

ACTION 14

Demonstrate how natural habitats and nature-based shoreline infrastructure can provide increased resiliency to changes in the Estuary environment

Promote projects that demonstrate how tidal habitats, oyster beds, habitat levees, restored beaches, and other natural and nature-based features of Estuary shorelines can make the region more resilient to rising sea level, drought, water pollution, and other future stresses. Identify locations where these kinds of features can provide the most benefits, both independently and in hybrid applications with more traditional approaches to managing flood risk, protecting shorelines, and reusing wastewater.

TASK 14-1 Develop a primer on how bayshore projects can be designed and optimized to achieve multiple rather than single benefits. Challenge designers and planners to look beyond a primary objective and find opportunities to incorporate not only flood protection but also habitat enhancement and recreational access, among other objectives, in proposed projects.

BY 2017 Develop primer and implement outreach strategy.

TASK 14-2 Develop a system for describing the variety of shorelines around the Estuary based on shoreline features, ecosystem processes, land use, and other relevant factors.

BY 2018 Develop shoreline typologies.

TASK 14-3 Based on the primer developed in Task 14-1 and the system developed in Task 14-2, develop best practices guidelines for natural and nature-based shoreline features that increase the resiliency of the Estuary and provide multiple ecosystem benefits.

BY 2019 Develop best practices guidelines and recommendations.

TASK 14-4 Construct pilot projects to test and refine natural and nature-based approaches to resiliency by applying the guidelines developed in Task 14-3. These pilot projects will build on design and adaptation steps established by projects such as the Oro Loma Horizontal Levee project, the San Rafael Oyster/Eelgrass Living Shoreline Project, and the Aramburu Island Beach Restoration Project. Like these projects, the Task 14-4 pilots will address a specific hypothesis, evaluate the performance of multi-benefit restoration design elements, and budget for monitoring, evaluation, and subsequent design refinement. Results from the pilot projects will be incorporated into a revised version of the guidelines developed in Task 14-3.

BY 2021 Identify, design, permit, and implement three additional pilot projects in the Bay.

BY 2021 Update best practices guidelines.

BACKGROUND

This action promotes “natural and nature-based” shoreline features and infrastructure as strategies that leverage natural processes to provide multiple biological and physical benefits. Such strategies may include a combination of natural systems, new habitats, restored processes (such as sediment or water delivery), built structures (such as water control gates, levees, and stormwater and wastewater pipelines), and upgrades or changes to existing infrastructure (such as creek mouth culverts, barriers, and flood control levees). The aim of these nature-based or green infrastructure approaches should not only be to provide flood protection, for example, but also to improve water quality, sequester carbon, and create habitat, among a range of possible benefits. Representative “features” in such nature-based shorelines might include horizontal levees, oyster reefs, islands created in restoration sites where birds can nest and find refuge from high waters, or plantings to speed revegetation ahead of sea level rise or in times of drought. In addition, nature-based or green infrastructure approaches connect to a suite of urban interventions often referred to as low impact development.

This CCMP action builds on *Baylands Ecosystem Habitat Goals Science Update* 2015 recommendations that natural infrastructure be utilized to improve shoreline resiliency and support ecosystem services. During the near-term, when sea level rise rates will still be relatively low, immediate actions can be taken to maximize resiliency of the shoreline. The 2015 *Baylands Goals* update highlights the importance of partnering with the industrial and residential communities along the shoreline to manage tidal habitat bayward of flood risk management levees through horizontal levees, living shorelines, or other features.

This CCMP action also supports Governor Jerry Brown’s 2015 executive order prioritizing natural infrastructure approaches to climate change impacts.

OWNERS

SF Estuary Institute (Tasks 14-1, 14-2, 14-3)
SF Estuary Partnership (Tasks 14-1, 14-2, 14-3, 14-4)

COLLABORATING PARTNERS

Bay Area Ecosystems Climate Change Consortium, CA State Coastal Conservancy, SF Bay Conservation and Development Commission, SF Bay Joint Venture, SF Bay National Estuarine Research Reserve, SF Bay Regional Water Quality Control Board, various special districts and the restoration community

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