



University of Southern California Sea Grant Program

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Dear Ocean Protection Council Members,

University of Southern California (USC) Sea Grant Program is excited to announce five new research projects that we have recommended for funding and are just pending final approval by NOAA. The projects will have a duration of two years (2024-2026). USC Sea Grant's "Urban Ocean" research program supports projects to solve the problems associated with urbanization on and adjacent to the coastal zone. The program's overall aims are to foster the use of sound scientific information to advance our understanding of coastal and ocean resources, to examine the ways we conserve and use these resources, and to support tools for evaluating the issues and socio-economic trade-offs that comprise coastal decision-making.

USC Sea Grant works closely with funded researchers to ensure research results will have a broad reach to diverse California constituencies, with particular attention to underserved and underrepresented communities. As our focus is always research-to-application, we will keep you informed on the progress made in these projects over the next two years.

We are including a brief description of the five projects below.

Please reach out with any questions.

Dr. Karla Heidelberg
Director, USC Sea Grant

Phyllis Grifman, Executive
Executive Director, USC Sea Grant

USCDornsife

Dana and David Dornsife
College of Letters, Arts and Sciences
Sea Grant Program

Greening the Grey: Using Novel Coastal Armoring Methods to Support Greater Intertidal Community Productivity and Resilience Against Climate Warming Impacts

Principal Investigator:

Luke Miller, Ph.D., San Diego State University

Mitigating the impacts of centuries of human coastal development and the increasing impacts of climate change will require a multitude of approaches to meet the challenge of fostering healthy coastal ecosystems. Balancing a desire for improved ecosystem function with the traditional and emerging needs of coastal economies has led to the search for methods of ‘greening gray infrastructure’ within urban ocean zones. The Port of San Diego has deployed one such project, using cast concrete coastal armoring units (‘COASTALOCK’ blocks) that serve the function of traditional rock riprap for armoring harbor shores, but also provide a more complex physical structure intended to create more favorable habitat for shoreline organisms. The pilot deployment was installed in 2021, and the two-year initial monitoring period of settlement of intertidal species on the blocks came to a close in early 2023. The Port of San Diego is continuing to weigh whether a further expansion of the COASTALOCK armoring units would meet the desired goals of providing durable coastal armoring while increasing biodiversity and productivity on armored shores, and is relying in part on the evaluation of the benefits to the biological communities associated with those shores. USC Sea Grant has funded a study to formally evaluate the functionality of COASTALOCK armoring units for creating more thermally favorable habitat that will permit occupation by a broader array of species than traditional rock riprap.

Ousting Oil: Southern California wetland serves as a model system for studying ecosystem recovery from an oil spill

Principal Investigator:

Roman Barco, Ph.D., University of Southern California

On October 1, 2021, an oil pipeline in San Pedro Bay (P00547) ruptured. Approximately 25,000 gallons of crude oil spilled into the ocean, with considerable amounts seeping into the state-protected Magnolia, Brookhurst, and Talbert saltwater marshes in the Huntington Beach Wetlands (HBW), Orange County. USC Sea Grant has funded a team who, fortuitously, had collected water and sediment samples one year prior to the spill in the Magnolia and Talbert Marshes. The team collected additional samples several days, a few weeks, and approximately one and two years after the spill to enable a detailed analysis of the ecosystem recovery at the wetlands. This project will answer questions about: the short- and long-term effects of the oil-spill on the microbial community of the Huntington Beach Wetlands/ What are the key microbial taxa that are stimulated by the recent oil-spill and could these key players be used as

indicators for oil degradation? And is it possible to grow novel oil-degrading microbes that are relevant to this site?

Propagating Problems: Studying the combined effects of ocean acidification, hypoxia, and harmful algal blooms in the California ecosystem

Principal Investigators:

Andrew Gracey, Ph.D., University of Southern California

David Hutchins, Ph.D., University of Southern California

The rate at which California coastal water conditions are changing is among the fastest globally due to warming and the development of co-occurring ocean acidification (OA) and hypoxia (OAH). Seasonal OAH may have major impacts on phytoplankton community structure, such as the occurrence of harmful algal blooms (HABs), that can easily propagate to upper trophic levels of the food web and could create an unprecedented challenge to the health of coastal California ecosystems, including valuable fisheries. USC Sea Grant has funded a study to experimentally alter pH and hypoxia while co-culturing key phytoplankton and zooplankton species to understand how they respond to the effect of OAH. The team aims would like to understand how co-occurring OAH and HAB events will impact zooplankton performance and bioaccumulation of toxins up the food chain. They also plan to confirm their laboratory results by comparing them against samples that were collected as part of the NOAA West Coast Ocean Acidification 2021 cruise. The team plans to communicate the results of their work to the research and resource management community concerned with OAH, hypoxia, HABs, and fisheries implications by sharing their data on the California Ocean Observing System (CalOOS) OAH portal.

Seafood for All: How studying larval fish over 50 years can improve food security in our urban ocean

Principal Investigator:

Daniel Pondella, Ph.D. Occidental College

Coastal nearshore ecosystems, especially those close to urban centers such as Los Angeles, are directly affected by anthropogenic impacts associated with development and human population increase. Combined with global climate change's effects on the ocean, coastal fauna has witnessed substantial changes in abundance and composition. Many of these species are important to recreational and subsistence fishers from underrepresented, underserved, disadvantaged, and food-insecure communities that can take advantage of no-fee fishing opportunities on nearby piers, breakwaters, and jetties. USC Sea Grant has funded a study to address this issue utilizing a unique, nearly 50-year-long, nearshore ichthyoplankton (fish larva) data set. The goal is to understand the impact of anthropogenic, fisheries, and climate-driven changes on the nearshore fish communities of the region, with a specific focus on species

relevant to subsistence fisheries in the region. The team will conduct outreach to regional resources managers.

TEK meets eDNA: Traditional Ecological Knowledge used to advance equity in collaborative management of the newly proposed Chumash Heritage National Marine Sanctuary

Principal Investigators:

Stephen Palumbi, Ph.D., Stanford University

Violet Sage Walker, Northern Chumash Tribal Council

The need to put into place true collaborative co-management is the focal point of the newly Proposed Chumash Heritage National Marine Sanctuary off the coast of central California. USC Sea Grant has funded a study that will enhance a collaborative plan between the Chumash community, NOAA National Marine Sanctuaries, Stanford University, and Stanford's Hopkins Marine Station. It uses an existing eDNA research project to move towards tribal collaborative/co-management for the sanctuary by including more indigenous community involvement in biodiversity research. The project will test two different Tribal-led citizen-science delivery systems for collecting eDNA specimens and compare them to previously funded collections based on long-established scientific protocols. The study will compare results from these sets of samples, and use the results to propose building greater involvement in Tribal communities in eDNA research in the proposed sanctuary. The team will also begin the process of describing sampling locations with their Chumash names to bring the traditional ecological knowledge about location history and features into the eDNA descriptions.

Dear OPC,

Please find attached joint agency memorandum from OPC, CDFW, and MBNMS asking the FGC to terminate our volunteer diver community kelp restoration project. The FGC cited this recommendation as justification for ending legal urchin culling anywhere on the central coast on Valentine's Day.

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Giant Kelp
Restoration Project



CALIFORNIA
**OCEAN
PROTECTION
COUNCIL**



**MONTEREY BAY
NATIONAL MARINE
SANCTUARY**

Memorandum

Date: January 30, 2024

To: Melissa Miller-Henson
Executive Director
Fish and Game Commission

From: Jenn Eckerle, Executive Director
California Ocean Protection Council

Dr. Craig Shuman, Marine Regional Manager
California Department of Fish and Wildlife

Dr. Lisa Wooninck, Superintendent
Monterey Bay National Marine Sanctuary

Subject: Joint Agency Comments and Recommendation to Amend Section 29.06, Title 14, California Code of Regulations, Re: Recreational take of sea urchins at Tanker Reef.

The Fish and Game Commission (Commission) authorized publication of its notice of its intent to amend subsection 29.06(d)(1) and (2) of Title 14, California Code of Regulations at its October 12, 2023, meeting regarding recreational take of sea urchins. Current recreational urchin regulations specify bag and possession limits and methods of harvest for purple sea urchins. Subsection (d) provides temporary exemptions to allow unlimited recreational take of purple sea urchins in Caspar Cove, Mendocino County, and at Tanker Reef, Monterey County, as well as red sea urchins at Tanker Reef, Monterey County, until April 1, 2024.

The proposed rulemaking includes two options for Commission consideration. The first option would extend the sunset date for Caspar Cove for another five years as described in subsection 29.06(d)(1) and allow the exemption at Tanker Reef to sunset on April 1, 2024. The second option would extend the sunset date for Caspar Cove for another five years and extend the sunset date for Tanker Reef for all or a portion of the existing boundaries for another five years as described in subsection 29.06(d)(2).

This joint memo addresses urchin removals at Tanker Reef, as both options contain an extension for Caspar Cove. The California Department of Fish and Wildlife (Department) and Ocean Protection Council (OPC) are supportive of extending the sunset date for Caspar Cove for another five years, as travel restrictions associated with the COVID-19 pandemic largely prevented recreational divers from holding organized urchin culling efforts at Caspar Cove for several years. Monterey Bay

National Marine Sanctuary (MBNMS) is not providing input regarding Caspar Cove.

The Department worked closely with MBNMS and OPC to evaluate the original petition (Petition #2020-001) and provided a joint agency memorandum (2020 Memo), dated August 5, 2020, outlining recommended stipulations for the temporary regulation. The 2020 Memo specified that the urchin culling effort at Tanker Reef must inform future management and requested the petitioner: 1) evaluate the efficacy of community-led in-water urchin culling activities and report findings at the end of three years; and 2) evaluate the potential ecological impacts from in-water urchin culling methods. Importantly, the Department, MBNMS, and OPC supported the recommended sunset date of three years (April 1, 2024), after which, data collected by the petitioner and others would be evaluated prior to considering an extension and/or broader application of these culling methods.

To date, the Department, OPC, and MBNMS have worked with the petitioner and Reef Check to develop a monitoring plan, specific performance criteria, and a data management and reporting framework to evaluate the efficacy of urchin culling. The Department and MBNMS staff have also collected a subset of data independent of the petitioner and other partners to verify monitoring trends and ecological changes at Tanker Reef. In addition, MBNMS and Department staff have conducted a study to better understand the potential impacts of culling to the reef and other organisms. Preliminary data from monitoring surveys conducted by agency staff and Reef Check citizen science divers can be found in the report entitled “Status of Research and Monitoring, Restoration Efforts, and Developing Management Strategies for Kelp Canopy Forming Species in California” ([CDFW, 2023](#)).

Independent monitoring by agency staff is ongoing and will continue through 2024 to evaluate the efficacy of urchin culling efforts and determine the persistence of kelp. If kelp persists at Tanker Reef through 2024, longer term monitoring may be required to determine the duration of the persistence and efficacy of these efforts.

Consistent with the original intent of the temporary regulations, and stipulations outlined for Tanker Reef in the 2020 Memo, the Department, MBNMS, and OPC, recommend the Commission adopt **Option 1**, which would allow the exemption at Tanker Reef to sunset on April 1, 2024, as intended and currently specified in regulations.

Option 1 enables the culmination of efforts put forth by the petitioner, partners, and Agencies to directly inform management and contribute to the growing body of work that has been underway to address the kelp crisis in the state ([CDFW, 2023](#)). Specifically, it also allows:

- 1) the tracking of changes in kelp and urchins at the treatment grid (before, during, and after) to determine if the kelp patch is resistant or succumbs to overgrazing by urchins;

- 2) the petitioner and partners to provide data in a timely manner on urchin densities, diver effort, and community-level changes in both algae and benthic invertebrates at the treatment grid; and
- 3) the opportunity to analyze all data, including impacts from culling to the reef, and produce a final report that fully evaluates the suitability of this strategy as an effective restoration tool.

The final report will detail restoration methods and results that will inform the development of the statewide [Kelp Restoration and Management Plan](#), contribute to the MBNMS Iconic Kelp Plan, and any potential future kelp restoration actions for the central coast.

The protection and restoration of California's kelp forests is a top priority for the Department, OPC, and MBNMS. In the last several years, OPC and the Department have made unprecedented investments (approximately \$10 million total) to monitor, protect, and restore kelp forest ecosystems and enhance the resilience of the coastal communities they support. This has included support of groundbreaking, solutions-oriented science, as well as a "learn by doing" approach to kelp restoration. Ongoing state and federal efforts will advance understanding of effective restoration techniques, enable resource managers to develop solutions to the kelp crisis, and foster meaningful partnerships with California Native American Tribes and coastal communities.

The Department, OPC, and MBNMS appreciate the passion, hard work, time, effort, and resources that the recreational dive community and citizen scientists have put towards culling efforts, monitoring, and site maintenance at Tanker Reef. The Department, MBNMS, and OPC look forward to working with the petitioner, the recreational dive community, and other interested parties to identify and implement ways to advance our understanding of regional kelp forest dynamics, effective techniques to promote kelp recovery and persistence, and accessible ways to engage in addressing the kelp crisis.

If you have any questions on this item, please contact Dr. Craig Shuman, Marine Region Manager, at (805) 568-1246 or by email at R7RegionalMgr@wildlife.ca.gov.

Enclosure: 2020 Memo

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January 30, 2024
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