

COASTAL CONSERVANCY

Staff Recommendation  
December 3, 2015

**SAN FRANCISCO BAY LIVING SHORELINES PROJECT**

File No. 10-010-01  
Project Manager: Marilyn Latta

**RECOMMENDED ACTION:** Authorization to disburse up to \$250,000 for one additional year of monitoring at the Living Shorelines Project sites on the San Rafael shoreline (Marin County) and at Eden Landing Ecological Reserve (Alameda County).

**LOCATION:** Two existing sites in San Francisco Bay on the San Rafael Shoreline in Marin County and at Eden Landing Ecological Reserve in Alameda County.

**PROGRAM CATEGORY:** San Francisco Bay Area Conservancy

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**EXHIBITS**

Exhibit 1: [Project Map](#)

Exhibit 2: [March 26, 2015 Staff Recommendation](#)

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**RESOLUTION AND FINDINGS:**

Staff recommends that the State Coastal Conservancy adopt the following resolution pursuant to Sections 31160 through 31165 of the Public Resources Code:

“The State Coastal Conservancy authorizes disbursement of up to \$250,000 (two hundred fifty thousand dollars) to conduct an additional year of monitoring for current Living Shorelines Project demonstration project in San Francisco Bay at the San Rafael Shoreline site in Marin County and at the Eden Landing Ecological Reserve site in Alameda County, subject to the following conditions: :

1. Prior to disbursement of any Conservancy funds for the project, the contactor shall submit for the review and approval of the Conservancy’s Executive Officer a work program, schedule, and budget for the proposed monitoring and the names and qualifications of all contractors and subcontractors that will be retained to complete any portion of the monitoring.
2. In carrying out any monitoring the contractor shall comply with all applicable mitigation and monitoring measures that are that are required by any permit or approval for the project.”

Staff further recommends that the Conservancy adopt the following findings:

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

1. The proposed project remains consistent with Chapter 4.5 of Division 21 of the Public Resources Code, regarding the resource goals of the San Francisco Bay Area Conservancy Program.
2. The proposed project remains consistent with the Project Selection Criteria and Guidelines adopted on October 2, 2014.”

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**PROJECT SUMMARY:**

The multi-habitat Living Shorelines Project (LSP) integrates subtidal habitat restoration of native oyster and native eelgrass beds with designs that test the use of natural structures to buffer and protect adjacent tidal wetland sites, and areas of the San Francisco Bay shoreline vulnerable to sea level rise and shoreline erosion. Since 2010, the Conservancy has previously approved funding for Phase 1 in the cumulative amount of \$1,850,000: \$850,000 of Conservancy funds, \$700,000 of Wildlife Conservation Board (WCB) grant funds to the Conservancy, and \$300,000 of U.S. Environmental Protection Agency (EPA) funds, granted to the Conservancy through the Association of Bay Area Governments (ABAG). See Exhibit 2. These funds have been utilized to conduct planning, site selection, final project and monitoring design, construction of LSP demonstration projects at two sites and three and a half years of post-construction monitoring of those projects. (In addition, the Conservancy has authorized funds, including outside grant funds, for planning Phase 2 at its March 26, 2015 meeting).

As now proposed, the LSP funding will be increased for an additional year of monitoring in 2016. Staff proposes an additional disbursement of up to \$250,000 for ongoing monitoring at the existing LSP locations on the San Rafael Shoreline in Marin County and Eden Landing Ecological Reserve in Alameda County. This monitoring is required by the San Francisco Bay Conservation and Development Commission (BCDC) permit for the project and is essential to evaluating the effectiveness of the pilot Living Shorelines sites prior to construction of larger-scale LSP demonstration projects in San Francisco Bay.

The LSP is being coordinated by the Conservancy, in collaboration with biological and physical scientists at San Francisco State University (SFSU), the University of California at Davis, U.S. Geological Survey (USGS) Western Ecological Research Center, and environmental services consultants, who are retained by the Conservancy to undertake the monitoring.

The original \$1,850,000 authorized for the LSP supported the development of draft and final design documents, permitting, construction, and up to three and a half years of post-construction monitoring. The Conservancy and its collaborators have made significant progress in completing the necessary project tasks. The project design and monitoring program design were completed in January, 2012, and all necessary permits obtained for the project in July, 2012. Construction occurred over a three week period in July-August 2012 at the two pilot sites. Monitoring of oyster and eelgrass success as well as a broad range of ecosystem services and species use monitoring has occurred three times per year over the three and a half years following construction. Preliminary results include the following impressive findings:

1. More than 3.8 million native oysters have settled onto the project-created oyster shell reefs at the San Rafael site, along with bay shrimp, Dungeness crabs, birds, fish, and many other species.
2. April 2015 monitoring data showed that eelgrass shoot densities are at ~120% of planted densities at the San Rafael site, suggesting eelgrass has now been well-established.
3. Fish trapping and fish seining results suggest that eelgrass presence increases the diversity or abundance of fish and invertebrates present on the oyster shell reefs.
4. A wave model was developed to quantify the change in wave energy under varying wave and water level conditions with and without the oyster shell reef. Preliminary results show that while most energy is lost on the mudflats, the reef extracts 30-50% more energy than a mudflat at the same location.

The Conservancy staff has raised a total of \$1,000,000 in outside funds for the LSP project to date and is currently continuing to fundraise for the remainder of project management and monitoring costs beyond this current proposed authorization. The LSP is using new climate adaptation techniques in San Francisco Bay, with the intention of demonstrating their effectiveness. Monitoring is essential to understanding the biological and physical benefits of LSP, so that the approach can be considered and potentially scaled up for other parts of San Francisco Bay and California. The estimate of remaining funds needed in addition to this proposed authorization to complete the fifth and final year of monitoring required by the San Francisco Bay Conservation and Development Commission is approximately \$250,000, and Conservancy staff and project collaborators are submitting a variety of additional grant proposals this year.

**Project History:** As explained in the August 5, 2010, December 2, 2010, March 29, 2012, December 5, 2013, and March 26, 2015 staff recommendations, the LSP is part of a continuing effort by the Conservancy and the Ocean Protection Council (OPC) to promote long-term management and restoration of subtidal habitat, and pilot climate adaptation project approaches, in the San Francisco Bay. In June of 2005, the OPC authorized funds for San Francisco Bay eelgrass and native oyster projects, and in January of 2006, the OPC designated the *San Francisco Bay Subtidal Goals Project* as a high priority for ocean conservation and requested funding by the Conservancy to study and prepare a report identifying threats to the Bay ecosystem, and develop restoration and research priorities. The final report was completed in December of 2010.

The LSP implements specific recommendations in the *Subtidal Habitat Goals Project* (2010), the *San Francisco Baylands Ecosystem Habitat Goals Report* (1999), and recently released *Climate Change Science Update to the San Francisco Baylands Ecosystem Habitat Goals Report* (2015)- which recommends the use of “living shorelines” and nature-based infrastructure techniques to achieve multiple objectives and ecosystem services while protecting shorelines from sea level rise and wave inundation.

The LSP is nationally recognized for this innovative pilot project and results to date. The project team recently received an “Outstanding Environmental Project” award from the San Francisco Estuary Partnership and has been invited to participate in two national book efforts, led by the University of Southern Alabama and by the University of Washington, to assess and compare Living Shorelines approaches in different regions of the U.S. In addition, Project Manager

Marilyn Latta has been invited to participate on the National Steering Committee and as a presenter to share LSP results to date at the National Living Shorelines Summit, hosted by Restore America’s Estuaries on December 1-3, 2015.

**Site Description:**

The initial LSP work has been done at a location along a portion of the San Rafael shoreline on property owned by The Nature Conservancy, and at the Eden Landing Ecological Reserve in Hayward on property owned by the Wildlife Conservation Board. The locations for this work are all in the low intertidal to shallow subtidal habitats, adjacent to and offshore from existing shorelines and tidal marshes. The purpose of this work is to continue testing a combined habitat approach to climate adaptation by restoring habitat features that may enhance and protect adjacent shorelines from sea level rise and other climate changes by providing biological values (feeding, breeding, nesting) as well as physical values (wave attenuation, sediment stabilization).

See the Project Location and Site Map (Exhibit 2) for precise locations.

**PROJECT FINANCING:**

**Funding Sources – Phase 1:**

This authorization:

Conservancy	\$250,000
<b>Subtotal</b>	<b>\$250,000</b>

Previous authorizations:

Conservancy	\$850,000
Association of Bay Area Governments (EPA funds)	\$300,000
Wildlife Conservation Board	<u>\$700,000</u>
<b>Subtotal</b>	<b>\$1,850,000</b>

<b>Total</b>	<b>\$2,100,000</b>
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The anticipated source of Conservancy funds for this grant is the FY 2010 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). This funding source may be used for the protection of beaches, bays and coastal waters, including projects that protect and restore the natural habitat values of coastal waters, pursuant to the Conservancy’s enabling legislation, Division 21 of the Public Resources Code. The proposed project serves to restore the natural habitat values of the San Francisco Bay by bringing back native eelgrass and oyster and associated natural habitats. Moreover, the proposed authorization includes funding specifically for monitoring, which is required as part of any restoration project funded by Proposition 84. In particular, Public Resources Code Section 75005 requires that Proposition 84 restoration projects include the planning, monitoring and reporting necessary to ensure successful implementation of the project objectives. Finally, as discussed below, the project is consistent with Chapter 4.5 of the Conservancy’s enabling legislation.

Proposition 84 also requires for restoration projects that protect natural resources that the Conservancy assess whether the project meets at least one of the criteria specified in Section 75071(a). The proposed restoration satisfies one of the specified criteria: consistent with 75071(a), the project creates subtidal habitat that provides linkages between the open bay and the shoreline.

**CONSISTENCY WITH CONSERVANCY'S ENABLING LEGISLATION:**

As modified by the proposed additional funding, the LSP remains consistent with Chapter 4.5, Sections 31160-31165, of Division 21 of the Public Resources Code regarding resource goals in the San Francisco Bay Area, as discussed in the August 5, 2010, December 2, 2010, March 29, 2012, December 5, 2013, and March 26, 2015 staff recommendations (See Exhibit 2).

Under Section 31162(b), the Conservancy may undertake projects and award grants in the nine-county San Francisco Bay Area to achieve the goal of protecting, restoring and enhancing natural habitats of regional importance. Consistent with this section, the LSP consists of work that will result in sound scientific planning and restoration project implementation to help protect, restore and enhance subtidal habitats in an estuary of regional importance within the Bay Area.

Under Section 31163(a), the Conservancy is required to cooperate with BCDC, other regional government bodies, and other interested parties in identifying and adopting long-term resource goals for San Francisco Bay area. The LSP is part of a program of activities that came about from the collaborative planning of four primary agencies that developed the San Francisco Bay Subtidal Habitat Goals (Conservancy, BCDC, National Oceanic and Atmospheric Association (NOAA), and the San Francisco Estuary Partnership).

The LSP is appropriate for prioritization under the selection criteria set forth in Section 31163(c) in that it: (1) is consistent with 2010 San Francisco Bay Subtidal Habitat Goals report, the 1999 San Francisco Baylands Ecosystem Habitat Goals Report and 2015 Science Update, and the San Francisco Bay Plan ("Bay Plan"), as described below; (2) involves the coordination of environmental solutions across several different agencies and many different jurisdictions within the San Francisco Bay Area; (3) will be implemented in a timely manner; (4) provides opportunities for benefits that could be lost if the project is not implemented quickly enough; and (5) includes matching funds from other sources of funding or assistance.

In addition, under Section 31165, the Conservancy may undertake projects and award grants for activities that are compatible with the preservation, restoration, or enhancement of ocean, coastal and bay resources. The proposed authorization will provide for monitoring that will serve as critical background data for future, large scale Living Shorelines projects for habitat protection, restoration and enhancement projects involving subtidal habitats in the Bay.

**CONSISTENCY WITH CONSERVANCY'S STRATEGIC PLAN GOAL(S) & OBJECTIVE(S):**

Consistent with **Goal 7, Objective D**, the LSP comprises implementation of a climate change adaptation pilot project that will test the role of living shorelines in reducing hazards from sea level rise and extreme storm events, while protecting natural resources and maximizing public benefits.

**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 above.
- 2. Consistency with purposes of the funding source:** See the "Project Financing" section above.
- 3. Promotion and implementation of state plans and policies:** By enhancing native subtidal habitat species, the project serves to promote and implement several statewide plans and policies including:
  - **San Francisco Bay Conservation and Development Commission's (BCDC) San Francisco Bay Plan:** The objectives of the plan are to protect the bay as a great natural resource for the benefit of present and future generations and to develop the bay and its shoreline to its highest potential with a minimum of bay filling. The proposed projects will further the BCDC's objectives by enhancing subtidal habitats for the benefit of multiple species.
  - **San Francisco Bay Subtidal Habitat Goals (2010) and Baylands Ecosystem Habitat Goals (1999) and Science Update (2015):** Both Goals documents recommend the restoration of native cordgrass and subtidal oyster and eelgrass habitats as part of a multi-objective habitat restoration approach to increased wave attenuation, sediment stabilization, and other climate adaptation benefits.
- 4. Support of the public:** The LSP is supported by the NOAA Fisheries Restoration Center, BCDC, San Francisco Bay Joint Venture, and the San Francisco Estuary Partnership. The Project also has broad public support from non-governmental organizations such as The Nature Conservancy and others. See Exhibit 3.
- 5. Location:** The LSP sites are located entirely within the nine counties that make up the San Francisco Bay Area, consistent with Section 31162 of the Public Resources Code.
- 6. Need:** The LSP would not occur without Conservancy participation and prior funding from EPA and WCB.
- 7. Greater-than-local interest:** The LSP will help develop new approaches and new techniques for restoration of subtidal habitats in San Francisco Bay. The techniques and designs resulting from the Project may have applicability at other sites in San Francisco Bay and in other estuarine systems on the Pacific Coast.
- 8. Sea level rise vulnerability:** The LSP helps to improve resiliency of natural habitats, which is one of the overarching recommendations in climate change adaptation planning. The Project itself will not result in increased vulnerability to sea level rise.

**Additional Criteria**

- 9. Urgency:** Without Conservancy involvement and prior EPA and WCB funding, the LSP would not occur at this time in San Francisco Bay.
- 10. Resolution of more than one issue:** The LSP implements subtidal habitat restoration designs, tests pilot climate change adaptation techniques, and will result in lessons learned that can be applied to additional sites.
- 11. Leverage:** The prior EPA and WCB grants help cover Conservancy staff time, maximizing leverage of staff resources.
- 12. Conflict Resolution:** The LSP involves multiple stakeholders with diverse views, and includes testing of ecosystem services that helps to address data gaps in subtidal restoration and in climate change adaptation planning.
- 13. Innovation:** The LSP is implementing recommendations in the San Francisco Bay Subtidal Habitat Goals Report and continues to build on new, innovative techniques with the San Francisco Bay Living Shorelines Project for restoration of subtidal habitats.
- 14. Readiness:** The LSP is ready to commence upon approval of disbursement of funding by the Conservancy.
- 15. Realization of prior Conservancy goals:** See “Project History” section above.
- 16. Cooperation:** The LSP is a collaborative project involving many agencies. The Conservancy is the lead agency, and supporting partners include The Nature Conservancy, the Wildlife Conservation Board, San Francisco State University, University of California at Davis, United States Geological Survey, and many others.
- 17. Minimization of Greenhouse Gas Emissions** The LSP incorporates measures to minimize emissions throughout implementation of the project. Work is completed by local staff, contractors, grantees, and community volunteers that live in close proximity to the project locations. Recommended regional construction best management practices have been followed. Materials and equipment used for the project has been purchased by local vendors where feasible.

**CONSISTENCY WITH SAN FRANCISCO BAY PLAN:**

The San Francisco Bay Plan (“Bay Plan”) was completed and adopted by BCDC in 1968 pursuant to the McAteer-Petris Act of 1965 and last amended in October 2011. The Bay Plan guides BCDC’s management and permitting decisions in the Bay. The Project is consistent with the following policies articulated in Part III, Findings and Policy Section of the Bay Plan:

Subtidal Areas Policy 5 (adopted April 2002): “The [BCDC] should continue to support and encourage expansion of scientific information on the Bay’s subtidal areas, including: (a) inventory and description of the Bay’s subtidal areas; (b) the relationship between the Bay’s physical regime and biological populations; ... (e) where and how restoration should occur.”

The LSP will assist in implementation of this policy by providing additional data on best techniques for restoration at a specific site, describe the densities, locations, and species

associated with subtidal habitats at that site, and conduct five years of monitoring after construction.

Fish, Other Aquatic Organisms and Wildlife Policy 1 (amended April 2002): “To assure the benefits of fish, other aquatic organisms and wildlife for future generations, to the greatest extent feasible, the Bay's tidal marshes, tidal flats, and subtidal habitat should be conserved, restored and increased.”

The LSP is consistent with this policy because it will restore and increase subtidal habitat in San Francisco Bay.

**COMPLIANCE WITH CEQA:**

The modified LSP remains categorically exempt from the provisions of the California Environmental Quality Act (CEQA), for the reasons described in the earlier staff recommendations (See Exhibit 2). In particular, the proposed authorization is categorically exempt from review under CEQA pursuant to 14 California Code of Regulations Section 15306, which exempts projects that involve basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. The LSP projects have been designed as an experimental study to research the most effective subtidal restoration techniques and timing for oyster and eelgrass restoration that may be applied to larger future projects in San Francisco Bay. Monitoring activities will entail studies of birds, fish, invertebrates, eelgrass, water quality, and changes in wave energy.

Conservancy staff will file a Notice of Exemption upon approval of the proposed authorization.