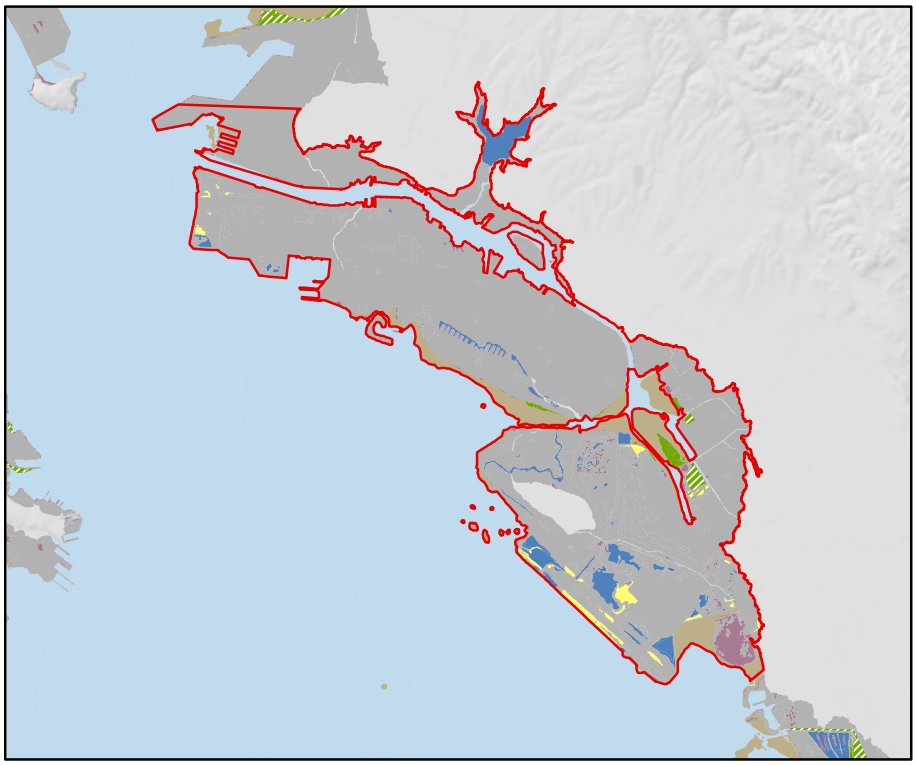
BAYLANDS SEGMENT K



OAKLAND AREA

Eastern edge of central San Francisco Bay between the San Leandro Marina and Oakland outer harbor

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 K.

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)

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Miles

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Port of Oakland

Unique Opportunities

Segment K will likely remain highly urbanized with limited opportunities for large-scale restoration, but it presents many opportunities to develop small-scale restoration and green engineering projects to meet the co-objectives of improving habitat quality and protecting the existing infrastructure, shorelines, and baylands. 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 and subtidal offshore habitats in several areas. Conditions at some sites are appropriate for native eelgrass and oyster restoration. Lake Merritt and the Oakland Estuary provide unique, visible opportunities to educate the public about wildlife habitat needs.

Very few large tracts of land are available for habitat acquisition or restoration, but this segment has multiple small habitat areas that include small but viable wildlife populations such as the steelhead run on San Leandro Creek.

Segment Features and Setting

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. Native eelgrass and oyster beds were distributed throughout this segment. 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 locally extirpated 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 existed 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. The marshes and other habitats near Bay Farm Island have been filled; they are now the site of the Oakland Airport. This segment receives heavy marine influences and high salinity. It includes highly

urbanized shorelines, a high-energy-wave environment, and limited sources of local sediment. It still supports oyster and eelgrass beds in limited areas.

Implications of Drivers of Change

The developed areas in this segment will become increasingly difficult to protect as sea levels rise. Outboard levees in particular will be subject to greater wave action as water depths increase, allowing larger waves to propagate inshore. Increasing wave action will also accelerate the erosion of the small remaining marsh edges, resulting in the narrowing and potential loss of marshes and other unique habitats such as coarse beaches. This urbanized segment has a great deal of development that directly abuts the shoreline, limiting the migration space and areas for restoration adaptation. More experimental approaches to address these limits might include vertical adaptation with new techniques such as living seawalls and breakwaters.

Considerations for Implementing the Actions

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

In the near term, when sea-level rise rates will still be relatively low, enhancing the baylands will provide immediate ecological benefits and maximize their resilience. Living breakwaters could be created around fringing marshes to preserve and enhance unique features like native eelgrass and oyster beds. Introducing fine sediment through mudflat and marsh recharge could increase vertical accretion rates. There are limited opportunities for landward migration of marshland, and it is likely that the fringing tidal marshes will drown as sea levels rise. However, opportunities exist to partner with the industrial and residential communities along the shoreline to develop green infrastructure such as horizontal levees, which would create habitat bayward of the flood-protection levees.

Major land uses, such as Highway 880, will remain largely in current configurations and will need to be protected. Innovative approaches such as living seawalls may provide an opportunity to do so. Diverse pocket habitats could be preserved, enhanced, and created, then linked together to create a subregional habitat corridor. Vertical enhancements (living seawalls, substrate improvements to docks, etc.) could be made in a few subtidal and intertidal areas where there is hardscape. Many existing habitats could be enhanced by improving tidegate management, removing contaminated soils and derelict boats, and removing trash that ends up in the bay. Habitats could be created along flood-control channels, floodplains, and off channels, and low-elevation marsh and other wetland could be restored. Upstream opportunities are limited but important to consider.

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

In the long term, sea-level rise rates will likely outpace vertical accretion rates, and marshes in this segment generally do not have enough space to migrate landward to survive. Prior to that point, a plan for restoring or relocating the functions within the existing tidal marshes should be implemented. Creating wetlands bayward of the

flood-protection levees, possibly using wastewater to enhance habitat on the slope, could provide space for landward migration. The planned communities built over former wetlands at Bay Farm Island, Alameda Island, and around the Oakland Airport will be at risk for flooding as sea levels begin to rise. If opportunities for managed retreat become available, options should be pursued to restore such areas to marshland.

Recommended Actions

FOR HABITATS AND THE LANDSCAPE IN GENERAL

- Preserve, enhance, and create diverse pocket habitats that are linked in a sub-regional habitat corridor that encompasses sand beaches, eelgrass, oyster beds, macroalgal beds, mudflats, rocky intertidal areas, and tidal marsh.
- Develop extensive and connected segments of native tidal marsh for small mammals and marsh-dependent birds.
- Protect and restore eelgrass and oyster beds in suitable locations.
- Enhance and expand tidal and diked habitats at all potential areas throughout the segment, for example, Alameda Island, Bay Farm Island, Martin Luther King Jr. Regional Shoreline Park, and the vicinity of the Oakland Airport.
- Enhance riparian corridors along streams throughout the segment and reconnect tributary streams to the Bay.

FOR PARTICULAR WILDLIFE POPULATIONS

- Preserve salmonid habitat in all creeks, and remove barriers to fish passage in areas of known populations.
- Enhance and protect suitable habitat (e.g., barren or sparsely vegetated areas protected from predators) for the snowy plover and least tern at Alameda Naval Air Station, Oakland Airport, Bay Farm Island, and other locations.
- Enhance cover for wildlife in existing tidal wetlands through active revegetation and by constructing high-tide-refuge islands within the marsh plains. Conduct pilot projects to assess the effectiveness of artificial floating islands for Ridgway's rail nesting and high-tide refugia.
- Restore pockets of low-lying sand beaches in sheltered sites to support reintroduced colonies of California sea-blite.
- Increase habitat in and around San Leandro Bay for harbor seals.
- Continue to control invasive *Spartina* throughout the segment and especially in San Leandro Bay.

Restoration Benefits

Implementing the recommended projects for this segment would demonstrate innovative techniques to restore and enhance habitat for many populations of key fish, amphibian, reptile, insect, mammal, and bird species. Restoring wetlands would enhance habitats for endangered species such as the Ridgway's rail and salt marsh harvest mouse. Restoring native oyster and eelgrass beds offshore would provide habitat for birds and fish, and might enhance food and nursery resources for species that use both wetlands and offshore shallow subtidal habitats. Living-shorelines designs might provide wave attenuation, sediment stabilization, and some flood protection in the near term for tidal marsh habitats on the shoreline.

Experimental pilot projects should be conducted using new approaches that are carefully tested in phases. Integrating native oyster and eelgrass restoration adjacent to tidal wetlands, creating living shorelines, and incorporating features such as high-tide-refuge islands might improve small areas of habitat. They would also provide information on how well these approaches succeed and whether they can be scaled up to larger areas in this segment. Such information could be applied to other segment adaptation planning.

Including public education and awareness components in any restoration initiative is critical to building the public and financial support that is needed to test adaptation approaches and work toward large-scale implementation of innovative techniques.

Challenges

Major challenges in this segment are its large urban population, extensive fill along the shoreline, bridges, water-treatment plants, railroad tracks and spurs, major highways, exotic predators (e.g., rats and red fox), and on-site contaminants. Invasive *Spartina* control remains a critical priority, constraint, and consideration for some existing marshes and for restoration planning.