MEMORANDUM

TO: Ocean Protection Council

FROM: Clare O'Reilly, Project Manager

DATE: December 16, 2011

RE: Concurrence with OPC priority scientific research projects selected for 2011-2012 Sea Grant awards

ATTACHMENTS: 1 – Ocean Protection Council Staff Recommendation for the Sea Grant Research Program 2011 (File No. 10-004-02 and -03, November 29, 2010)
2 – Research Priority Descriptions for the Sea Grant 2011 Call of Proposals

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REQUESTED ACTION:

Staff recommends the council approve the following resolution:

"The Ocean Protection Council (OPC) concurs with the proposed grant awards for scientific research projects selected for funding from the University of California Sea Grant and University of Southern California Sea Grant Programs as they are consistent with the 2011 Ocean Protection Council Research Priority Descriptions, and are highly relevant to state management needs."

BACKGROUND:

At its November 29, 2010 public meeting, the OPC authorized a grant of $1,080,000 to the state's two Sea Grant programs (Attachment 1) to select and fund high quality scientific research projects that support the council's research priorities and will deliver useful information to inform management and policy decisions. The OPC resolution and grant agreements require that prior to awarding funds, Sea Grant must obtain the OPC's concurrence for the selected research projects recommended for each of the Sea Grant programs. The 2011 OPC priorities and guidelines for Sea Grant research proposals can be found in Attachment 2.

RECOMMENDED PROJECTS:

Based on the OPC's research priorities and the extensive review process described below, staff recommends that the council concur with the following recommendations for funding from the 2011 research proposals.

University of California Sea Grant College Program (California Sea Grant)

Pursuant to the council's authorization, in February 2011 the California Sea Grant Program released a request for proposals (RFP) soliciting preliminary proposals. The RFP required multidisciplinary research teams to focus on a single issue and discuss how they would synthesize the current state of knowledge for that research topic in a series of policy papers, produce applied tools or products (such as indicators or predictive models), and disseminate their results to policy makers and other interested communities. The research priority focal areas available to initiative teams were:

- Climate Change Adaptation to Address Sea-Level Rise and Other Climate Impacts to California's Ocean and Coastal Ecosystems
- Coastal and Marine Spatial Planning to Inform Decisions about Ocean Uses Off the California Coast
- Land-based Management to Reduce Impacts on Ocean and Coastal Resources
- Preparing for Emerging and Industrial Uses of the Ocean
- Sustainable Fisheries Management to Ensure Healthy and Thriving Marine Ecosystems and Fishing Communities.

Five preliminary research proposals were received. The Resources Agency Sea Grant Advisory Panel (RASGAP) reviewed all proposals for their relevance to state needs and the Sea Grant technical review committee reviewed the proposals for scientific validity. Three projects were selected to submit full proposals, and two were received. The selected research teams were provided extensive comments from the reviewers. Each final proposal was again reviewed by both RASGAP and the technical reviewers, including outside peer-reviewers who submitted extensive written comments on each of the research proposals.

OPC staff recommends funding the project titled, ***Integrating the MLMA and MLPA – Developing new ways to manage California's nearshore fisheries using catch data from marine protected area monitoring.***

This project will address the research priority focal area, Sustainable Fisheries Management to Ensure Healthy and Thriving Marine Ecosystems and Fishing Communities. Specifically, the project will develop methods to integrate sustainable fisheries management with marine protected areas (MPAs), increase understanding of the ecosystem effects of fishing, expand an existing cooperative research project with fishing stakeholders to explore methods to co-manage fisheries, and conduct original research regarding data-poor fisheries. Effective management of California's fisheries is currently challenged by limited data available for use in traditional data-intensive stock assessments. This project will develop and test less data-intensive methods to generate predictive outcomes. Initiative outcomes will support the Department of Fish and Game (DFG) in the development and application of methods and management tools to better inform management decisions.

Project Budget

OPC Funds	$719,753
Matching funds	$366,003

Project Team

Researchers:
Rick Starr, California Sea Grant Extension Program and Moss Landing Marine Laboratories, Co-Principal Investigator
Dean Wendt, Cal Poly State University, San Luis Obispo (Cal Poly), Co-Principal Investigator
Tom Barnes, California Department of Fish and Game Marine Region (DFG)
Jason Cope, National Marine Fisheries Service (NOAA/NMFS)
Kristen Honey, Stanford University
Jono Wilson, University of California Santa Barbara (UCSB)

Technical Advisory Committee:
Meg Caldwell, Stanford Center for Ocean Solutions, MLPA Blue Ribbon Task Force
Chris Costello, UCSB
Meisha Key, DFG
Steven Gaines, UCSB
Michele Leary, Central Coast Sportfishing
Melissa Locke, Cal Poly
Alec MacCall, NOAA/NMFS
Tom Mattusch, Huli Cat Sportfishing
Pete Nelson, Collaborative Fisheries Research West
Ana Pitchon, California State University Dominquez Hills
Steven Ralston, NOAA/NMFS
Liz Whiteman, California Ocean Science Trust, MPA Monitoring Enterprise
Deb Wilson-Vandenberg, DFG

California's Marine Life Management Act (MLMA) of 1998 calls for greater efforts to involve fishermen, scientists, and interested citizens in developing management measures for the state's marine fisheries. Similarly, California's Marine Life Protection Act (MLPA) also identifies stakeholder involvement in creating a network of MPAs to sustainably manage ocean resources, including research and monitoring to measure the health of California's marine ecosystems. Integrating the goals of the MLMA and MLPA provides opportunities for well-informed fisheries management, yet it is not without challenges. For example, traditional stock assessments are founded on population parameters (e.g., growth, recruitment, mortality) and cannot easily incorporate spatially explicit information such as the variable harvest patterns created by the existence of MPAs. Also, for marine fisheries in California and along the West Coast, there is a mismatch between the large spatial scale at which stock assessment and management occurs and the much smaller spatial scale of stock structure and distribution of fishing pressure.

To address these issues, the initiative will test existing models and develop specific tools that may be used to improve how California manages its nearshore fisheries. The researchers will use a multi-year dataset on MPAs collected through a collaboration of Central Coast fishing communities to conduct a side-by-side performance comparison of five or more newly published

data-poor models for setting catch levels. The researchers established a collaborative fisheries research partnership to collect baseline information about fisheries resources in four Central Coast MPAs, and they will draw upon this partnership to collect an additional two years of data. Select data-poor models will be used to analyze this seven-year dataset. Model results will be compared against other fisheries models and traditional stock assessments, and evaluated for data quantity requirements, accuracy, the degree to which they are precautionary, and to determine if the models can meet MLMA and federal requirements for developing annual catch-limits. The researchers will further assess the most promising data-poor methods/models in a Management Strategy Evaluation (MSE) simulation model. The initiative team has assembled a technical advisory committee to provide input on modeling, management implications and policy, and intends to hold several workshops to foster collaboration and share knowledge among stakeholders, resource managers, and scientists. Initiative results will be vetted in a workshop before recommendations regarding managing fishing pressure on multiple nearshore fin fish species and the potential for co-management of fisheries are delivered to DFG and FGC staff, and other fisheries and MPA management entities.

The University of Southern California Sea Grant Program

The USC Sea Grant Program released an RFP in February 2011 that included OPC's Research Priority Descriptions. Proposals were required to illustrate a strong connection to management by specifying outreach mechanisms to integrate results with state management needs. Fourteen proposals were received. The review process for these proposals was the same as with California Sea Grant, with each being reviewed by RASGAP and technical reviewers.

OPC staff recommends fully funding the following projects:

- *The Ecosystem Impacts of Kelp Forest Habitat Restoration, Including Important Fishery Species*
- *Will a Warmer, More Acidic Ocean Lead to Increased Pseudo-nitzschia Bloom Toxicity in the Southern California Bight?*

OPC staff recommends partially funding the following project:

- *The Value of Habitat Diversity in Marine Reserves: Spiny Lobster and Sheephead Use of the Intertidal Zone of the Santa Catalina Island MPA*

For the partially-funded project, the OPC funds will be matched by USC Sea Grant NOAA funds. This funding arrangement allows maximal use of monies to support as many projects as possible.

1) ***The Ecosystem Impacts of Kelp Forest Habitat Restoration, Including Important Fishery Species***

This project will address the research priority focal area, Coastal and Marine Spatial Planning to Inform Decisions about Ocean Uses off the California Coast, by gathering data to measure habitat quality using indicators that can be combined and modeled to better understand ecosystem function and the supply of ecosystem services. Project outcomes will also relate to research priorities listed under Sustainable Fisheries Management, most notably through the

project's connection to MPAs. Several Southern California management entities, including the County Sanitation Districts of Los Angeles County and the Southern California Coastal Water Research Project, expressed significant interest in how the results of this research will inform their efforts by contributing knowledge on how kelp restoration can improve ecosystem function and productivity.

Project Budget

OPC Funds	$59,513
Matching Funds	$40,486

Project Team

Daniel Pondella II, Occidental College
Jeremy Claisse, Occidental College
Tom Ford, Santa Monica Bay Restoration Foundation

Kelp forest ecosystems are iconic and productive features along the coast of California with ecosystem services that span a wide array of consumptive (e.g., commercial and recreational fishing) and non-consumptive (e.g., tourism, scuba diving and diminishing coastal erosion) uses. Predation is one of the most significant and persistent causes of kelp forest loss in southern California. Sea urchins will aggregate in feeding fronts and consume large sections of kelp forest if left unchecked, and can create "urchin barrens" which are observed to support far fewer species and reduce ecosystem structure and function. Southern Sea Otter, California Spiny Lobster, and California Sheephead prey on sea urchins, thus limiting sea urchin consumption of kelp. However, Southern Sea Otters are no longer present in the area and California Spiny Lobster and California Sheephead are under significant fishing pressure in southern California.

In addition to urchin predation, kelp forests in Santa Monica Bay are directly affected by a diverse set of anthropogenic impacts (e.g. sedimentation, urban runoff, and pollution) that combine to further contribute to the decline of productive, stable kelp habitat along this important stretch of coastline. Given the complexity of factors impacting rocky reef sites in Santa Monica Bay, conservation and resource management efforts demand an equally diverse and proactive suite of strategies such as kelp restoration. Large-scale sea urchin relocation projects have successfully enabled the natural re-development of Giant Kelp in demonstration plots on shallow rocky-reefs in Santa Monica Bay. Restoration efforts are now being expanded across a larger impacted region of the Palos Verdes Peninsula. This presents a novel opportunity to develop evaluation tools for habitat restoration in terms of ecosystem response.

Understanding the potential of kelp restoration to complement concurrent management actions to limit fishing pressure (e.g., Marine Protected Areas) and to mitigate the effects of sedimentation and pollution (e.g., watershed management, artificial reefs) will be key to informing the implementation and evaluation of these adaptive and integrative management strategies throughout southern California. The researchers will use matching funds from the South Coast MPA Baseline Program and NOAA's Montrose Settlements Restoration Program.

2) ***Will a Warmer, More Acidic Ocean Lead to Increased Pseudo-nitzschia Bloom Toxicity in the Southern California Bight?***

Understanding how ocean acidification, elevated carbon dioxide, and warming can affect the toxicity of Harmful Algal Blooms (HABs) addresses two OPC research priority focal areas: Climate Change Adaptation to Address Sea-Level Rise and Other Climate Impacts and Sustainable Fisheries Management. This project complements previous OPC investments in Sea Grant research projects which address ocean acidification and HABs, yet it employs an innovative approach by investigating both of these emerging threats. With this information, indicators will be developed to allow marine resource managers, shellfish harvesters, aquaculturists, and the general public to better understand the evolving HABs threat in rapidly-changing Southern California waters. Representatives of the shellfish industry have expressed significant interest in research results, and the investigators intend to share their results with shellfish harvesters and scientists through the California Current Acidification Network to inform industry adaptation strategies to ocean acidification-related risks.

Project Budget

OPC Funds	$147,915
Matching Funds	$76,363

Project Team

David Hutchins, University of Southern California
Feixue Fu, University of Southern California

Harmful algal blooms (HABs) can have negative impacts on human and ocean health, and coastal economies (e.g. aquaculture, fisheries and tourism) due to production of toxins, which can cause illness and mortality in humans and wildlife, degrade water quality, and disrupt the food chain. HABs and the resulting shellfish toxin loads are increasing in frequency worldwide at significant costs to human and ecosystem health. Preliminary research conducted by these investigators suggests that elevated carbon dioxide dramatically increases the toxin production of HAB species, especially when these species are challenged by nutrient limitation. There is a need to better understand how the carbon dioxide/toxin response interacts with other concurrent climate change variables, such as seawater warming and sunlight availability.

This study will investigate how rising carbon dioxide concentrations in seawater, in combination with warmer sea surface temperatures and altered light regimes, affect the toxicity of HABs in the Southern California Bight. The researchers will conduct a detailed series of laboratory experiments with locally isolated HAB cultures, along with a more limited set of natural bloom incubations during local southern California bloom events. The lab experiments will target multiple local bloom species in experimental designs incorporating carbon dioxide changes in concert with warming and light exposure changes. Toxin levels will be measured in all experiments, along with other biological metrics to aid in interpreting the toxin data.

3) ***The Value of Habitat Diversity in Marine Reserves: Spiny Lobster and Sheephead Use of the Intertidal Zone of the Santa Catalina Island MPA***

Outcomes anticipated from this research will address the research priority focal area, Sustainable Fisheries Management to Ensure Healthy and Thriving Marine Ecosystems and Fishing Communities. In particular, the before-after/control-impact (BACI) analysis of the effects of MPA establishment will inform assessments of MPA effectiveness in fulfilling management objectives related to improving fish abundance. OPC staff will encourage the researchers to share their results with the MPA Monitoring Enterprise to ensure that this information is included in evaluations of the South Coast MPA network. OPC funds will be used for the first year of this research project, and will be matched by USC Sea Grant NOAA funds for the second year.

Project Budget

OPC Funds	$20,337
USC Sea Grant	$18,618
Matching Funds	$19,935

Project Team

Corey Garza, California State University, Monterey Bay

During the South Coast MLPA Initiative process, intertidal habitat was considered as an important ecosystem which provides a vital food source for several species. Specific components of intertidal habitat (e.g. algal turf and mussels) can serve as a key foraging resource for spiny lobster and California sheephead, two ecologically and economically important species in Southern California. Previous studies suggest that intertidal habitat may be critical to female lobster and sheephead, especially during the spring/summer spawning season. Given recent declines in the catch of these two species, additional information on how these species rely upon intertidal habitat may be necessary to inform MPA management and evaluation in order to promote sustainable populations.

This study will investigate how spiny lobster and sheephead populations are affected by the establishment of an MPA offshore of Catalina Island near USC's Wrigley Marine Science Center. The researchers will analyze a long-term dataset and conduct new subtidal surveys of intertidal habitat and sheephead and lobster populations in the Catalina MPA to describe linkages between intertidal habitat characteristics and population characteristics throughout the species' life cycles. Survey and historical data will also inform assessments of the importance of intertidal habitat for female lobsters and sheephead, and the extent to which establishment of the MPA affected demographic features (e.g. abundance, body size, fecundity) of the lobster and sheephead populations.

NEXT STEPS

If the council concurs with the recommended projects, staff will authorize the Sea Grant programs to begin these projects. The two Sea Grant programs will administer the grants on

behalf of the OPC and provide annual reports to OPC staff on the progress of the research projects. The OPC Science Advisor will coordinate with grant recipients to improve the translation of their research results to products that are useful to resource managers and policy makers.

CONSISTENCY WITH THE OPC'S STRATEGIC PLAN, THE CALIFORNIA OCEAN PROTECTION ACT, AND THE PROJECT FUNDING GUIDELINES

The proposed research projects are consistent with the OPC Five-year Strategic Plan[1], the California Ocean Protection Act, and the OPC Funding Guidelines, as described in the November 29, 2010 staff recommendation.

COMPLIANCE WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

Each of the proposed projects is categorically exempt from review under the California Environmental Quality Act ("CEQA") pursuant to 14 Cal. Code of Regulations Section 15306 because each of the projects involves only data collection, research and resource evaluation activities that will not result in a serious or major disturbance to an environmental resource. While the research may result in additional management actions by public agencies, those actions, if any, have not yet been approved, adopted or funded. Staff will file a Notice of Exemption upon approval by the council.

[1] The current strategic plan continues to guide the Council's activities until the next five-year strategic plan has been adopted.