

COASTAL CONSERVANCY

Staff Recommendation
March 25, 2021

Impacts of Sea Level Rise on San Diego's Intertidal Communities

Project No. 21-001-01
Project Manager: Evyan Sloane

RECOMMENDED ACTION: Authorization to disburse up to \$151,869 to the California Marine Sanctuary Foundation to collect topographical map data, analyze the impacts of sea level rise on rocky intertidal habitat, and identify potential restoration and enhancement areas across San Diego County.

LOCATION: San Diego County

EXHIBITS

Exhibit 1: [Project Location Map](#)

Exhibit 2: [Project Letters](#)

RESOLUTION AND FINDINGS

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

Resolution:

The State Coastal Conservancy hereby authorizes a grant of an amount not to exceed one hundred fifty-one thousand eight hundred sixty-nine dollars (\$151,869) to the California Marine Sanctuary Foundation ("the grantee") to collect topographical map data, analyze the impacts of sea level rise on rocky intertidal habitats, and identify potential restoration and enhancement areas across San Diego County.

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.

Impacts of Sea Level Rise on San Diego's Intertidal Communities

4. Evidence that all permits and approvals required to implement the project have been obtained.

Findings:

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

1. The proposed authorization is consistent with Section 31111 and 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.
 3. The California Marine Sanctuary Foundation is a nonprofit organization organized under section 501(c)(3) of the U.S. Internal Revenue Code.
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STAFF RECOMMENDATION

PROJECT SUMMARY:

Staff recommends the Conservancy authorize a grant of up to \$151,869 to the California Marine Sanctuary Foundation ("the grantee") to collect topographical map data, analyze the impacts of sea level rise (SLR) on rocky intertidal habitats, and identify potential restoration and enhancement areas across San Diego County. This project will provide a projection of the ecological consequences of sea level rise by mapping topography and available rocky habitat areas in San Diego County and linking it to existing data on rocky intertidal species. The new habitat mapping data collected through this project will be overlaid on current SLR projections to develop maps of potential losses of rocky intertidal habitat over time. The project will develop online maps visualizing the consequences of different SLR scenarios for rocky intertidal species along the outer coastline of San Diego County. The final phase of the project will be to identify areas for inland migration of rocky intertidal habitats to help these areas persist in the face of SLR. This is the first-time areas of rocky intertidal habitat will be identified for sea-level rise adaptation and enhancement in Southern California.

Recent SLR projections of ~3.5 feet by 2050 pose immense social, economic, and ecological questions with respect to the management and conservation of coastal ecosystems. For rocky intertidal habitats, the ecological consequences are particularly vexing because of the lack of understanding about the relationship between SLR, habitat availability, and species associations with habitat. The proposed project will fill this information gap by mapping the structural habitat features along the outer coastline of San Diego County, identifying species associations with those habitat features (i.e. rock or sand), and predicting vulnerability and habitat migration potential to SLR.

For the last 25 years the Multi-Agency Rocky Intertidal Network (MARINE, <https://marine.ucsc.edu/>) has been collecting spatially explicit data of the habitat associations and tidal range for all rocky intertidal species at 165 sites along the coast from Baja California to Washington State. However, SLR projections of species associations with habitat and tidal

Impacts of Sea Level Rise on San Diego's Intertidal Communities

range need to be local because geomorphology, wave climate, and orientation of the coast vary at a local scale. To determine habitat migration potential, shifts in species distributions due to SLR need to be localized because there are very local constraints to migration potential (i.e. availability of suitable habitat inshore) mainly due to natural (e.g., transition from rock to sand, presence of cliffs) or anthropogenic constraints (e.g., roads, seawalls, housing).

This project proposes to use the MARINE species geospatial and habitat data in conjunction with high accuracy Unmanned Aircraft Vehicle (UAV) mapping data (collected as part of the proposed project) to build an interactive, spatially explicit mapping tool that would provide species mapping under current and future sea levels. The SLR mapping tool will provide a highly informed projection of locations that will lose rocky intertidal habitat and areas where habitat could be gained with rising sea levels for a large suite of rocky intertidal species along the San Diego coast. The proposed project will conduct the UAV surveys to develop a Digital Elevation Model (DEM) of the San Diego coast, integrate the species associations from the MARINE dataset onto the DEM, analyze SLR vulnerability by overlaying current SLR projections onto the DEM, identify areas for potential rocky intertidal habitat migration and enhancement, and develop online maps to visualize the results.

The results of this project will allow local and State land managers to make more informed policy and management decisions for implementing coastal enhancement projects in rocky intertidal habitats along the San Diego coast. While previous studies have identified rocky intertidal habitat as one of the most vulnerable to sea level rise in California, there is not any information on or any pilot projects examining local impacts to rocky intertidal species in San Diego or potential actions to mitigate the impacts of sea level rise. The proposed project will identify key areas of concern across the San Diego County and provide information on habitat enhancement methods and locations to facilitate the inland migration of these rocky intertidal areas of concern. Following this project, the project's methods could be expanded throughout the state to answer the same key management decisions.

Site Description: The project will conduct UAV surveys along the entire San Diego County outer coastline.

Grant Applicant Qualifications: The California Marine Sanctuary Foundation (CMSF) is highly qualified to manage a Conservancy grant and carry out the project. CMSF currently manages 11 State of California funded grants across several agencies including the California Ocean Protection Council, California Department of Food and Agriculture, and California Coastal Commission with a total grant value in excess of \$1.5M. Overall CMSF manages 67 grants across state, local, and various foundations for a total grant value of over \$3M. CMSF maintains financial, legal, and human resources infrastructure that ensures all grants are managed to meet or exceed all requirements and maintain grant financial integrity.

The research program will be led by Dr. Pete Raimondi who is a professor of Ecology and Evolutionary Biology at UC Santa Cruz. Dr. Raimondi has been a Principal Investigator of the Bureau of Ocean Energy Management-funded rocky intertidal inventory MARINE project since its inception and has been responsible for data analysis of the project for the past 27 years. MARINE sampling has been the basis of all rocky intertidal assessment for the State Marine Protected Areas and Area of Special Biological Significance programs, as well as for Oil Spill

Impacts of Sea Level Rise on San Diego's Intertidal Communities

assessments along the West Coast. Dr. Raimondi will be responsible for overseeing all research activities for the project as well as managing the field and lab team that will be working on 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's Master Plan for Marine Protected Areas (2016): The proposed project will be essential for understanding how one of the key marine habitats identified in the Plan, "rocky shores", within existing Marine Protection Areas will operate in the future based on changes in habitat and associated changes in biological communities under projected sea level rise scenarios.

California Wildlife Action Plan 2015 Update: The project is centered on one of the key habitats in the MARINE province: the rocky intertidal. The proposed project is also directly focused on one of the identified key threats: sea level rise. Finally, one of the key species that will be assessed in the project is a species that has been identified in the Wildlife Action Plan as one that is most threatened by environmental change: black abalone, a federally listed endangered species.

California Department of Fish and Wildlife's Abalone Recovery and Management Plan and NOAA National Marine Fisheries Service's Black Abalone Recovery Plan: One of the key elements of the recovery plans are to maintain critical habitat for black abalone. The proposed project will allow prediction of loss or gain of critical black abalone habitat under projections of sea level rise.

California Coastal Sediment Management Master Plan: The proposed project will inform the Sediment Master Plan by providing projections of coastal habitat (e.g. rocky shores vs sandy beaches) and their tidal elevations and geographic extents as a function of predicted sea level rise as it interacts with coastal geomorphology.

California Climate Adaptation Strategy/Safeguarding California: Reducing Climate Risk Plan: The proposed project is directly aligned with the sea level rise consideration with respect to loss of critical habitat and loss of biodiversity.

4. **Support of the public:** The proposed project has wide support from federal and state agencies and the academic community. See Exhibit 2 for Project Letters.

Impacts of Sea Level Rise on San Diego’s Intertidal Communities

5. **Location:** See the “Project Summary”.
6. **Need:** This project would not occur without Conservancy participation and funding.
7. **Greater-than-local interest:** The National Park Service and the California Coastal Commission are interested in this project (see Exhibit 2) as it will inform both agencies’ sea level rise planning efforts for rocky intertidal habitats in San Diego.
8. **Sea level rise vulnerability:** The proposed project is not vulnerable to sea level rise as it is a study assessing rocky intertidal habitat across San Diego County. The project will identify key habitat areas vulnerable to sea level rise and determine key areas for coastal management to facilitate sea level rise resiliency via inland migration.

Additional Criteria

9. **Urgency:** The threats of sea level rise to rocky intertidal habitats across the State have already begun with species shifting or declining and rocky areas becoming permanently underwater. If the coastal management community does not understand where vulnerable hot spots exist or key areas for adaptation strategies, rocky intertidal habitat will be lost.
10. **Resolution of more than one issue:** The project will fill several information gaps for rocky intertidal habitats in San Diego County. The project will answer where intertidal rocky habitat features and species exist today, where they are vulnerable, and where they could potentially be expanded to restore habitats in the face of sea level rise. The project’s methods may also be expanded across California’s coastline following this demonstration study to answer the same questions outside of San Diego County.
11. **Leverage:** See the “Project Financing” section below.
12. **Innovation:** The project uses innovative methodologies for obtaining digital elevations for the shoreline of San Diego County using UAV technology and for projecting SLR scenarios by creating spatially explicit predictions of change in habitat and biological communities.
13. **Readiness:** The project team is ready to implement the project as soon as funding becomes available. No permits are required to complete the project.
14. **Realization of prior Conservancy goals:** “See Project Summary.”
15. **Vulnerability from climate change impacts other than sea level rise:** The project is not vulnerable to climate change as it is a sea level rise vulnerability study of rocky intertidal habitats.

PROJECT FINANCING

Coastal Conservancy	\$151,869
Project Total	\$151,869

Impacts of Sea Level Rise on San Diego's Intertidal Communities

The expected source of Conservancy funds for this authorization is 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.). This funding source is available to the Conservancy for projects that are consistent with Division 21 of the Public Resources Code and that protect coastal waters and watersheds, protect and restore the natural habitat values of coastal waters and lands, and/or promote access to an enjoyment of coastal resources. (Section 75060(b)) Proposition 84 authorizes funding specifically for projects that protect San Diego Bay and adjacent watersheds. (Section 75060(f)) The project is an appropriate use of Proposition 84 funds because it will provide information necessary to develop successful SLR resilience projects in rocky intertidal habitats throughout San Diego County.

Section 75071 requires the Conservancy to give priority to projects that demonstrate one or more of a list of factors. This project is a priority because it supports an area of an under-protected major habitat type, i.e. rocky intertidal habitat. (Section 75071(c)) Rocky intertidal areas are experiencing and will face even worse impacts from the effect of sea level rise. The proposed project will identify key rocky intertidal habitats that are vulnerable to SLR as well as areas that could support the inland migration needed for rocky intertidal habitats to adapt with SLR.

CONSISTENCY WITH CONSERVANCY'S ENABLING LEGISLATION:

The proposed project would be undertaken pursuant to Section 31111, regarding plans and Chapter 6 (Section 31251, regarding resource enhancement) of the Conservancy's enabling legislation, Division 21 of the Public Resource Code.

Section 31111 permits the Conservancy to award grants to public agencies and non-profit organizations for the purpose of funding and undertaking plans. Consistent with this section, the proposed project will grant funds to a non-profit organization, the California Marine Sanctuary Foundation, to develop information needed to plan rocky intertidal habitat restoration and sea level rise adaptation strategies in San Diego County.

Consistent with Section 31251 of the Public Resources Code, the proposed project is an analysis of SLR impacts to rocky intertidal habitat across San Diego County, a study necessary to enable the identification and prioritization of projects that will enhance these rocky intertidal habitats, which are a coastal resource of San Diego that is impacted by the natural or human-induced events of SLR. The proposed project will assist the Conservancy in meeting its purposes and objectives under this section by increasing the feasibility, cost-effectiveness, and sea level rise resilience of rocky intertidal restoration and enhancement projects in San Diego's coastal zone.

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

Consistent with **Goal 6, Objective A** of the Conservancy's 2018-2022 Strategic Plan, the proposed project will generate information necessary to develop plans for the restoration and enhancement of San Diego's rocky intertidal habitats. The information generated by the

Impacts of Sea Level Rise on San Diego's Intertidal Communities

proposed project will help local project proponents plan pro-active and more successful projects by identifying key habitat areas in need of enhancement and potential areas for inland migration of rocky intertidal habitat to provide SLR resiliency.

CEQA COMPLIANCE:

The proposed project is categorically exempt from review under the California Environmental Quality Act (CEQA) pursuant to 14 Cal. Code of Regulations (CCR) Section 15306, exempting “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 proposed project includes data collection, analysis, and planning, all of which will not result in a serious or major disturbance to an environmental resource.

Additionally, the proposed project is statutorily exempt from CEQA pursuant to CCR Section 15262, because the proposed project involves feasibility or planning studies for possible future actions which the Conservancy has not approved, adopted, or funded.

Upon approval, staff will file a Notice of Exemption for the project.