



SAN MATEO COUNTY NATURE BASED SHORELINE PROTECTION STRATEGIES

San Francisquito OLU

Identifying Nature Based Solutions

SeaChange SMC released a Countywide Sea Level Rise Vulnerability Assessment in 2018 identifying San Mateo County's key vulnerabilities. Communities throughout the County are identifying potential adaptation strategies for the shoreline. Nature based strategies provide multiple benefits, but there are questions about what strategies work in which locations throughout the bay and how they integrate with engineered strategies. This fact sheet summarizes the types of strategies identified through a stakeholder driven process. Local communities and stakeholders can use this information as high level guidance to spur cross-jurisdictional collaboration and to identify potential project areas and concepts for further evaluation.

Types of Nature Based Solutions

Below are examples of nature based strategies. More information and details on adaptation strategies are available at: www.resilience.sfei.org/

Marsh: wetlands affected by daily tides that can decrease wave energy and erosion.

Mudflat: a stretch of mud exposed at low tides that can protect marshes from erosion.

Ecotone/Horizontal Levee: a gently sloping upland, and marsh habitat supported by a flood levee on the shoreline.

Nearshore Reef: mix of oyster shell and baycrete to support subtidal habitat and reduce wave energy.

Submerged Aquatic Vegetation: underwater vegetation such as eelgrass that traps sediment and slows erosion.

What are Operational Landscape Units (OLU)?

OLUs are areas of the shoreline extending from subtidal (i.e. areas that are always underwater, including during low tides) to inland areas in an OLU. The geology, hydrology and climate are similar so that adaptation planning in this area benefits from being aligned. OLU's, like watersheds, span across jurisdictions.

San Francisquito OLU Summary

The San Francisquito OLU stretches along the shoreline between the Dumbarton Bridge and into Palo Alto. In San Mateo County, this OLU is primarily East Palo Alto, and the south shoreline of Menlo Park, though crosses into Palo Alto, emphasizing the need for multi-county coordination.

A majority of the OLU is tidal marsh along the bay and includes the Ravenswood and Baylands Preserves and the Ravenswood Ponds along East Palo Alto and Menlo Park's shoreline. The Sea Change SMC Sea Level Rise Vulnerability Assessment evaluated a number of key assets including the City of East Palo Alto and Ravenswood Ponds.

SEA LEVEL RISE VULNERABILITIES AND NATURE BASED SOLUTIONS

This map shows potential flooding from a 1% storm (baseline), and 3.3 (mid-level), or 6.6 feet (high-end) of sea level rise in blue. Potential nature based solutions are shown along the shoreline.

Menlo Park Vulnerabilities

In the baseline scenario, a portion of the Ravenswood Pond Complex is flooded. In the mid-level scenario, the Bayfront Expressway would be flooded, along with parts of the Belle Haven neighborhood and Bayfront area. Once the Ravenswood Ponds are flooded they no longer provide flood protection since they do not have pumps or other ways to drain water into the Bay. The wastewater pump station, energy transmission infrastructure, outpatient health care facilities and parks are vulnerable to flooding.

Nature Based Solutions

Nearshore oyster reefs and raising the elevation of mudflats with sediment could occur along Ravenswood Ponds and Preserve. Ecotone levees could be created inland of the ponds to protect communities from flooding.

San Francisco OLU

- Baseline scenario*
- Mid-level scenario (Baseline + additional 3.3 ft of sea level rise)
- High-end scenario (Baseline + additional 6.6 ft of sea level rise)

Conditions suitable for:

- Mudflat augmentation
- Beach along natural shoreline
- Beach along fortified shoreline
- Horizontal levee
- Nearshore reefs

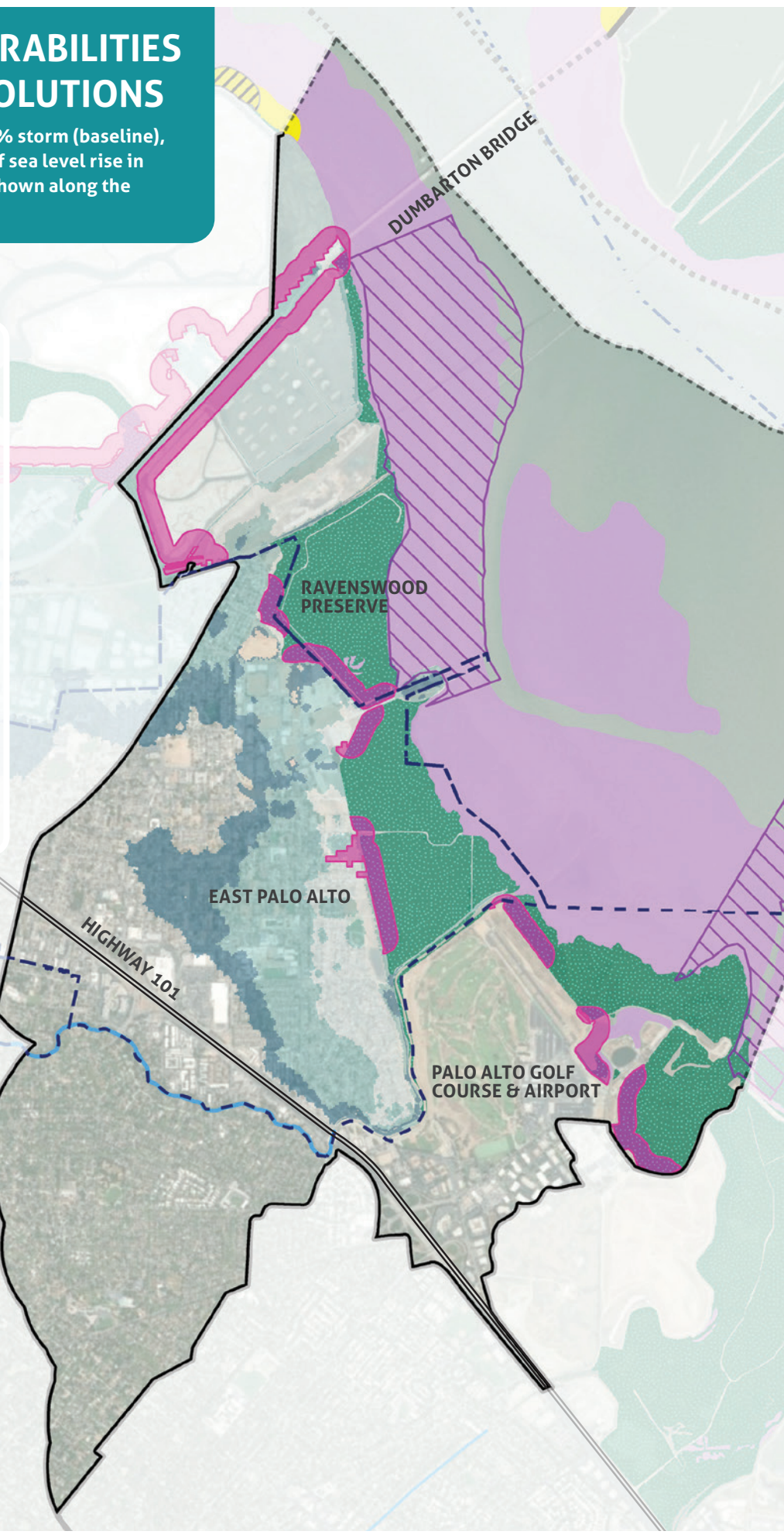
Existing features:

- City boundaries
- Operational landscape unit boundaries
- Major roads
- Creeks
- Tidal marsh

* Estimated impacts are based on 1% annual chance storm or 1 in 100 chance of a storm occurring in any given year.



0.25 Miles



East Palo Alto Vulnerabilities

Parts of East Palo Alto are below sea level and flood often. Many areas do not drain water during high tides, backing up storm drains and flooding neighborhoods. In the baseline scenario 335 acres of land, an electric substation, underground chemical storage tanks, and outfalls are at risk.

In the city's mid-level scenario, 714 acres of land, sixty percent of its schools, 39 hazardous material sites, including the Romic and Rhone-Poulenc Superfund Sites, and underground chemical storage tanks, are vulnerable. Flooding can disproportionately affect the 57% of people in the city who rent their homes. Flooding or rising groundwater could mobilize contaminants at Superfund and cleanup sites, potentially creating a risk to public health.

Nature Based Solutions

The city's existing shoreline protection is not certified as a levee, but rather as berms or non-engineered structures. The city and partners are improving existing levees and nearby marshes through the SAFER project. Mudflats could be elevated along the shoreline. Ecotone levees could be created to protect inland neighborhoods along the bay trail from San Francisquito Creek north to Cooley Landing.

OLU-Wide Nature Based Solutions

A large amount of open space is available to protect nearby homes by creating floodable spaces and green stormwater infrastructure. Where the Baylands are next to development, ecotone levees could provide flood protection to low-lying communities. Ecotone levees may be created as part of the SAFER Bay project and the South Bay Salt Ponds Restoration Project. Projects to reconnect San Francisquito Creek to its marshes have occurred.

In the Bay, nearshore reefs and raising mudflat elevation could reduce wave energy, trap sediment, and reduce marsh erosion. Existing marshes could be enhanced by adding sediment to help them maintain elevations over time as sea level rises. Creating green stormwater infrastructure in upland areas could reduce creek flooding in the lower-lying developed areas and allow tidal waters to drain faster.



CO-BENEFITS

Not only do nature based shoreline protection strategies protect from rising sea levels, but they support wildlife habitat, reduce erosion from waves, store extra carbon from the atmosphere, and reduce runoff of pollutants into the Bay. The scenarios assume marshes will survive with sea level rise until 2050, then will require enhancement. In 2050 as much as 30 percent of the marshes could be lost. Protecting existing marshes, restoring salt ponds to marsh where possible, and adding nature based features throughout the OLU would provide the following benefits:



Coastal Protection

Protecting and restoring tidal wetlands in San Mateo OLU can reduce wave height and help protect communities and coastal structures. For example, marshes by the Dumbarton bridge reduce storm waves as compared to an unvegetated tidal flat. Healthy coastal marsh can also help to lower crest height requirements and costs of levees.



Habitat

Marshes provide habitat for critical species. For example, planned marsh restoration will more than triple the habitat available to the endangered Ridgway's Rail.



Carbon

Each year, existing marshes in San Mateo County store as much carbon dioxide as emitted by over 22,000 cars each year. By 2050, planned restoration efforts in San Francisquito can store an estimated 100,000 tons of carbon. That is equivalent to removing over 21,000 cars from the road for a year for a total of 43,000 cars.



Stormwater Retention

Marshes in the San Francisquito OLU retain pollutants that might otherwise reach the Bay. Compared to a hardened shoreline, marshes keep 2.5 times more nitrogen or more than 9,000 pounds of nitrogen a year out of the bay.

MOVING FORWARD ON REGIONAL SEA LEVEL RISE PLANNING



Through partnerships and the actions below, the County will continue to support strategies to reduce risks from sea level rise that protect vulnerable communities, enhance the use of nature based approaches and address regional impacts.



Partner

early and often with community-based organizations to develop culturally competent and participatory outreach and engagement strategies based on community needs.



Develop and Coordinate

messaging and outreach to a variety of audiences including City Councils and inland neighborhoods.



Participate

in the Climate Ready SMC Collaborative, to learn and share information and best practices, and engage community leaders in solving multi-jurisdictional challenges.



Evaluate

existing plans and policies to encourage cross-jurisdictional planning, implementation of nature based sea level rise adaptation projects, and assessment of necessary changes to land use regulations to support adaptation projects.



Submit

joint grant applications through the Flood and Sea Level Rise Resiliency District for projects that will address sea level rise across jurisdictions.



Monitor

existing and planned projects to inform future work, share with stakeholders, including updates to sea level rise risks based on planned and implemented adaptation projects.

Summaries of the other OLU and workshops are available at seachangesmc.org/current-efforts/nature-based-shoreline-protection-strategies/

