

COASTAL CONSERVANCY

Staff Recommendation
March 25, 2021

San Diego Bay Native Oyster Living Shoreline Project

Project No. 13-019-03
Project Manager: Evyan Sloane

RECOMMENDED ACTION: Authorization to disburse up to \$890,000 to the San Diego Unified Port District to implement and monitor a native oyster living shoreline project at the Chula Vista Wildlife Reserve in San Diego County.

LOCATION: Chula Vista Wildlife Reserve in San Diego Bay, City of Chula Vista, San Diego County

EXHIBITS

- Exhibit 1: [Project Location Map](#)
Exhibit 2: [60% Designs of Native Oyster Reef Structures](#)
Exhibit 3: [Project Letters](#)
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RESOLUTION AND FINDINGS

Staff recommends that the State Coastal Conservancy adopt the following resolution and findings.

Resolution:

The State Coastal Conservancy hereby authorizes disbursement of an amount not to exceed eight hundred ninety thousand dollars (\$890,000) to the San Diego Unified Port District (“the grantee”) to restore 2.5 acres of native oyster habitat by installing and monitoring reef elements made of cement and oyster shell at the Chula Vista Wildlife Reserve in South San Diego Bay.

Prior to commencement of the project, the grantee shall submit for the review and written approval of the Executive Officer of the Conservancy (Executive Officer) the following:

1. A detailed work program, schedule, and budget.
2. Names and qualifications of any contractors to be retained in carrying out the project.
3. A plan for acknowledgement of Conservancy funding.

4. Evidence that all permits and approvals required to implement the project have been obtained.
5. Evidence that the grantee has entered into agreements sufficient to enable the grantee to implement, operate, and maintain the project.

Findings:

Based on the accompanying staff recommendation and attached exhibits, the State Coastal Conservancy hereby finds that:

1. The proposed authorization is consistent with Chapter 6 of Division 21 of the Public Resources Code, regarding coastal resource enhancement.
2. The proposed project is consistent with the current Conservancy Project Selection Criteria and Guidelines.

STAFF RECOMMENDATION

PROJECT SUMMARY:

Staff recommends the Conservancy authorize disbursement of an amount not to exceed eight hundred ninety thousand dollars (\$890,000) to the San Diego Unified Port District (“the grantee”) to restore 2.5 acres of native oyster habitat by installing and monitoring reef elements made of cement and oyster shell at the Chula Vista Wildlife Reserve in south San Diego Bay (Exhibit 1). Funds for this authorization derive from a grant to the Conservancy of \$960,533 from the US Fish and Wildlife Service (USFWS) National Coastal Wetlands Conservation Program (NCWC) specifically for this project. The remaining \$70,533 in USFWS grant funds will be used to pay for Conservancy staff project management costs. The proposed project aims to improve the water quality, restore natural estuarine habitat, and protect the shoreline from the erosive and flooding effects of storms and sea level rise.

The primary goal of the native oyster living shoreline project is to create a biologically rich native oyster reef in San Diego Bay, thus restoring an ecological niche that was historically present while also working to protect Bay tidelands and shorelines. This native oyster reef and living shoreline will increase resilience to climate change while providing numerous ecosystem services to San Diego Bay tidelands and shorelines by 1) achieving localized reductions in erosive impacts of wave action and severe weather events on the shoreline, in turn ensuring continued flood control services of marshlands; 2) creating new habitat for ecologically and commercially important wildlife and 3) increasing connectivity among fragile wetlands and subtidal lands in south San Diego Bay.

San Diego Bay was historically a shallow water system with significant intertidal habitat. However, decades of dredging and channelization have resulted in a loss of over 90% of all intertidal habitats since the late 1800s. At the same time, total wetland area has also declined by over 70%, with additional losses anticipated as a result of climate change-driven sea level rise and tidal inundation.

Shoreline armoring, the dominant shoreline treatment in San Diego Bay, continues to exacerbate this trend of wetland loss, causing increased rates of erosion on armor-adjacent lands, preventing natural shoreline processes and sediment flows, and providing little to no functional habitat for aquatic species. The loss of shallow water and salt marsh habitats has increased the vulnerability of the Bay's shoreline communities to extreme weather events and flooding. Protection of the Bay's remaining marsh interface areas is essential if healthy ecosystems and coastal infrastructure are to be sustained. Today, with climate change and sea level rise further threatening San Diego Bay's ecological and economic resources, sustainable shoreline protection strategies must be developed to promote the resilience of the Bay's marshland habitats and fisheries to increased temperatures, weather extremes, and rising waters.

Living shorelines present a resilient and long-term structural response to these concerns, providing an ecologically stable alternative to the destructive effects of shoreline armoring. Construction of a living shoreline in the form of a native oyster reef can help serve as a natural levee, reducing wind wave and boat wake energy along marsh shorelines while simultaneously restoring ecological functions to the estuarine system. This small-scale living shoreline demonstration project will increase understanding of how living shorelines can help promote wetland accretion in the face of rising tides while also restoring habitat benefiting numerous aquatic and avian species.

Native Olympia oysters (*Ostrea lurida*) are particularly well suited for use in construction of a living shoreline project in the Bay as they were a dominant native species until the early 1900s when their populations declined due to over-harvesting, pollution, and loss of wetlands. Since there is still a viable native oyster stock still existing in the Bay, providing hard substrate will allow oysters to establish reef populations. As critical building blocks to the benthic community, oysters act as ecosystem engineers, providing structurally complex habitat in which invertebrates and small fish can grow while hiding from predators. Oyster reefs also serve as a food source to fish, ducks, and other invertebrates.

Creation of a living shoreline that utilizes native oyster reef components will provide multiple ecosystem benefits while also increasing the resiliency of the region's coastal salt marsh and shoreline infrastructure to projected climate change impacts. Building off the lessons learned from the Conservancy's San Francisco Bay Living Shorelines Project, this project will serve as an innovative demonstration project for the San Diego region. As such, it shall provide vital data and improve understanding of the creation and use of living shorelines as a structural response to climate change.

With the proposed funding, the San Diego Unified Port District will install oyster reef elements across 2.5 acres of subtidal and intertidal wetland habitat at the Chula Vista Wildlife Reserve. The oyster reef elements, also called "reef balls", will be made of cement, aggregate rock, and oyster shell. Reef balls provide hard substrate necessary for natural native oyster settlement.

Oyster shell is added to the mix to increase rugosity, i.e. structural complexity of the reef ball surface to further facilitate native oyster establishment. Approximately 360 reef balls will be installed across the 10 acres of mudflat at two tidal elevations to analyze the impact of tidal height on native versus invasive species establishment. The project was designed to maximize reduction of wave energy with waves encountering multiple reef elements from two predominant wave directions over the full width of the project area, which will reduce wave height at the shoreline and promote sediment accretion.

With the proposed funding, the Port will also implement a 5-year monitoring plan to determine success in terms of the project's biological and physical goals. For the restoration, the monitoring plan will focus on benefits to algae, invertebrates, submerged aquatic vegetation, fish, and birds. For the physical goals, the monitoring plan will analyze wave attenuation, sediment accretion, shoreline progradation/erosion, and water quality. Beyond the 5-year period, the Port will include the restored oyster reef within the physical extent of the Port's eelgrass survey monitoring that is conducted every three to five years as well as the Port's fish monitoring program every five years.

Site Description: The project covers 2.5 acres of oyster reef habitat spread across 10 acres of intertidal zone (i.e. mudflats) adjacent to the Chula Vista Wildlife Reserve in south San Diego Bay. The site was selected from among several possible sites in south San Diego Bay through analysis of wave energy, proximity to high functioning natural salt marsh, and other considerations assessed during development of the San Diego Bay Native Oyster Restoration Plan (Merkel and Associates, 2015).

The project is located entirely on the San Diego Unified Port District (hereafter Port) tidelands. This site placement on lands within the Port's jurisdiction assures that attention to the integrity of the project shall be sustained over the long term.

Grant Applicant Qualifications: This project is the result of six years of collaboration between federal, state, local and academic partners united by a shared interest in addressing climate change and shoreline protection in San Diego Bay through alternatives to harmful shoreline armoring practices. The Port has played a lead role in this collaboration by hiring and managing all pre-construction studies and surveys, facilitating agency coordination meetings, and finalizing all the project's permitting requirements. With the Port's leadership, the partners worked together to move the idea of restoring San Diego Bay's native oysters within a living shoreline demonstration project from concept to implementation-ready project.

In 2013, the Coastal Conservancy (funded through a NOAA grant) and the Port awarded a grant to the Southwest Wetlands Interpretive Association (hereafter SWIA) to develop the San Diego Bay Native Oyster Restoration Plan ("the Conceptual Plan") (Merkel and Associates, 2015). The Conceptual Plan included native oyster population surveys in San Diego Bay, wave and current modeling, restoration site feasibility analysis, and design of scientific monitoring protocols necessary to guide a multi-year restoration and scientific study effort.

In 2016, the Coastal Conservancy and the Port awarded a grant to SWIA to develop the San Diego Bay Native Oyster Restoration Project Basis of Design (Merkel and Associates, 2018) and

to complete the final designs for implementation. This planning effort led directly to this current phase of the project.

CONSISTENCY WITH CONSERVANCY'S PROJECT SELECTION CRITERIA & GUIDELINES:

The proposed project is consistent with the Conservancy's Project Selection Criteria and Guidelines, last updated on October 2, 2014, in the following respects:

Required Criteria

1. **Promotion of the Conservancy's statutory programs and purposes:** See the "Consistency with Conservancy's Enabling Legislation" section below.
2. **Consistency with purposes of the funding source:** See the "Project Financing" section below.
3. **Promotion and implementation of state plans and policies:**

California Department of Fish and Wildlife State Wildlife Action Plan 2015 Update: The California Department of Fish and Wildlife's State Wildlife Action Plan (SWAP) provides an ecosystem approach for conserving fish and wildlife resources by identifying strategies to improve conditions of Species of Greatest Conservation Need and the habitats upon which they depend. SWAP 2015 is focused on conservation of the wildlife resources of the nation's most biologically diverse state using an approach that is in harmony with a growing human population and the need for resilience in the face of a changing climate.

The project aligns with the Conservation Targets and Strategies for the Marine Province by "increasing native oyster populations... as indicators of improved community structure in embayments, estuaries, and lagoons ecosystems," in addition to creating lasting shoreline resilience for predicted sea level rise in the San Diego Region.

California Water Action Plan (CNRA, CDFW and CalEPA, 2014), Action 4: Protect and restore important ecosystems. Construction of a native oyster reef living shoreline implements this Action by restoring ecologically vital native oyster habitat that provides a myriad of ecological benefits including creation of complex benthic structure, forage opportunities for aquatic and avian species, and structural protection of adjacent native salt marsh habitat.

Integrated Natural Resources Management Plan (INRMP) for San Diego Bay: The INRMP for San Diego Bay was updated in 2011 by the Port and the U.S. Navy, and groups its detailed implementation recommendations under seven core initiatives. One of the INRMP Initiatives seven cores is "sustainability by design", which seeks to maintain the SDUPD's and the Navy's assets as well as the natural resources of the Bay in the face of anticipated climate change and sea level rise. This initiative directly relates to a second core initiative of "habitat enhancement of shoreline structures", which calls for construction of shoreline structures, such as this oyster restoration project, that will achieve multiple objectives including shore stabilization, providing native habitat, contributing to sustainability of the Bay's natural resources, and accommodating expected sea level rise. San Diego Bay's INRMP identifies improvement of habitat values of

shoreline infrastructure to be among the top nine priority projects for implementation. Elsewhere in the INRMP, objectives are established for protecting existing coastal wetlands and expanding these resources where possible.

4. **Support of the public:** This project enjoys strong support from partners in federal and state agencies, the academic community, regional government, the non-profit sector, and elected officials. See Exhibit 3 for project support letters.
5. **Location:** See the “Project Summary”.
6. **Need:** This project would not occur without Conservancy participation and funding.
7. **Greater-than-local interest:** The California Coastal Commission’s 2018 Sea Level Rise Guidance calls for the use of non-armored shoreline management approaches in the future. This project would serve as a valuable demonstration project for the region and provide a learning experience to guide future living shoreline projects’ development.
8. **Sea level rise vulnerability:** The project is testing an innovative and adaptive response to sea level rise vulnerabilities. Creating a living shoreline oyster reef in south San Diego Bay would help slow sea level rise-driven shoreline erosion by reducing erosive wave energy and promoting natural sediment accretion in adjacent areas of existing coastal salt marsh. As oysters thrive at a wide range of tidal depths, the initial planted population should be able to shift inland as wetlands migrate due to sea level rise.

Additional Criteria

9. **Urgency:** Loss of shallow water and salt marsh habitats has increased the vulnerability of the Bay’s aquatic communities as well as the vulnerability of inshore areas to extreme weather events and increase risk of flooding. Protection of the Bay’s shoreline is essential if healthy habitats and coastal infrastructure are to be sustained.
10. **Resolution of more than one issue:** Creation of a living shoreline in south San Diego Bay will provide valuable habitat to native species, protect fragmented salt marsh habitat that is vulnerable to climate change impacts, help protect coastal infrastructure that relies on existing marsh for buffering from floods, and provide an educational opportunity on nonarmored shoreline management solutions for the southern California region.
11. **Leverage:** See the “Project Financing” section below.
12. **Innovation:** Living shorelines projects, such as the one proposed, present an innovative long-term, non-armored structural sea level rise adaptation strategy. Native oyster restoration and creation of living shoreline as proposed by this project is a highly innovative, ecologically based approach to addressing sea level rise in Southern California.
13. **Readiness:** The grantee is ready to begin working on the specific tasks defined under this grant as soon as the funding is approved. Permit applications have been submitted and final designs will be completed by April 2021.
14. **Realization of prior Conservancy goals:** “See Project Summary.”
15. **Return to Conservancy:** See the “Project Financing” section below.

16. **Cooperation:** The Southwest Wetlands Interpretive Association, San Diego Unified Port District, U.S. Fish and Wildlife Service, and CA State Fullerton cooperated on the development of this project over the past six years and will continue to work together throughout implementation of the project.
17. **Vulnerability from climate change impacts other than sea level rise:** Oysters are adapted to a broad range of salinity, depth, and water temperature, and so are naturally resilient to many of the environmental shifts that may be associated with predicted climate change.
18. **Minimization of greenhouse gas emissions:** The project will consider measures during the final design planning process to minimize emissions throughout implementation of the project. These measures will be considered and applied as possible: a) work to be undertaken by local staff, contractors and grantees; b) use of recommended regional construction best management practices; and c) use of materials and equipment for the project that are purchased from local vendors, where feasible.

PROJECT FINANCING

USFWS NCWC (via a grant to the Conservancy)	\$890,000
San Diego Unified Port District	\$65,000
Ca State University at Fullerton	\$1,400
Project Total	\$956,400

The source of funding for the proposed authorization is a USFWS National Coastal Wetlands Conservation Grant awarded to the Conservancy. The USFWS has awarded \$960,533 to the Conservancy to support the project. Approximately \$890,000 of the NCWC grant will support project implementation directly, while the remaining \$70,533 will pay for Conservancy staff costs.

The Port, California State University at Fullerton, Southwest Wetlands Interpretive Association, and the Living Coast Discovery Center will also provide significant in-kind contributions of staff time, valued at seventy-two thousand eight hundred twenty-four dollars (\$72,824).

NCWC grants require a non-federal match of at least 25%. The aforementioned matching funds from the Port and Cal State Fullerton along with the Conservancy's previously authorized grants for designs, studies, engineering, and permitting meet the match requirements. Specifically, the Conservancy granted \$198,368 to Southwest Wetlands Interpretive Association for studies, designs and engineering to support the project at its January 28, 2016 meeting, and the Conservancy augmented that grant by \$86,500 at its September 3, 2020 meeting. The source of the first grant was a 2015-2016 fiscal-year appropriation from the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1, codified at Water Code section 79700 et seq). The source of the funding for the augmentation was an appropriation to the Conservancy from the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Proposition 84, Public Resources Code sections 75001 et

seq.).

The Port and CA State Fullerton will be providing an additional \$66,400 of required matching funds.

CONSISTENCY WITH CONSERVANCY'S ENABLING LEGISLATION:

The proposed project would be undertaken pursuant to Chapter 6 of Division 21, Public Resources Code Sections 31252-31270, regarding natural resource enhancement projects. The project will undertake activities necessary for the enhancement of a severely depleted natural resource - oyster beds in San Diego Bay – that have been impacted by indiscriminate dredging and filling, improper location of improvements, and human-induced events, and have suffered the loss of natural values. The Port's work on this project along with federal and regional partners will help to develop innovative sea level rise adaptation strategy of living shorelines, which provide multiple benefits to the intertidal natural resources in San Diego Bay.

The proposed project is located on Port of San Diego managed tidelands within the City of Chula Vista and is subject to the Port's Master Plan (which is certified by the Coastal Commission and serves as the local planning document). Because the proposed project is not described within the Port of San Diego's existing Port Master Plan, a Port Master Plan amendment is required. This amendment will include text changes to the Chula Vista Bayfront Planning District to describe the pilot project and list it as an approved project in the Plan. Before the Port of San Diego can issue a Coastal Development Permit for the proposed project, the amendment must be certified by the Coastal Commission. The Port's Board authorized the amendment process to begin and a draft amendment has been submitted to the Coastal Commission. The amendment is expected to be finished prior to project implementation by summer 2021.

In determining the amount of Conservancy funding for this project, the factors identified in Section 31253 have been considered and applied, as described in detail below, in the "Consistency with Conservancy's Project Selection Criteria & Guidelines" section.

CONSISTENCY WITH CONSERVANCY'S [2018-2022 STRATEGIC PLAN](#) GOAL(S) & OBJECTIVE(S):

On November 30, 2017, the Conservancy adopted an updated Strategic Plan. The project is consistent with the Conservancy's updated 2018-2022 Strategic Plan, as follows:

Consistent with **Goal 6, Objective B** of the Conservancy's 2018-2022 Strategic Plan, the project will restore approximately 2.5 acres of coastal intertidal habitat.

Consistent with **Goal 8, Objective C**, the project will implement an adaptation strategy to address threats to coastal communities and public infrastructure in a way that protects natural resources and provides maximum public benefits.

CEQA COMPLIANCE:

The proposed project is categorically exempt from review under CEQA pursuant to 14 California Code of Regulations Section 15333, Small Habitat Restoration Projects, regarding projects under five acres in size that assure the maintenance, restoration, enhancement, or protection of habitat for fish, plants, or wildlife. The project will result in 2.5 acres of native oyster reef habitat. Upon approval of the project, Conservancy staff will file a Notice of Exemption.