

COASTAL CONSERVANCY

Staff Recommendation  
November 10, 2011

**UPPER NEWPORT BAY EELGRASS RESTORATION PROJECT**

Project No. 11-057-01  
Project Manager: Megan Cooper

**RECOMMENDED ACTION:** Authorization to disburse up to \$156,000 to Orange County Coastkeeper to conduct eelgrass restoration in the Upper Newport Bay Ecological Reserve, Orange County.

**LOCATION:** City of Newport Beach, County of Orange

**PROGRAM CATEGORY:** Resource Enhancement

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**EXHIBITS**

Exhibit 1: [Project Location and Site Maps](#)

Exhibit 2: [Photos of Restoration Techniques](#)

Exhibit 3: [Project Support Letters](#)

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**RESOLUTION AND FINDINGS:**

Staff recommends that the State Coastal Conservancy adopt the following resolution pursuant to Sections 31251-31270 of the Public Resources Code:

“The State Coastal Conservancy hereby authorizes the disbursement of an amount not to exceed one hundred fifty-six thousand dollars (\$156,000) to Orange County Coastkeeper to conduct eelgrass restoration in the Upper Newport Bay Ecological Reserve. This authorization is subject to the condition that, prior to the disbursement of any funds, Coastkeeper shall submit for the review and written approval of the Conservancy’s Executive Officer a work program, budget, schedule, and the names of any contractors to be employed in carrying out the work.”

Staff further recommends that the Conservancy adopt the following findings:

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

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

3. Orange County Coastkeeper is a nonprofit organization existing under Section 501(c)(3) of the United States Internal Revenue Code and whose purposes are consistent with Division 21 of the Public Resources Code.”
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### PROJECT SUMMARY:

Staff recommends that the Conservancy authorize disbursement of up to \$156,000 to Orange County Coastkeeper (“OC Coastkeeper”) for the Upper Newport Bay Eelgrass Restoration Project (“Project”). The Project will restore approximately one acre of eelgrass, explore new eelgrass restoration techniques for Newport Bay, monitor restoration success and include community education.

Eelgrass (*Zostera marina*) is one of 60 species of seagrass, a unique group of aquatic flowering plants that grows fully submersed in shallow coastal waters worldwide. Eelgrass meadows provide many important ecological services, including habitat and foraging grounds for many invertebrate, fish, and bird species; nutrient cycling; carbon sequestration; sediment stabilization; and water quality improvement. Several studies of eelgrass in Southern California have found that the diversity and abundance of marine life is increased within eelgrass beds in comparison to unvegetated soft bottom habitat. Eelgrass in Newport Bay has been an important component of the estuary ecosystem dating back to 600 A.D. (Wiede 1981). Over the last 40 years, however, eelgrass habitat, especially in the Upper Newport Bay Ecological Reserve (“the Reserve”) (Exhibit 1), has undergone dramatic declines due to increased urban runoff and coastal development activities. Eelgrass has high light requirements and decreased light availability has been a consistent problem in Newport Bay as a result of increased water turbidity from sediment inputs and the persistence of harmful algal blooms resulting from excess nutrients. These stressors have most likely been the cause of the decline of eelgrass habitat in the Reserve. As water quality and clarity have improved in recent years due to increased regulation of sediments and nutrients entering Newport Bay and a large ecosystem restoration project that has recently been completed, it is a prudent time to restore eelgrass in the Reserve.

The Project will restore eelgrass adjacent to the newly restored habitat in the Reserve using innovative restoration methods that have not yet been tested in Newport Bay. The Project will evaluate the environmental factors that contribute to eelgrass growth and survival in this area where eelgrass has not been restored before, and evaluate methods of restoration that will help inform management and future restoration projects.

The OC Coastkeeper will implement the following three methods of eelgrass restoration (Exhibit 2):

1. Transplanting Eelgrass Remotely with Frames (TERFS) – Shoots (turions) from mature plants will be collected, attached to frames with dissolving paper ties, and deployed for approximately six weeks until the eelgrass takes root and the frames can be removed permanently. The frames are used to prevent erosion around the transplants, help the plants stay in place, and also minimize dive time. TERFS plots will consist of approximately 25 evenly spaced frames, each holding approximately 80 shoots. TERFS

frames may be placed at the restoration site by divers, snorkelers, or they may be lowered over the side of a boat.

2. Buoy-Deployed Seeding (BuDS) – Seeding will be accomplished using buoys filled with fertilized eelgrass flowers containing seeds. Each buoy consists of a heavy anchor (concrete or clay brick) and a buoy, which will suspend a small mesh bag at the surface holding up to 100 flowering shoots. Seeds will be released through the mesh bag and deposited in the surrounding sediment. Eelgrass seeds and flowers will be hand-picked by divers so as not to remove any whole plants. Replicate bags taken from each collection site within the donor area will be taken to estimate mean viable seed yield per bag. The BuDS buoys will be deployed for up to six weeks, or until the majority of seeds have been released through the mesh.
3. Diver transplant (DT) – Shoots (turions) from mature plants will be collected by divers, bundled into planting units of 10-12 shoots, and planted by divers in the sediment in one-meter increments. The diver transplant is the only method that has been used in Newport Bay.

The Project site will contain three experimental plots. Each plot will consist of approximately 20 BuDS buoys covering a total area of 100 square meters, 25 TERFS frames covering 50 square meters, and 50 diver transplant planting units covering 50 square meters (Exhibit 1, Figure 2). There will be a 50-meter buffer in between each method within a plot and at least 100 meters in between plots. Eelgrass will be planted/seeded between 0 ft and -3 ft mean lower low water (MLLW). The lower depth limit of eelgrass in the restoration area is -6 ft MLLW but to address possible effects of climate change and lower light transmittance characteristic of this area, eelgrass planting will be limited to the upper depth limits.

Donor material will be collected from established eelgrass sites in Newport Harbor approximately 600 meters south of the southernmost transplant site and outside of the Reserve boundaries (Exhibit 1, Figure 3). Donor beds were chosen because the eelgrass growing in these beds is physically similar to eelgrass at the restoration sites and because environmental characteristics and eelgrass growth patterns are similar between the donor beds and the restoration sites. Donor material will be taken based upon the guidelines outlined in the Southern California Eelgrass Mitigation Policy, which states, “No more than 10 percent of an existing bed shall be harvested for transplanting purposes.”

The Project duration will be four years. In year one, the OC Coastkeeper will plant one test plot with the three restoration techniques. Following year one the test plot will be monitored and the success of each restoration technique will be assessed. In year two, the OC Coastkeeper will plant the remaining two test plots using the most successful restoration technique from year one. Success monitoring for all three plots will occur in years three and four.

Monitoring criteria to measure success of transplants are directly related to primary production and use of eelgrass as habitat and foraging grounds and will include multiple indicators of habitat structural and functional parameters. Eelgrass surveys will be performed quarterly for the first two years and biannually for years 3 and 4 and will measure the following parameters:

1. Percent survival of original transplants in restored beds for the first year (for diver transplants and TERFS)
2. Seedling abundance and distribution in restored areas using the BuDS method in the first year of original dispersal in restored beds.
3. Percent areal cover and density of donor and restored eelgrass beds once beds become established (years 2 – 4).

Eelgrass growth and long-term health is heavily dependent upon underwater light availability and water quality. Therefore, multiple measurements of light and water quality parameters will be measured throughout the project at four water quality monitoring stations throughout the Project area (Exhibit 1, Figure 3). Light and temperature data will be collected at the surface and at eelgrass depth in month-long intervals each quarter throughout the project. These light measurements, taken continually while the sensors are deployed, will allow for a measurement of light penetration at the restoration site, which is critical for assessing growth conditions for eelgrass. In addition to the light penetration measurements, water quality data will be collected monthly from the same monitoring stations to characterize the conditions of the restoration site and allow for comparison to other healthy eelgrass beds. Water quality measurements will include salinity, temperature, dissolved oxygen, light availability, and turbidity.

One of the ecological goals of this project is to restore essential fish habitat for the numerous species of fish found in the Reserve, with the intent of increasing their diversity and abundance. To estimate fish diversity and abundance, the grantee will make incidental observations within the restoration area of the number and species of fish observed during regular eelgrass surveys and use cameras to make additional observations. In addition to incidental observations, trends in fish communities may be observed during the regular bottom trawls and beach seines performed as a part of the Back Bay Science Center's monthly Marine Life Inventory.

In addition to restoring important eelgrass habitat in the Reserve, this project will also educate the public and the restoration community about eelgrass and eelgrass restoration techniques. Restoration activities will involve volunteers, including interns from the University of California, and volunteer divers from the Back Bay Science Center. The Project will also become part of on-going eelgrass educational program for high school students at the Back Bay Science Center. OC Coastkeeper will publish the results of this study in a peer-reviewed journal, will create an informational page on their website to provide information and reports and the project, will produce outreach materials for the community at large, and will present the results of the study at conferences to share the information with the scientific community and resource and regulatory agencies. An additional public benefit of the project will be realized through exploring the use of innovative restoration techniques that could allow greater participation by volunteers in future eelgrass restoration projects.

The final goal of the Project is to establish and enhance healthy eelgrass beds in Newport Bay so that they may be able to withstand predicted future effects of global climate change. Climate change may impact eelgrass populations, but the design of the Project has considered factors that may help eelgrass populations in the future. To address sea level rise, transplant depths will be limited to the upper limits of eelgrass growth and the restoration site have ample tidal mudflat in the upper depths to allow the eelgrass to grow shoreward. The restored eelgrass beds may be

able to withstand increases in sea surface temperatures because eelgrass in Newport Bay and other Southern California waters can withstand large ranges in temperatures and can tolerate temperatures up to 21°C for long periods of time. If necessary, eelgrass will shed its leaves and rely on energy stored in its rhizomes to sustain it until temperatures cool. Because eelgrass helps stabilize sediments, restored beds could help slow shoreline erosion as sea levels rise. And finally, the project aims to speed up natural recolonization and growth of eelgrass in the Reserve, creating larger beds that may be able to withstand extreme short-term weather and long-term climate events. While the Project area is small, it has the potential to establish a founder population capable of naturally colonizing additional areas because the dispersal distance for eelgrass is one of the highest for all angiosperms (flowering plants). By establishing a larger seed bank in Newport Bay the eelgrass populations might be able to recover following periods detrimental to eelgrass survival. In addition, the use of seeds and mature plants from various donor populations in the Bay may help increase diversity of donor genotypes within restoration sites, increasing resistance to disturbance.

Orange County Coastkeeper's mission is to protect and preserve the region's marine habitats through education, advocacy, restoration, research, and enforcement. Since its founding in 1999, OC Coastkeeper has been involved in and spearheaded multiple restoration projects. In 2004, OC Coastkeeper worked in partnership with the Army Corps of Engineers, the City of Newport Beach, and the Orange County Conservation Corps on an eelgrass restoration project with the purpose of determining those areas of Newport Bay suitable for future restoration and mitigation projects. In 2001, OC Coastkeeper formed a team to conduct bay-wide surveys for the invasive alga *Caulerpa taxifolia*. From 1999 to 2005 OC Coastkeeper initiated a collaborative project with the California Coastkeeper Alliance to restore kelp in Orange County, which involved classroom education and volunteer divers.

### **Site Description:**

The Upper Newport Bay Ecological Reserve (soon to be State Marine Conservation Area) is one of the last remaining coastal wetlands in Southern California and is home to over 935 species of plants and animals and over 200 bird species, including several endangered species. Visitors and locals come to the Reserve to hike, run, bike, kayak, boat, fish, or watch the thousands to tens of thousands of birds that inhabit the area during breeding, migration, or wintering seasons.

Approximately ten acres of intertidal and shallow subtidal potential eelgrass habitat (defined as habitat suitable for eelgrass growth that is currently unvegetated) is present in the Reserve. The restoration site at DeAnza Peninsula (Exhibit 1) was selected as the site with the greatest potential for restoration success based upon the historical (and current) presence of eelgrass, abiotic and biotic conditions, good tidal flushing, and historical water quality data. Little aquatic vegetation exists within the project site other than various species of algae and several small eelgrass patches along the northern main channel side of the peninsula. Adjacent to the site there is coastal salt marsh habitat.

### **Project History:**

The Project was added to the Southern California Wetlands Recovery Project Work Plan on October 6, 2010. The Work Plan provides a prioritized list of wetland and marine restoration

projects for southern California that have been vetted by a panel of 19 resource and regulatory agencies.

**PROJECT FINANCING**

<u>Coastal Conservancy</u>	156,000
<b>Total Project Costs</b>	156,000

The anticipated source of Conservancy funds is a grant awarded to the Conservancy in 2010 from the NOAA Coastal and Marine Habitat Restoration National and Regional Partnership Grant Program. The funds from this Partnership program are dedicated to implementing qualified restoration projects listed on the Work Plan of the Southern California Wetlands Recovery Project that specifically protect and enhance NOAA Trust Resources. As noted in the Project History section, the proposed Project is on the Recovery Project’s Work Plan. Restoration projects to be funded with these monies should “contribute to the return of degraded or altered marine, estuarine, coastal and freshwater. . .fish habitats to a close approximation of their condition prior to disturbance” and are expected to have “strong on-the-ground habitat restoration components that provide educational and social benefits for communities, in addition to long-term ecological habitat improvements for NOAA trust resources.” The Project will restore eelgrass, a NOAA Trust Resource, which will provide essential fish habitat for other NOAA Trust Resources, such as California halibut (*Paralichthys californicus*), through on-the-ground restoration that includes educational components. As discussed below the project is consistent with Chapter 6 of Division 21, Pub. Res. Code.

The project will provide approximately \$31,000 of in-kind services. The majority of in-kind funding will include volunteer hours for data management, restoration project preparation, and technical advice. In-kind services will also consist of donated supplies and laboratory equipment.

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

This project will be undertaken pursuant to Chapter 6 of Division 21 of the Public Resources Code (Sections 31251-31270) regarding coastal resource enhancement projects. Consistent with Section 31251, the proposed authorization will award a grant to a nonprofit organization to enhance coastal resources that have become degraded due to natural and human-induced events. The proposed project will restore the natural character of eelgrass beds in Newport Bay by re-establishing populations that existed before they were impacted by poor water quality and habitat degradation.

Section 31252 states that all areas proposed for resource enhancement shall be identified in a certified local coastal plan or program as requiring public action to resolve existing or potential resource protection problems. Although the City of Newport Beach does not have a certified Local Coastal Program, they do have a coastal land use plan and an approved local issue identification and work program. The proposed project is consistent this plan, as described in the “Consistency with Local Coastal Plan” section, below.

Consistent with Section 31253, staff has determined the recommended amount of funding by evaluating the total amount of funding available to the Conservancy for coastal resource enhancement projects, the fiscal resources of the applicant, the urgency of the project relative to other eligible similar projects, and the application of other factors prescribed by the Conservancy for the purpose of determining project eligibility and priority. The Conservancy's funding is appropriate because the Project's benefits to coastal habitat are significant, the funding source is dedicated to the restoration of NOAA Trust Resources, and the Project's use of volunteers will provide added cost savings and an important public education component.

**CONSISTENCY WITH CONSERVANCY'S 2007 STRATEGIC PLAN GOAL(S) & OBJECTIVE(S):**

Consistent with **Goal 5, Objective B** of the Conservancy's 2007 Strategic Plan, the proposed project will restore approximately one acre of eelgrass habitat.

**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 June 4, 2009, 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. **Support of the public:** The project is supported by the City of Newport Beach, an elected official, resource agencies, and an academic institution (see Exhibit 3).
4. **Location:** The proposed project would be located within the coastal zone of the City of Newport Beach, County of Orange.
5. **Need:** The project will not proceed in the 2012 eelgrass growing season without Conservancy funding because additional funding sources are not available.
6. **Greater-than-local interest:** The project will restore eelgrass, an Environmentally Sensitive Habitat Area recognized by the Coastal Commission as a resource of statewide importance and a NOAA Trust Resource of nationwide importance. Greater coverage of eelgrass in Newport Bay will increase foraging area for migratory birds and nursery habitat for commercially and recreationally important fish.
7. **Sea level rise vulnerability:** To address predicted sea level rise, eelgrass transplant depths will be limited to 0.0ft to -3ft mean lower low water rather than planting to the extent of potential habitat (-6ft mean lower low water). In addition, all sites have ample tidal mudflat at these depths to grow shoreward. Sea level rise may also have the effect of improving tidal

flushing in Newport Bay and creating suitable habitat where none existed before, allowing eelgrass to expand its distribution shoreward.

**Additional Criteria**

8. **Urgency:** OC Coastkeeper would like to implement the project during the 2012 eelgrass growth season, which begins in March.
12. **Innovation:** The Project will assess two eelgrass restoration techniques which have never been used in Newport Bay. These innovative techniques could allow greater participation by volunteers in future eelgrass restoration projects.
13. **Readiness:** The Project will be considered by the Coastal Commission at its November 2011 hearing and, following that, OC Coastkeeper will have all necessary permits and will be ready to start the project in March 2012.
14. **Realization of prior Conservancy goals:** See “Project History” above.”
16. **Cooperation:** Multiple volunteers from the public, academic institutions and consulting companies will contribute to the Project.
17. **Vulnerability from climate change impacts other than sea level rise:** See “Project Summary” above.
18. **Minimization of greenhouse gas emissions:** Greenhouse gas emissions from the Project may result from boat engines engaged in restoration. Boat use shall be minimized when possible.

**CONSISTENCY WITH LOCAL COASTAL PROGRAM POLICIES:**

The City of Newport Beach does not have a certified Local Coastal Program (LCP) but it does have a Coastal Land Use Plan (“LUP”) and, consistent with Section 31109 of the Public Resources Code, a local issue identification and work program that have been approved by the Coastal Commission. This LUP contains the following two policies that relate to restoration in Newport Bay:

Policy 4.1.4-1 states: Continue to protect eelgrass meadows for their important ecological function as a nursery and foraging habitat within the Newport Bay ecosystem.

Policy 4.1.4-2 states: Implement eelgrass restoration and enhancement programs in Newport Harbor.

Although discussion of eelgrass restoration in the LUP is specific to Newport Harbor, the Project is consistent with the LUP policy to protect eelgrass as it will increase the seed bank in Newport Bay and will provide information for future restoration projects.

**COMPLIANCE WITH CEQA:**

The proposed project is categorically exempt from review under the California Environmental Quality Act (CEQA). Pursuant to 14 Cal. Code of Regulations Section 15304(d), projects involving minor alterations in land, water, and vegetation on existing officially designated wildlife management areas or fish production facilities which result in improvement of habitat for fish and wildlife resources or greater fish production are categorically exempt. The Project involves eelgrass restoration at the Upper Newport Bay Ecological Reserve, which will result in improved habitat for fish and other wildlife. Staff will file a Notice of Exemption upon approval.