SUISUN MARSH WEST
Western portion of Suisun Marsh

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 B.
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 B provides opportunities to restore large patches of tidal marsh adjacent to areas of moist grasslands and vernal pools and to enhance wide natural transitions between these habitat types. An existing large tract of tidal marsh can be expanded, and marsh migration facilitated, at Rush Ranch. Riparian vegetation can be restored and enhanced along streams, several of which support steelhead, that flow into the marsh from the north. Management of diked wetlands can be improved for waterfowl and other waterbirds. As with the eastern segment of the Suisun Marsh (segment A), this area’s large size, current protected status, relative isolation, and location on the estuarine salinity gradient all increase its potential restored habitat value.

Segment Features and Setting

Historically, this part of Suisun Marsh was largely fresh and brackish marsh, with 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 were many large tidal marsh ponds. Adjacent to the tidal marshes north of Potrero Hills were large areas of moist grassland with vernal pools. Moist grassland lay in scattered patches along the base of the hills to the west. Riparian woodland lined several of the larger creeks that flowed into the marshes from the north. Like the eastern part of Suisun Marsh (segment A), 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 managed agricultural baylands. Tidal marshes are limited and are generally confined to areas along the Hill, Peytonia, Montezuma, Suisun, and Cutoff Sloughs and to First and Second Mallard Branches. None of the historical marsh ponds remain except in low areas in diked baylands, and the tidal channels have narrowed markedly or disappeared. A native species of submerged aquatic vegetation, sago pondweed, is distributed in the shallow subtidal areas adjacent to tidal marsh edges. 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.

Implications of Drivers of Change

The main drivers of change for segment B are climate change, sea-level rise, changes in upstream water quality and quantity, and managed wetland activities. Salinity throughout segment B will likely be elevated for a longer duration each year as a consequence of sea-level rise and tidal restoration. Numerous areas within this segment are subsided and, with sea-level rise, current tidal and future restored tidal areas may become subtidal habitats. Additionally, as managed wetlands are converted to tidal wetlands, regional water quality is expected to change, along with ecosystem functions.

Ultimately, opportunities for restoration in this segment may be largely shaped by climate change and sea-level rise as some managed wetlands become unsustainable because of changes in flood-event frequency, unanticipated levee failures, high levee...
maintenance costs, subsidence, and so on. Changes in upstream water quality (sediment supply, salinity, contaminants, temperature, etc.) and changes in water quantity (the amount of freshwater water coming into segment B) can significantly affect the ecosystem function and effectiveness of restoration projects. Furthermore, areas of limited hydrological connectivity to major sloughs within this section have questionable restoration benefits to fish species targeted for conservation or mitigation requirements. The presence of the railroad tracks, petroleum pipelines, and the proximity of I-680 and Suisun City present additional challenges to restoration. Investments will need to be made to update this infrastructure for sea-level rise. These upgrades may provide opportunities for improving landscape processes important to maintaining the baylands. As the impacts of these main drivers of change become more pronounced, some existing regulatory obligations (e.g., SWRCB D-1641 water-salinity standards) may become unachievable, thereby necessitating the revision of some regulatory obligations. With increasing salinity levels, wetland plant diversity in the managed and tidal habitats is expected to decrease.

Considerations for Implementing the Actions

NEAR TERM (NOW TO MIDCENTURY, PRIOR TO SLR CURVE ACCELERATION)
The target of 5,000 to 7,000 acres of tidal restoration set forth in the SMP is to be accomplished within the next 30 years. Contributions to this acreage could come from the Fish Restoration Program (FRP) and the Ecosystem Restoration Program (ERP), which are funded efforts. The Bay Delta Conservation Plan (BDCP), if it is approved and funded, could also contribute to the SMP’s restoration acreage goal. A smaller portion of this tidal restoration acreage is likely to fall within segment B than in segment A.

Nonetheless, impacts of salinity changes due to tidal restoration locally (within Suisun Marsh) and regionally (particularly in the delta) should be assessed as water-quality regulations (e.g., SWRCB D-1641) must be met in both Suisun Marsh and the delta. For managed wetlands, waterfowl habitat should be improved following best management practices, and general management practices should be promoted that reduce land subsidence and improve water quality.

LONG TERM (LATTER HALF OF THE CENTURY, AFTER SLR CURVE ACCELERATION)
Similar to the vision for segment A, the long-term vision for segment B is uncertain. While additional tidal restoration requirements are likely (such as remaining requirements of the FRP or BDCP), restoration opportunities may be largely shaped by climate change and sea-level rise as managed wetlands become less sustainable because of changes in flood-event frequency, unanticipated levee failures, high levee maintenance costs, subsidence, and so on). As managed wetlands are converted into tidal wetlands, significant impacts to upstream water supply (e.g., increased salinity) and ecosystem functions throughout Suisun Marsh and the delta are likely. The replacement or relocation of major infrastructure (e.g., portions of Highway 680, the railroad tracks, and petroleum pipelines) will likely be needed due to higher water levels. Plans to contend with these challenges to large-scale tidal restoration will be necessary.
Recommended Actions

FOR HABITATS AND THE LANDSCAPE IN GENERAL

- Restore large tracts of tidal marsh in the Hill Slough and upper Suisun Slough areas (including Goat Island), on Morrow Island south of the confluence of Goodyear and Suisun Sloughs, and at Southampton Bay. Connect these large areas of restored tidal marsh via a tidal marsh corridor along Cordelia Slough or other appropriate corridor location.

- Enhance and restore the natural transition zone, focusing on tidal marsh transitions, incorporating protective buffers wherever possible and thus creating shoreline migration space.

- Optimize managed marshes (duck clubs) to ensure continued support for a diverse suite of waterbirds, prevent subsidence, protect water quality, store carbon, and accumulate peat in the face of increasing salinities, sea-level rise, and other changes.

- Restore and enhance riparian vegetation along streams that flow into the marsh.

- Protect and enhance sago pondweed beds in the western portion of the segment. Study the ecosystem services and functions of beds, including the provision of habitat refugia and corridors for fish and aquatic species moving between the Carquinez Straight and tidal marshes, the provision of food to wildlife, and any other values associated with wave attenuation and shoreline protection.

FOR PARTICULAR WILDLIFE POPULATIONS

- If duck clubs are converted to other habitat types, compensate for the loss of managed marsh habitat for waterbirds.

- 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. Use methods that do not jeopardize seed banks of desirable plant species by avoiding persistent soil-active herbicide.

- Complete the eradication of the invasive *Spartina* at Benicia State Park. Implement aggressive control measures for the invasive plant yellow flag, which could become a serious problem.

- Study the impacts of invasive feral pigs to determine appropriate control measures. Feral pigs disturb marsh vegetation. These disturbances may cause long-term damage, or they may enhance the recruitment of particular marsh plants.
**Restoration Benefits**

Restoring tidal marshes in this segment would benefit many estuarine and anadromous fish species, including Chinook salmon, steelhead, and delta smelt. It would also benefit the Ridgway’s rail. Restoring natural marsh–upland transition zones would improve conditions for endangered plant species, such as the soft bird’s-beak, especially along the segment’s northern edge. Protecting subtidal sago pondweed beds adjacent to marshes may help to improve habitat corridors for fish, provide additional habitat complexity and food resources, and play a role in protecting tidal marsh edges against erosion. Mammals that depend on transition areas for high-water-escape habitat would also benefit. The lower-elevation tidal marshes would provide habitat and food-web support for aquatic invertebrates and habitat for diving ducks. 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.

**Challenges**

Posing the main challenges are Southern Pacific railroad tracks, industrial areas in the southwest portion, flood-control considerations, levee maintenance, sedimentation of tidal creeks, water salinity management, and water quality impacts. Effective tidal restoration on the west and north sides of segment B will be challenging due to limited hydroconnectivity and the constraints of Highway 680, railroad tracks, Suisun City, and petroleum pipelines. Key regional restoration plans that involve this segment include the Suisun Marsh Plan, Delta Plan, BDCP, and FRPA.