

CALIFORNIA OCEAN PROTECTION COUNCIL

Staff Recommendation  
June 29, 2016

**Cardiff Beach Living Shoreline Project**

Chris Potter, Program Manager

**RECOMMENDED ACTION:** Authorization to disburse up to \$2,195,932 to the State Coastal Conservancy to restore approximately five acres of dune habitat and widen the beach at Cardiff State Beach, and adoption of findings under the California Environmental Quality Act.

**LOCATION:** The project is located San Diego County in the City of Encinitas at Cardiff State Beach.

**STRATEGIC PLAN OBJECTIVE(S):** Area D: Coastal and Ocean Impacts from Land; Issue 9: Downstream Impacts.

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**EXHIBITS**

Exhibit A: Project Location and Site Map

Exhibit B: Site images

Exhibit C: Letters of support

Exhibit D: Initial Study Mitigated Negative Declaration, March 2016

Exhibit E: Draft Notice of Determination for Ocean Protection Council potential action

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**RESOLUTION AND FINDINGS:**

Staff recommends that the Ocean Protection Council (OPC) adopt the following findings: “Based on the accompanying staff report and attached exhibits, the Ocean Protection Council hereby finds that:

- 1) The proposed projects are consistent with the purposes of Division 26.5 of the Public Resources Code, the Ocean Protection Act.
- 2) The proposed projects are consistent with the Ocean Protection Council's Proposition 1 grant guidelines (adopted September 2015).
- 3) The Ocean Protection Council has reviewed the Final Mitigated Negative Declaration, adopted by the California Department of Parks and Recreation on March 23, 2016 pursuant to the California Environmental Quality Act and attached to the accompanying

staff recommendation as Exhibit D, and delegates to staff the ability to file a notice of determination consistent with these findings.”

Staff further recommends that the OPC adopt the following resolution pursuant to Sections 35500 *et seq.* of the Public Resources Code:

“The California Ocean Protection Council hereby approves the disbursement of up to \$2,195,932 to the State Coastal Conservancy to restore approximately five acres of dune habitat and widen the beach at Cardiff State Beach.

Prior to the disbursement of any funds, the State Coastal Conservancy shall submit for the review and written approval of the OPC’s Executive Director the following:

- 1) A detailed work program, including budget, schedule and list of contractors to be retained for the project;
- 2) Evidence that all necessary permits and approvals have been obtained;
- 3) A plan to create signage to acknowledge OPC and Proposition 1 funding; and
- 4) A legally-enforceable agreement between the property owner(s) and the grantee sufficient to give the grantee adequate site control for the purposes of developing the project and long-term management for the life of the project.”

**PROJECT SUMMARY:**

The State Coastal Conservancy (Coastal Conservancy), in partnership with California Department of Parks and Recreation (State Parks), the City of Encinitas (City), and the San Elijo Lagoon Conservancy (SELCO), is proposing to restore a dune system along 2,900 feet of Cardiff Beach (Beach) to serve as a natural sea-level rise adaptation strategy to protect a vulnerable segment of the Pacific Coast Highway (Coast Highway). This multi-benefit project will also provide native dune habitat and increase public access to the coast.

The section of the Coast Highway adjacent to Cardiff Beach has been damaged and flooded on numerous occasions in the past as a result of extreme wave events and high tides. For instance, El Niño storms of 1998 caused major damage to this reach of the highway resulting in limited access and emergency repairs on more than 20 occasions (Figure 1). The Coast Highway is currently "protected" from flooding by a non-engineered revetment, beach nourishment projects, and a natural cobble berm.

The consulting firm of Moffatt & Nichol completed a feasibility study in November 2015 that included extensive site-specific storm and sea-level rise modeling. Modeling results provided evidence that more protection was needed beyond the beach’s natural geology and the City of Encinitas’ revetment and beach nourishment projects. Without the project, the Coast Highway would experience frequent flooding and erosion with 43-year swell events and with high rates of sea-level rise by 2050.

Through a collaborative process, project alternatives were developed and a preferred alternative was selected in October 2015. The preferred alternative is to create dunes with

“lumps and bumps” along the project reach to serve as a heterogeneous habitat. The existing un-engineered rock riprap will be repaired by reconfiguring/consolidating the existing rock into a more robust form. New 2-ton rock (to match existing) will be imported in areas where the existing rock is not adequate to form the rock template.

The sand dunes will be constructed with ~20,000 cubic yards of sand from the SELC annual dredging, San Elijo Lagoon Restoration Project or other compatible sand source. The sand will be placed on top of the engineered revetment to occupy a max width of 60' (~2 times wider than the reconfigured revetment). No new cobble will be imported for the project; however, the existing cobbles will be reconfigured to form the heterogeneous landscape across the dunes.

The dunes will be seeded with native plant seed collected within and surrounding the San Elijo Lagoon. The project may incorporate restoration methods (e.g., rice straw wattles) that would reduce seed blowing and provide nutrients and to establishing dune plants.. A sand fence will also be placed within the dune system adjacent to the highway to prevent sand from blowing onto the Coast Highway. Last, a pedestrian footpath with four access points into the beach will be created parallel to the dune system (on the highway-side) to improve public access.

The project will also develop a robust monitoring program to provide data on the effectiveness of this approach for the west coast. The Scripps Institution of Oceanography has collected beach profile data at the project area since 2007 and will continue this program with the addition of monitoring dune features using drone technology for the project's duration. Further, the San Elijo Lagoon Conservancy will develop an intensive monitoring and invasive removal program utilizing its existing volunteer base for the project's duration.

**Site Description:** The project site is located within the City of Encinitas on the seaward side of the Pacific Coast Highway at Cardiff State Beach. The proposed project area spans 2,900 linear feet (about 0.5 mile) of shoreline, from the Chart House Restaurant to the north to just before the South Cardiff State Beach Parking Lot to the south, and covers approximately 5 acres.

**Project History:** Along Cardiff State Beach, the Coast Highway has been damaged and ocean flooded on numerous occasions as a result of extreme wave events, coastal erosion and high tides. Since the 1990's, the Coast Highway closed at least 40 times during extreme storms and caused major damage to this reach resulting in limited access and emergency repairs. The current El Niño has also caused wave overtopping along Coast Highway and required emergency actions by the City and California Coastal Commission to prevent flooding.

The Coast Highway is currently "protected" from flooding by a non-engineered revetment, beach nourishment projects, and a natural cobble berm. For beach nourishment, two projects have taken place, one in 2001 and another in 2012, which placed a total of 190,000 cubic yards on the beach. To date, the beach nourishment projects have resulted in a general trend of increasing beach widths. While the current El Niño has caused minor flooding to date, the beach widths have stayed relatively consistent due to the bathymetry of the shoreline and sand

movement from the northern beaches. Although beach nourishment has provided a short-term solution, a longer-term solution is needed.

The Coastal Conservancy funded Phase I of the project which included 30% conceptual design, seed collection and bulking, and a feasibility study to analyze the efficacy of using dune habitats as natural flood protection infrastructure. Phase I also included an extensive coastal numerical modeling effort to analyze the benefits and longevity of the proposed dune system against various, site-specific, extreme wave and water level conditions. Overall, modeling results suggested that the Coast Highway is vulnerable to undermining and flooding for wave events greater than a 43-year return period in its existing condition. The proposed project was found to protect the Coast Highway from undermining and flooding during a 100-year event under existing, extreme water levels.

**PROJECT FINANCING**

Ocean Protection Council	\$2,195,932.00
State Coastal Conservancy	\$433,000.00
San Diego Association of Governments	\$1,000,000.00
Scripps Institution of Oceanography	\$25,000.00
TOTAL	\$3,628,932.00

The expected source of Ocean Protection Council funds for this project is the fiscal year 2015-16 appropriation to the Natural Resources Agency pursuant to the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1, Water Code §79700 et. seq.). Funds appropriated to the Natural Resources Agency derive from Chapter 6 (commencing with §79730) and may be used “for multibenefit water quality, water supply, and watershed protection and restoration efforts for the watersheds of the state” (Water code §79731). Section 79732 identifies specific purposes of Chapter 6, which include protecting and restoring coastal watersheds, including, but not limited to, bays, marine estuaries, and nearshore ecosystem. The proposed project is an appropriate use of Proposition 1 funds because it has multibenefits and will improve resiliency and adaptation to climate change, provide healthier marine or estuarine ecosystems, and restore watershed and coastal habitat.

The proposed project was selected through a competitive grant process under the Ocean Protection Council’s *Proposition 1 Grant Guidelines* adopted in September 2015 (“Prop 1 Guidelines”) (see §79706(a)). The proposed project meets each of the evaluation criteria in the Prop 1 Guidelines as described in further below.

**CONSISTENCY WITH CALIFORNIA OCEAN PROTECTION ACT:**

The proposed project is consistent with the Ocean Protection Act, Division 26.5 of the Public Resources Code, because it is consistent with trust-fund allowable projects, defined in Public Resources Code Section 35650(b)(2) as projects which:

- 1) Eliminate or reduce threats to coastal and ocean ecosystems, habitats, and species.

- 2) Allow for increased public access to, and enjoyment of, ocean and coastal resources, consistent with sustainable, long-term protection and conservation of those resources.
- 3) Provide monitoring and scientific data to improve state efforts to protect and conserve ocean resources.
- 4) Provide funding for adaptive management, planning, coordination, monitoring, research, and other necessary activities to minimize the adverse impacts of climate change on California's ocean ecosystem.

The proposed project will develop, implement, and test the effectiveness of dune restoration as a sea-level rise adaptation strategy. The restored dunes will serve as natural flood-protection infrastructure for the City of Encinitas and the Pacific Coast Highway. The restored habitat will fill a needed ecological void for the northern part County of San Diego as much of its dune habitat was lost in the late 1800s due to transportation construction. Last, there is a huge data gap in understanding the quantitative designs and benefits of using "living shorelines" for flood protection. The monitoring program associated with the project will provide needed information on the benefits and details for implementing living shorelines projects on the West Coast.

**CONSISTENCY WITH THE OPC'S STRATEGIC PLAN:**

This project implements Focal Area "Climate Change". The goal of which is to prepare for and reduce harmful impacts of climate change on coastal development and infrastructure, public health and safety, the economy, and ecosystems by encouraging adaptation to climate change and engaging decision makers at all levels of government.

**CONSISTENCY WITH THE OPC'S PROPOSITION 1 GUIDELINES:**

The following are the criteria that were applied to the applications in either the Letter of Intent or full proposal stage of the evaluation.

**Chapter 6 of Proposition 1 purposes:** The applicant has indicated that proposed project will address the following purposes enumerated in Chapter 6 of Proposition 1:

- (2) Implement watershed adaptation projects in order to reduce the impacts of climate change on California's communities and ecosystems.
- (4) Protect and restore aquatic, wetland, and migratory bird ecosystems, including fish and wildlife corridors and the acquisition of water rights for instream flow.
- (9) Protect and restore rural and urban watershed health to improve watershed storage capacity, forest health, protection of life and property, stormwater resource management, and greenhouse gas reduction.
- (10) Protect and restore coastal watersheds, including, but not limited to, bays, marine estuaries, and nearshore ecosystems.
- (12) Assist in the recovery of endangered, threatened, or migratory species by improving watershed health, instream flows, fish passage, coastal or inland wetland

restoration, or other means, such as natural community conservation plan and habitat conservation plan implementation.

**OPC's Key Issue Areas for Prop 1 Funding:** This project addresses OPC issue area "Climate Change".

**Multi-benefits:** The proposed project will implement and test extensive dune restoration along Cardiff State Beach as a "living shoreline" approach to protect the Coast Highway from large storm events and sea-level rise. It will also serve as natural flood-protection infrastructure for the City of Encinitas and provide dune habitat, an ecosystem which constitutes only a fraction of its historic coverage in Southern California.

**Ability to adapt to impacts of climate change:** The proposed dune restoration would significantly reduce the vulnerability of the Coast Highway at current and future conditions by providing protection from undermining and wave overtopping. Modeling results demonstrated that the proposed project will protect the Highway with high rates of sea-level rise in conjunction with large storm events until 2050 (National Research Council, 2012). Although the proposed project could not withstand the 2100 sea-level rise plus extreme wave condition scenario, there are possible avenues for future maintenance of the dunes (i.e., funding and sediment sources) to ensure adequate protection for the future. In addition, this modeling work has initiated ideas for future (2100) sea-level rise adaptation strategies that will be explored following project implementation.

**California Water Action Plan Goals:** The proposed project will implement two of the three goals of the California Water Action Plan: a) Restoration of important species and habitat - By restoring dune habitat with native and rare dune plant species and potentially provide habitat to the endangered Western Snowy Plover; and b) A more resilient, sustainably managed water resources system by providing flood protection to the section of Coast Highway adjacent to the project site.

**Removes or reduces multiple stressors to the environment:** The proposed project will reduce multiple stressors from the ocean and near coastal environment by reducing habitat degradation caused by local erosion at Cardiff Beach and by reducing the vulnerability of the project area to the effects of sea-level rise.

**Utilizes green infrastructure, natural systems, or systems that mimic natural systems:** The proposed project will develop, implement, and test the effectiveness of dune restoration as a sea-level rise adaptation strategy. This type of adaptation strategy is known as green infrastructure or a living shoreline. There is evidence that coasts containing natural habitats such as dune and wetlands instead of hardened shorelines experience less damage and are more resilient to large storm events and sea-level rise.

**New, innovative, or proven technologies or practices:** Constructing living shorelines for flood protection instead of "grey" strategies such as sea walls is very new to the West Coast even

though this strategy has been utilized on the East Coast with some frequency. Further, designing and testing the success of this sea-level rise adaptation strategy will inform future living shorelines projects across the West Coast.

**Sustainable outcomes:** Site-specific modeling has demonstrated that the project will provide flood protection and native dune habitat with no additional sand maintenance until 2050. Although the project would not withstand 2100 levels of sea-level rise and storms, sand from annual maintenance dredging of the San Elijo Lagoon inlet would provide the sand needed to maintain the dunes and the fore-beach beyond 2100.

**Ability to begin implementing the project in timely fashion:** The project team has completed a feasibility study, design studies at 30%, and environmental documents required under the California Environmental Quality Act. The project team is currently drafting materials to complete a Coastal Development Permit from the California Coastal Commission and a Major Use Permit from the City of Encinitas. Project partners anticipate the entire project being complete by January 2020.

**Provide mapping/data that can enhance current understanding:** There is a huge data gap in understanding the quantitative designs and benefits of using “living shorelines” for flood protection. The proposed project has already provided extensive modeling to establish a 30% design and the proposed monitoring program will also provide needed information on the benefits and details for implementing living shorelines on the West Coast.

**Demonstrates solutions that can be implemented regionally and/or statewide:** The Pacific Coast Highway is located adjacent to many beaches in Southern California. Consequently, the highway is currently or will soon be vulnerable to sea-level rise and storms. This is particularly the case at beaches with narrow widths or high levels of erosion such as Cardiff State Beach. Furthermore, much of the coastal zone in Southern California is highly urbanized and supported by at-risk infrastructure. The proposed project will inform other areas if and how they can utilize restored dune habits for flood protection.

**Demonstrates experience successfully implementing similar projects or demonstrates appropriate and necessary partnerships to complete the project.** The project proponent, the Coastal Conservancy, has decades of experience working with partners in San Diego on estuary protection and restoration, including the restoration design of San Elijo Lagoon. The Coastal Conservancy has recently worked on dune restoration at Surfer’s Point in Ventura as a means to increase the area’s resiliency to sea-level rise. The Coastal Conservancy is also experienced in external grant management with staff carrying out several projects funded by federal and other state agency grants. The agency has the staff capacity to initiate this project as soon as funding is awarded and carry it out in a timely fashion. Project partners including the San Elijo Lagoon Conservancy, the City of Encinitas, and Scripps Institution for Oceanography are also highly qualified.

**Consistent with best available science:** Throughout project implementation, the project team will coordinate with local, regional and state advisors to incorporate the most recent science in dune restoration. To this end, the City of Encinitas intends to leverage existing efforts by joining the San Diego Regional Climate Collaborative, Climate Science Alliance, and the Tijuana River National Estuarine Research Reserve in their newly NOAA-funded project, *Connecting the Dots and Building Coastal Resilience in the San Diego Region* (see Exhibit C). As a part of the NOAA project, the project will gain input on final design utilizing their Regional Science Advisory Committee as well as serve as a case study in their workshop series aimed to disseminate and coordinate living shoreline information. Information gained from the Regional Science Advisory Committee meetings and workshops will ultimately be written into a white paper to be shared with interested parties within and outside of San Diego County.

Additionally, during Phase I, the project team conducted a thorough literature review of local and national dune restoration design. The project team has also utilized local knowledge by involving beach morphologists, such as Dr. Timu Gallien (Scripps Institute of Oceanography, UCSD), throughout the project's concept development process.

**Demonstrates a clear and reasonable method for measuring and reporting effectiveness of project:** Physical and biological monitoring will be conducted before and after project construction to understand how and why dune topography changes over time (i.e., elevation, erosion, and progradation) and which native plants are the best suited for dune restoration in the region. Progradation is the seaward growth of a beach by progressive deposition of sediment through shoreline processes.

For physical monitoring, the City of Encinitas will monitor the seaward toe of the dunes to evaluate progradation and erosion while Scripps Institute of Oceanography will monitor elevations and specific morphological changes using photogrammetry. The project will also include annual, early-spring plant monitoring and invasive control efforts in the project area and reference site.

**Likelihood of project to fulfill its stated objectives:** While the dunes alone are projected to provide protection until 2050, the modeling that was done did not include beach nourishment resulting from the San Elijo Lagoon Restoration Project. This beach nourishment will expand the width of Cardiff Beach and provide additional protection to the dunes, thus increasing their lifetime. Further, the annual maintenance of the San Elijo Lagoon inlet yields 25,000 – 30,000 cy of sand which has been deposited on Cardiff State Beach since 2000. Maintenance of the inlet of the restored lagoon will yield a sustainable sand source of approximately 40,000 cy each year. If the project fails to protect the Coast Highway or the natural winter dune erosion continues through the spring season when the dunes should be naturally re-building, SANDAG and the City's Engineering and Public Works Department in collaboration with the California Coastal Commission will develop new plans to address any long-term flooding or erosional issues. One potential management option for discussion will be the long-term maintenance of



the dunes using the aforementioned annual dredge material from the mouth of the San Elijo Lagoon.

**Community support as well as support from outside local area:** The project team has taken a collaborative approach involving public and regulatory agencies in quarterly concept development meetings at the City of Encinitas in 2015, including one public stakeholder meeting. Involved entities included the California Coastal Commission, San Diego Association of Governments, Surfrider Foundation, the U.S. Fish and Wildlife, Scripps Institution of Oceanography, and U.S. Army Corps of Engineers. Surfrider Foundation expressed initial concerns about the availability of parking. The project team explained that the intention of the project is to have more organized parking and that the project would not result in the decrease in parking area. Surfrider did not comment on the Mitigated Negative Declaration released in draft form in February 2016.

After construction, the San Elijo Lagoon Conservancy (SELC) will utilize its volunteer base and existing educational programs working with elementary schools in Encinitas and Escondido to educate and engage the public in the invasive control and monitoring efforts. As part of the SELC's 5th grade curriculum, students learn about watershed resources, from inland to coastal communities. The program includes a beach clean up to demonstrate how everyone can make a difference in protecting our coastal communities.

Letters of support submitted with the grant application include those from the following organizations: City of Encinitas, Assemblymember Colonel Rocky J. Chávez, State Senator Patricia C. Bates, California Coastal Commission, San Diego Association of Governments, U.S. Fish and Wildlife Service, Climate Science Alliance and Climate Collaborative San Diego Region, The Bay Foundation, San Diego Audubon Society, and California Department of Parks and Recreation.

### **Bonus points**

**Advances the management individual marine managed areas (MMAs) or the statewide MMA network:** The project is located between San Elijo Lagoon State Marine Conservation Area (SMCA) and Swami's SMCA. The project could benefit the SMCA's by restoring coastal strand dune habitat, which once existed within the highway corridor. Avian species such as the Western Snowy Plover and California Least Tern would benefit from the project by the increased, contiguous area of restored dune habitat for loafing and nesting. The project may also benefit the California grunion population by providing sandy beach habitat for spawning, as this resource is much reduced from its historic levels. The most critical problem facing the grunion resource is the loss of spawning habitat caused by beach erosion, harbor construction, and pollution.

### **COMPLIANCE WITH CEQA:**

A Final Mitigated Negative Declaration was prepared and adopted, by the California Department of Parks and Recreation on March 23, 2016 pursuant to the provisions of the

California Environmental Quality Act. The OPC has considered the Mitigated Negative Declaration filed by the Department of Parks and Recreation (DPR) pursuant to section 15096 of the CEQA Guidelines. Consequently, staff recommends that the following mitigation and avoidance measures be adopted, and the following findings be included in your approval:

**Biological Resources (Mitigation Measures)**

- Prior to substrate deposition or manipulation, areas within and adjacent to the project footprint shall be surveyed for special status species. Any such species found on-site shall be avoided to the maximum extent practical through project redesign, timing/seasonal restrictions, delineated buffers, or other measures deemed necessary by the SELC or DPR staff.
- To avoid adverse impacts to any sensitive species (i.e., least tern, western snowy plover or grunion), construction activities shall occur between September 15th and February 28th of any given year.
- The project footprint shall be kept clear of trash to avoid attracting scavengers/predators of the western snowy plover. All food and garbage shall be placed in sealed containers and regularly transported from the site. Following construction, any trash, debris, or rubbish remaining within the work limits shall be collected and hauled off to an appropriate location/facility.

**Cultural Resources (Avoidance and Mitigation Measures)**

- In areas where existing ground disturbance (trenching associated with the riprap reconfiguration) is proposed, DPR Archaeologist shall be consulted such that archaeological and Native American monitors can be scheduled as necessary.
- The discovery of any archaeological or historical objects or features (including bone) will shall be reported to the Cultural Resources specialist immediately and work shall cease in that location until the potential resource can be evaluated. Whenever possible resources will shall be protected and avoided through redesign in consultation with District Archaeologist. If archaeological deposits and features are encountered during the project, resources shall be protected from construction impacts until a data recovery program can be implemented.
- Contractor educational efforts shall be completed prior to construction to alert workers to potential sensitive cultural resources and impact minimization measures to be implemented during construction.
- In the event that human remains are observed, there shall be no further excavation or disturbance of the site or any nearby area suspected to overlie adjacent human remains until the San Diego County Medical Examiner has evaluated the remains. If the Medical Examiner determines the remains to be Native American, the Medical Examiner will shall contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission shall identify the person or persons to be the Most Likely Descendent (MLD). The landowner (DPR) or DPR representative and the MLD will determine the appropriate course of action.

**Hazards and Hazardous Materials (Mitigation Measures)**

- The contractor shall implement an applicable plan to avoid contamination from fuel or other potential hazards. A Spill Prevention, Containment and Countermeasures Plan may be necessary. That plan specifies fueling procedures, equipment maintenance procedures, and containment and cleaning measures to be followed in the event of a spill). If not deemed necessary (due to not requiring fuel storage on-site), similar procedures are specified in the required Stormwater Management Plan.

**Transportation Traffic (Mitigation Measures)**

- The City shall require the contractor to implement a traffic control plan with a system of signs and flagmen to prevent accidents while construction vehicles access and egress from the project site. The traffic control plan shall include plans for traffic lane closure, shoulder closure, bike lane detour and pedestrian detour. The traffic control plan would also consider the additional safety measures at the schools located within the vicinity of the haul routes (e.g., extra control at school crossings) to reduce potential hazards. The traffic control features shall reduce impacts to transportation and circulation to below a level of significance.

OPC will delegate to staff the ability to file a notice of determination consistent with these findings.