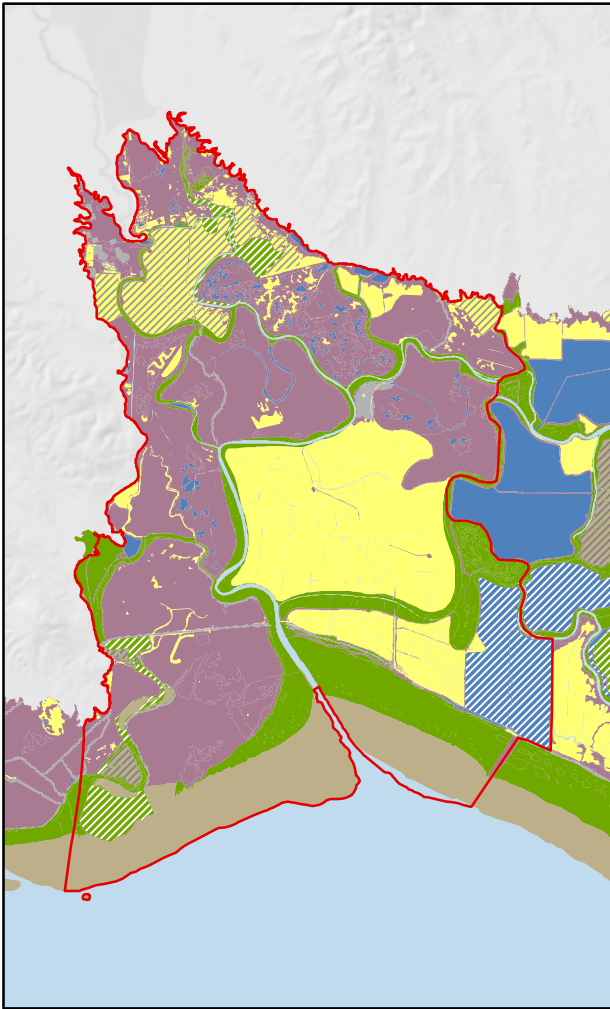


# BAYLANDS SEGMENT E



## SONOMA AREA

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

### 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 E.

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)



## Unique Opportunities

Segment E provides considerable opportunities to protect undeveloped land and restore diked wetlands to tidal marshes, which are more resilient to climate change. It also presents opportunities to restore extensive tidal marsh and natural marsh–upland transition zones. In addition to restoring large patches of tidal marsh (some as isolated marsh islands and others with natural transitions to the adjacent terrestrial habitats), wetlands restoration can also be integrated with watershed management in Sonoma and Tolay Creeks, thereby taking advantage of associated freshwater and sediment pathways. Finally, several large areas are well suited to be managed as diked wetlands for shorebirds and waterfowl.

## Segment Features and Setting

Nearly all of the lands within this segment were once tidal salt marsh or tidal brackish marsh. Some limited areas of moist grasslands lay 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 except for agriculture, and several restoration efforts have been made to enhance and restore tidal flows to diked wetlands along the periphery of the segment since the 1999 Baylands Goals. At Tolay Creek and Lower Tubbs Island, tidal marsh, subtidal, and marsh–upland transition zones have been restored by improving hydrological flow and tidal flushing, reestablishing connections between marsh areas, and restoring native plants along the transition zone. Internal levees and sills, which formed barriers to tidal flow and circulation, were breached or removed, and new channels that reconnect marsh areas to existing drainages were excavated. Projects at Skaggs Island, Sears Point, and adjacent to Sonoma Creek are under way with substantial areas slated for restoration. 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 in Lower

Sandpipers and dowitchers at low tide



Tubbs Island and adjacent to Highway 37 and Tolay Creek. Spawning Chinook salmon have been observed in Sonoma Creek.

A Caltrans stakeholder process is under way to improve Highway 37, and the initial consensus among stakeholders (including the CDFW, US Fish and Wildlife Service, Regional Water Quality Control Board, and Ducks Unlimited) is to widen it to four lanes, plus bike lanes, into a causeway like the Yolo Bypass I-80 and I-5 designs. This process is encouraged for its significant benefits to baylands habitat and climate-change adaptation.

The Sonoma Resource Conservation District (RCD) conducts a permit program for 29 landowners who maintain over 60 miles of levee in the Sonoma Creek and Petaluma River Area segments. Each year, the Sonoma RCD gathers information from each landowner on the work done in the previous year and the work to be done the coming year and submits it to the permitting agencies. The permits restrict the extent and timing of levee-maintenance work and outline a series of best management practices to protect habitats for threatened and endangered species.

### Implications of Drivers of Change

The United States Geological Survey (USGS) has collected site-specific baseline elevation, vegetation, and tidal data to assess elevation changes over 12 years for the Tolay Creek restoration. These results indicate that the tidal marshes and mudflats along the creek were accreting sediment during the past 12 years, and most of the site had accretion rates that outpaced sea-level rise during the study period. Thus, the area may keep pace with sea-level rise over the next few decades. However, in the longer term, the rates of sea-level rise are expected to increase, and sediment accretion is much less likely to keep pace, 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. Finally, sea-level rise will put pressure on managed systems designed and maintained for particular water levels. For example, as water depths increase, outboard levees will be subject to increasing wave action and the damage associated with erosion and overtopping.

### Considerations for Implementing the Actions

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

In the near term, the acquisition of key agricultural lands from willing sellers and the restoration of tidal action by breaching levees and removing barriers should be pursued while suspended-sediment concentrations are still sufficient to sustain marsh-building processes. Improving drainage conditions in the fringing tidal marsh along Sonoma Creek south of Highway 37 and creating transition zones will help create a mosaic of habitat types, including critical high-tide refugia as sea levels rise. Existing and planned levees that are integrated with the San Francisco Bay Trail should be designed not to impede the objectives of tidal marsh connectivity, improved hydrology, and marsh migration.

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

The long-term vision is to reduce the impact of migration barriers such as highways and railroads and to reconnect the baylands with watershed inputs of sediment and water. The goal is to reduce the flood risk to shoreline communities and infrastructure while increasing the resilience of the baylands to climate change. Sediment demand to maintain marsh elevations will increase as sea levels rise. It is important to consider enhancing the natural sediment transport through Sonoma Creek and the Napa River to tidal marshes to help maintain marsh elevations. Managed ponds and other diked baylands providing important bird habitat may need to be resituated in locations that will require less maintenance, including levee repairs.

## **Recommended Actions**

### **FOR HABITATS AND THE LANDSCAPE IN GENERAL**

- ◆ Restore large connected patches of tidal marsh across the entire sweep of San Pablo Bay, particularly near the mouths of sloughs and major streams. Protect and enhance the marshes on the bay side of Highway 37 to ensure connectivity between marshes along the full perimeter of San Pablo Bay. Improve drainage from Sonoma Creek East through a connection to Sonoma Creek. Allow full hydrological connections between diked areas (i.e., Lower Tubbs Island and Tolay Creek).
- ◆ Increase sediment supply to the tidal baylands, where appropriate for stream and watershed health. Reconnect stream channels in the Tolay Creek watershed into marshes, increase sediment supply to the restored marshes north of Highway 37, and augment the trapping efficiency of tidal baylands to foster accretion, as appropriate.
- ◆ Protect and restore agricultural lands and other open space to reestablish a transition zone adjacent to the tidal marsh and provide space for future landward migration.
- ◆ Elevate Highway 37 to a causeway and elevate, modify, or remove other barriers, such as the railroad, to achieve unimpeded tidal and other hydrological connectivity.
- ◆ Design and implement improved flood protection for adjacent developed areas that takes advantage of the natural infrastructure and promotes ecological resilience.
- ◆ Protect, restore, and enhance riparian habitat along Sonoma Creek in the Schellville area, in the Tolay Creek watershed, and along other waterways.

### **FOR PARTICULAR WILDLIFE POPULATIONS**

- ◆ Establish managed marsh or enhanced seasonal pond habitat (especially for shorebirds) where feasible on agricultural baylands that are not restored to tidal marsh. Locate seasonal diked wetlands in close proximity to tidal flats to provide high-tide roosting habitat for shorebirds.
- ◆ Reduce the runoff of contaminants and nutrients from agricultural activities to improve water quality for aquatic food webs 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. Consider relocating rare plants to more appropriate areas as flooding and salinity conditions change.
- ◆ Increase the populations of threatened and endangered species through methods such as farming best practices to meet specific conservation objectives to buffer future impacts.
- ◆ Continue to control invasive *Spartina* along Sears Point, Sonoma Baylands, and Tolay Creek and Tubbs Island.

### Restoration Benefits

Implementing these recommendations would increase the area of tidal marsh and expand suitable habitat and habitat connectivity for endangered tidal marsh species, such as the Ridgway's rail and the salt marsh harvest mouse. Restoring tidal marsh in this segment would also greatly enlarge the area of shallow- and deep-channel habitat for many fish species and diving ducks. Restoring marsh at the periphery of the baylands, where natural transitions to adjacent terrestrial habitats could develop, would benefit several rare plants as well as birds, mammals, and amphibians that depend on the transition zone. Furthermore, the conservation of transition zones and their reconnection with the baylands ecosystem provides critical migration space for high tidal marsh and brackish marsh to migrate as sea levels rise toward the end of the 21st century. Large areas 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.

### 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 serious challenge because in the near term it will prevent any significant landward movement of the baylands. Planning will require coordination with local agencies and organizations, including Sonoma County, Sonoma RCD, San Pablo Bay National Wildlife Refuge, CDFW, the Sonoma Land Trust, Northwestern Pacific Railroad, SMART rail, and Caltrans.

Groundwater considerations also need to be addressed. Two groundwater-pumping depressions are apparent in the deep-zone groundwater elevation contour map southeast of the city of Sonoma and around El Verano. The pumping depression southeast of Sonoma has the potential to induce an intrusion of brackish water from the baylands area, which may be exacerbated by sea-level rise.