

CALIFORNIA OCEAN PROTECTION COUNCIL

Staff Recommendation  
October 17, 2016

**MPA effectiveness and ecological responses in the face of changing ocean conditions**

Jenn Phillips, Program Manager

**RECOMMENDED ACTION:** Authorization to disburse up to \$310,000 to the Regents of the University of California, Santa Cruz to integrate subtidal ecological and global climate change monitoring to test marine protected areas' (MPA) resilience to ocean acidification.

**LOCATION:** Statewide

**STRATEGIC PLAN OBJECTIVE(S):** Science-based decision-making; Climate change; Sustainable Fisheries and Marine Ecosystems

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**EXHIBITS**

Exhibit A: Support Letters

Exhibit B: Map of Proposed Sites

Exhibit C: Project Images

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**FINDINGS AND RESOLUTION:**

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 grant program funding guidelines (Interim Standards and Protocols, August 2013).
- 3) The proposed project is not a 'legal project' that triggers the California Environmental Quality Act (CEQA) pursuant to Public Resources Code section 21068 and Title 14 of the California Code of Regulations, section 15378. If it were determined to be a 'legal project' under CEQA, the proposed project is categorically exempt from review under CEQA pursuant to 14 Cal. Code of Regulations Section 15306 because the project

involves information collection, consisting of data collection, research, and resource evaluation activities that will not result in a serious or major disturbance to an environmental resource.”

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 \$310,000 to the Regents of the University of California, Santa Cruz to integrate subtidal ecological and global climate change monitoring to test marine protected areas’ (MPA) resilience to ocean acidification.

This authorization is subject to the condition that prior to disbursement of funds, the Regents of the University of California, Santa Cruz shall submit for the review and approval of the Executive Director of the OPC detailed work plans, schedules, staff requirements, budgets, and the names of any contractors intended to be used to complete the projects, as well as discrete deliverables that can be produced in intervals to ensure the projects are on target for successful completion. All projects will be developed under a shared understanding of process, management and delivery.”

**PROJECT SUMMARY:**

*The overarching goal of this project is to integrate subtidal ecological and global climate change monitoring to test marine protected areas’ (MPA) resilience to ocean acidification.*

California sits at the frontlines of researching the effects of accelerating changes in ocean chemistry, and there is strong interest in assessing the vulnerability of our coastal marine ecosystems to these changes, as well as identifying opportunities for adaptation. California’s network of MPAs provide an important opportunity to assess and monitor the ecological “signal” of these ongoing ocean changes across a gradient of fishing pressure including inside marine reserves where fishing impacts are eliminated. Current monitoring of nearshore ocean acidification and hypoxia (OAH) is limited to a few locations with significant resources (i.e., Monterey Bay, San Diego, and Santa Barbara Channel) or at intertidal sites near academic marine labs (i.e., Bodega Marine Lab). Currently, MPA monitoring is not coupled with any comprehensive, long-term environmental monitoring efforts across the majority of California’s MPA Network which spans across over 1100 miles of coastline. This represents a significant gap in our ability to adequately interpret the effectiveness of the MPA network in California, as well as our ability to monitor and adapt to climate change impacts like OAH. Using the scientifically robust citizen science network established by Reef Check California (RCCA), this project aims to:

1. Co-locate high resolution monitoring of OAH with ongoing ecological monitoring efforts to allow better interpretation of MPA effectiveness and ecological responses to global change;
2. Assess the scales at which low-cost 'snapshots' of ocean temperatures and dissolved oxygen characterize more permanent differences among sites and regions; and
3. Engage local citizen scientists in ongoing efforts to monitor OAH in California.

RCCA Director Dr. Jan Freiwald and Dr. Kristy Kroeker's lab at University of California, Santa Cruz will add a climate change research component to RCCA's ecological monitoring inside and outside of MPAs along the entire California coast. This project will collect physical and chemical oceanographic data at multiple spatial and temporal scales. To achieve this, sensors will be deployed at permanent moorings (long-term) as well as during RCCA survey dives (snapshots).

First, sensors on moorings will collect time-series data on dissolved oxygen (DO), pH and temperature. These sensors will be placed on the benthos at Reef Check sites in regions along the coast in which no other research groups are collecting these types of data. They will serve several functions:

1. Expand California's OAH monitoring into MPAs and regions currently not covered by any research program (e.g., northern California, Big Sur Coast, Catalina Island);
2. They will allow researchers to ground-truth and match the data collected during RCCA's surveys by comparing high resolution monitoring of long-term trends to survey snapshots.

Second, lower cost sensors will be deployed on divers during RCCA surveys at all sites along the coast. These will collect data on DO and water temperature, creating a "snapshot" of the ocean conditions at the time the ecological data are collected at these sites. These data will allow (1) a direct match of ecological and oceanographic data that is not being achieved by any other program at this geographic scale, (2) an opportunity to test how less expensive, snapshot data can be incorporated into OAH monitoring, modeling efforts, and (3) engagement of citizen scientists into OAH science. Previous collaborative work by Dr. Kroeker with Drs. Tessa Hill and Brian Gaylord (UC-Davis) found that intertidal snapshots can adequately capture relative differences among sites within a few years of data collection. In addition, DO and hypoxia can affect mobile, fish communities on very short time frames (e.g., fish avoiding areas of low oxygen), which could influence interpretation of monitoring efforts that only capture a single ecological snapshot each year.

At some RCCA sites, the researchers will permanently install a subset of inexpensive sensors similar to the ones carried by divers to correlate the snapshot environmental data to longer-

term trends of these parameters at those sites. This will illustrate how well the snapshot data captures the relative rankings and mean environmental conditions at a site.

Sensor data will be downloaded by the RCCA Regional Managers and stored at a central location. The data will be made available to the public in an understandable and engaging format in combination with Reef Check’s ecological monitoring data through an online platform: Reef Check’s Global Reef Tracker at [www.data.reefcheck.org](http://www.data.reefcheck.org). This citizen science collected information will be used to develop outreach materials and inform the public about the processes seen in the ocean right now and about what we might expect the future to look like in a changing world.

Further, AB 2139 (Williams) references the West Coast Ocean Acidification & Hypoxia Science Panel report action items, and asks the OPC to work on these action items as well as to report back to the Council annually on what has been done to address ocean acidification. The proposed work will directly address AB 2139 (Williams) as AB 2139 calls for taking action to address ocean acidification and hypoxia.

**Project Timeline:** 2 years

**PROJECT FINANCING:**

Staff recommends that the Ocean Protection Council (OPC) authorize encumbrance of up to \$310,000 to University of California, Santa Cruz to integrate subtidal ecological and global change monitoring to test the effectiveness and resilience of marine protected areas to ocean acidification and changing ocean conditions.

Ocean Protection Council	\$310,000
<b>TOTAL</b>	<b>\$310,000</b>

The anticipated source of funds will be from the Ocean Protection Council’s appropriation of the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Proposition 84). Proposition 84 authorizes the use of funds for purposes consistent with Section 35650 of the Public Resources Code, establishing the California Ocean Protection Trust Fund (Pub. Res. Code § 75060(g)). Under Section 35650(b), Ocean Protection Trust Fund monies may be expended for projects authorized by the OPC that are identified as appropriate Trust Fund purposes, as specified. The project is consistent with the Trust Fund purposes as discussed in the following section.

**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) as projects which:

- Provide monitoring and scientific data to improve state efforts to protect and conserve ocean resources
- 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, including, but not limited to, the effects of sea level rise, changes in ocean productivity, and ocean acidification on coastal and ocean habitat, wildlife, fisheries, chemistry, and other key attributes of ocean ecosystems and to increase the state's understanding of the ocean's role in carbon sequestration. Adaptive management strategies, planning, research, monitoring, or other activities shall be designed to improve the management of coastal and ocean resources or aid the state to adapt to climate change impacts.

This proposed statewide project will promote coordination between state agencies and stakeholders across the MPA community who are interested in these questions about MPA effectiveness and ecological responses to OA. This work will help scientists and managers dive deeper into understanding the adaptive capacity of some species and ecosystems to changing ocean conditions, and how this adaptive capacity may be supported or advanced in protected areas. It will also promote coordination and knowledge sharing with the federal government, academic and the NGO community as this data will be shared publicly and widely to promote such discussion, coordination, and advancement of this adaptation strategy.

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

This project implements Focal Area A: Science-based decision-making, Focal Area B: Climate change, and Focal Area C: Sustainable Fisheries and Marine Ecosystems. The dominant cause of ocean acidification is atmospheric carbon dioxide emissions therefore this is an issue that is global in nature and will require global solutions. At the same time, the pace and magnitude of OA on the West Coast requires that we explore and employ regional and local strategies and actions as we continue to reduce CO<sub>2</sub> emissions. These strategies must be acted upon quickly and be informed by the best available science to offer the possibility of forestalling at least some of the negative consequences of OA on ecosystems and communities.

**CONSISTENCY WITH PROPOSITION 84 (The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006; Public Resources Code §75060(g))**

This project is consistent with the purposes outlined in Proposition 84, specifically it includes the development of scientific data needed to adaptively manage the state's marine resources and reserves. OA data of high precision, quality, and frequency that is collected inside and outside of marine protected areas across the state will allow managers to adequately interpret the effectiveness of the MPA network and ecological responses to ocean acidification and global change.

**CONSISTENCY WITH THE OPC'S GRANT PROGRAM FUNDING GUIDELINES:**

The proposed project is consistent with the OPC's Grant Program Funding Guidelines for Proposition 84 funds, in the following respects:

Required Criteria

1. Directly relate to the ocean, coast, associated estuaries, or coastal-draining watersheds: *This project will occur inside and outside of state marine protected areas from Northern to Southern California.*
2. Support of the public: *See Exhibit A*
3. Greater-than-local interest: *Given that this project stretches the length of the state and is addressing a global challenge like ocean acidification, it will garner attention across the state and findings will be shared broadly with other researchers and managers working on ocean acidification.*

Additional Criteria

4. Coordination: *This project includes an academic institution, a statewide non-profit, and many volunteer divers for Reef Check California.*

**COMPLIANCE WITH CEQA:**

The proposed project is not a 'legal project' that triggers the California Environmental Quality Act (CEQA) pursuant to Public Resources Code section 21068 and Title 14 of the California Code of Regulations, section 15378. If it were determined to be a 'legal project' under CEQA, the proposed project is categorically exempt from review under CEQA pursuant to 14 Cal. Code of Regulations Section 15306 because the project involves information collection, consisting of data collection, research, and resource evaluation activities that will not result in a serious or major disturbance to an environmental resource. Staff will file a Notice of Exemption upon approval by the OPC.