, diving ducks, and shorebirds as well as water circulation. Improving managed-pond habitat would also provide valuable deep-water foraging and resting habitat for diving ducks. Restoring riparian vegetation would benefit many amphibians, birds, and small mammals. Enhancing estuarine–terrestrial transitions would improve conditions for several rare and endangered plants. Conserving and reconnecting transition zones with the baylands ecosystem would provide critical migration space for high tidal marsh and brackish marsh to migrate as sea levels rise toward the end of the 21st century. Reestablishment of salinity gradients to tidal marsh will also provide critical brackish buffers to increasing salinity, thereby supporting tall emergent vegetation that forms essential high-tide cover. Recycled water could also enhance seasonal and brackish marsh habitat types that are rare in this part of the bay. Protecting subtidal eelgrass and oyster beds may help improve habitat corridors for fish from the Napa River to San Pablo Bay, provide additional habitat complexity and food resources, and help protect tidal marsh edges from erosion.

Napa Ponds

Challenges

Challenges for the existing marshes and future transition zone include California Northern railroad tracks, Highway 37, and PG&E power lines. Highway 37 tends to parallel the shoreline within the transition zone, making it a challenge to migration because in the near term it will prevent significant landward movement of the baylands. The Napa–Sonoma Marsh Restoration Project and the San Pablo Bay National Wildlife Refuge are the key regional entities for this segment. Planning will require coordination with local agencies and organizations, including the San Pablo Bay National Wildlife Refuge, California Department of Fish and Wildlife (CDFW), Napa County, Solano County, and Caltrans.