SAN MATEO COUNTY NATURE BASED SHORELINE PROTECTION STRATEGIES

San Mateo 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. The geology, hydrology and climate are similar so that adaptation planning in this area benefits from being aligned. OLUs, like watersheds, span across jurisdictions.

San Mateo OLU Summary

There are 5 OLUs in the County. The San Mateo OLU stretches along the shoreline between the Coyote Point Recreation Area and into Foster City.

The immediate shoreline across most of the OLU is recreational land, including the Bay Trail, Coyote Point Recreation Area, Seal Point Park, Baywinds Parks, and Mariners Point. The Sea Change SMC Sea Level Rise Vulnerability Assessment evaluated a number of key assets including the Foster City Levee, Foster City Corporation Yard, and Bayside STEM Academy.

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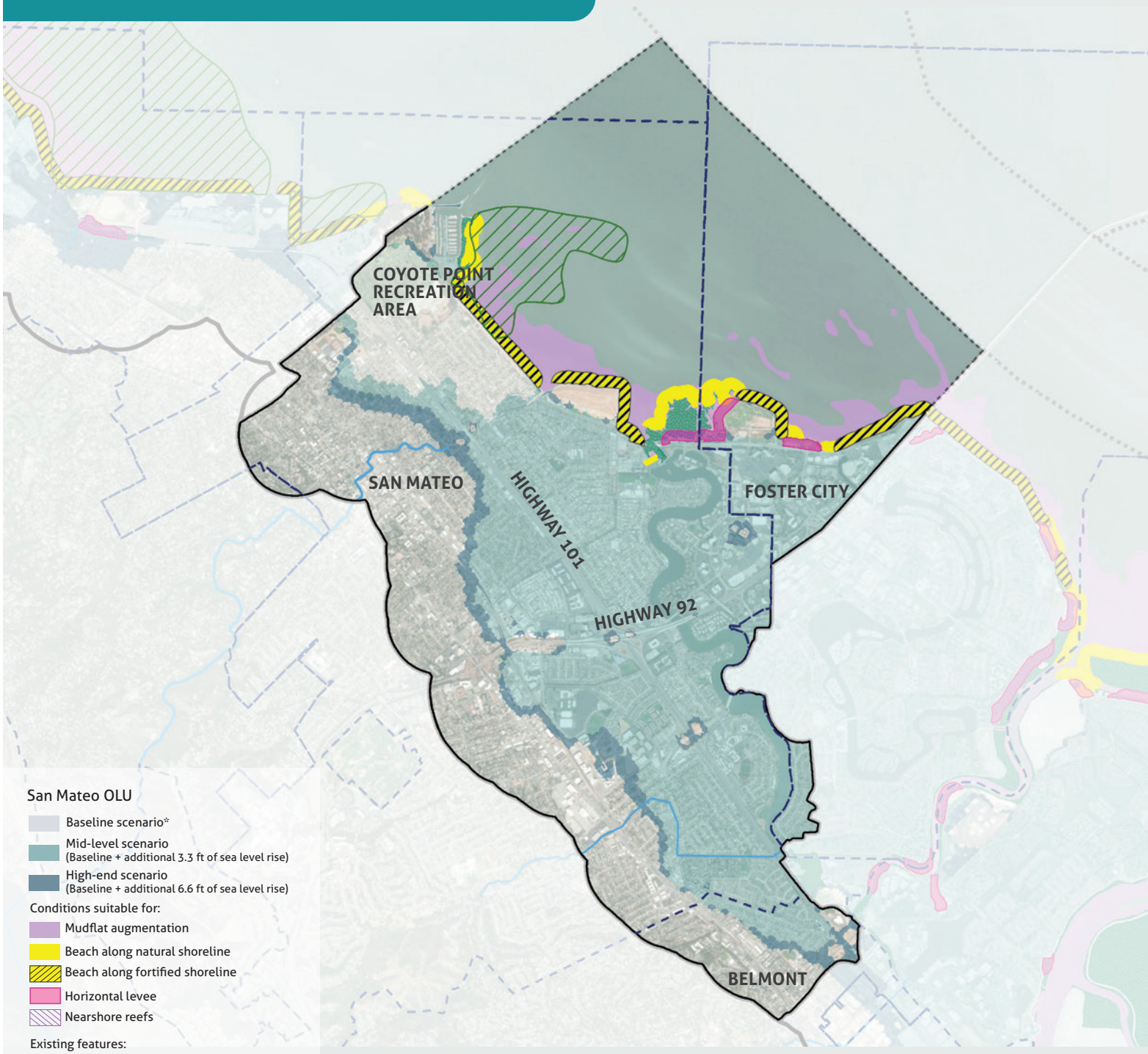
SEA LEVEL RISE VULNERABILITIES AND NATURE BASED SOLUTIONS

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.



San Mateo 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.

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Belmont

Vulnerabilities

The mid-level scenario would lead to flooding of the area east of Highway 101 and also flood Highway 101 in the area south of Belmont Creek. A significant number of Belmont's built and natural flood protection assets are vulnerable including the single electrical substation, one of the three hazardous material sites, and both outpatient facilities.

San Mateo

Vulnerabilities

In the baseline scenario, the Poplar Golf Course and area south of the golf course are flooded, as well as part of Highway 101, Peninsula Avenue, and J Hart Clinton Drive. In the mid-level scenario, the levees that protect the City of San Mateo and Foster City would be overtopped, leading to flooding of Highway 101 and flooding of the Caltrain Station and surrounding areas. Electrical substations, hazardous material sites, outfalls, outpatient facilities and a number of other assets are vulnerable to sea level rise. Plans are moving forward to raise these levees.

Nature Based Solutions

Flood prevention projects completed in 2012 include the South Bayfront Levee improvements at the following sites: the Detroit Drive Floodwall, the Seal Slough Floodwall, the San Mateo Creek Floodwall, and the East End Levee. The City of San Mateo is protected by the Foster City levee and San Mateo levees. The City of San Mateo is upgrading pumps and raising their levee as part of the North Shoreview project. An ecotone levee could be placed along the north end of Mariners Point. The County of San Mateo is improving the shoreline of Coyote Point Recreation Area to account for sea level rise, with raised levees and a perched beach. A marsh or eelgrass habitat could be placed alongside the Coyote Point Marina and is also being explored by the County as an option.

Foster City

Vulnerabilities

A significant number of built and natural assets would be affected in Foster City under the mid-level scenario should the levee be overtopped.

Nature Based Solutions

Foster City is protected by a levee, which the city is actively working to raise by adding a flood wall, in order to achieve FEMA accreditation and to protect against projected future sea level rise. This will also reduce the risk of flooding in some parts of San Mateo. Beach habitat could be added to the outer edge of the levee to reduce wave runup if space is available.

OLU-Wide Nature Based Solutions

Coarse beaches, along the Bay Trail could soften the shoreline, limit marsh edge erosion, dampen wave energy, and provide recreation benefits. Management of these beaches would have to include longshore transport of coarse materials and may require groins. Mudflats are critical for buffering waves, reducing marsh edge erosion, and may supply shell and coarse material to the existing beaches. They could be placed north and south of Mariners Point. Green stormwater infrastructure could continue to be implemented in the watershed to reduce creek flooding in the low-lying developed areas.

CO-BENEFITS

Not only do nature based shoreline protection strategies protect from rising sea levels, they support wildlife habitat, reduce erosion from waves, can store extra carbon from the atmosphere and reduce runoff of pollutants into the Bay. Protecting existing marshes, restoring salt ponds to marsh as possible, and adding nature based features throughout the OLU would provide the following benefits. The values below assume that planned and existing marsh habitat will keep pace with sea level rise through 2050. After 2050 modeling in the Bay suggests that additional restoration and protection efforts will be required to sustain marsh.

Coastal Protection

Protecting and restoring tidal wetlands can reduce wave height and help protect communities and coastal structures. For example, vegetation around Coyote Point currently reduces wave heights during major storms by more than a foot. Protecting and restoring marsh at Mariners Point could reduce further reduce risk from coastal hazards. Healthy coastal marsh can help to lower height requirements and costs for levees.

Habitat

Planned habitat restoration will add nearly 100 acres of marsh and 75 acres of Ridgway's Rail habitat as compared to a hardened shoreline. Adding ecotone levees could increase total shoreline habitat to 1,383 acres. Planned beach restoration efforts would add 30 acres of beach but up to 111 acres of beach could be restored.

Recreation

Recreation here is approximately 6% of the total recreational activity in the five OLUs in the County. Sea level rise protection strategies along the coastline, especially beach restoration, could maintain and increase recreation. The Bay Trail and Water Trail provide valuable recreation opportunities (i.e. are associated with more visitors) and adaptation efforts can support these benefits through design that integrate these types of trails.

Carbon

Existing marshes in San Mateo County store as much carbon dioxide as is emitted by over 22,000 cars each year. By 2050, planned restoration efforts to from additional marsh will increase the amount of carbon stored and sequestered in San Mateo OLU to almost 14,000 tons. This is roughly equal to removing more than 3,000 cars from the road for a year for a total of 25,000 cars.

Stormwater Retention

Marshes retain pollutants that might otherwise reach the Bay. If marshes are maintained, in contrast to solely maintaining levees, 1,728 more pounds of nitrogen are kept out of the Bay each year.

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 these multi-jurisdictional challenges.

Develop and Share
tools such as design guidelines, regulatory frameworks, and interactive mapping tools.

Submit
joint applications through the Flood and Sea Level Rise Resiliency District to grant programs for projects that will address sea level rise across jurisdictions, coordinate permitting, and pilot innovative strategies.

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

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

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

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