



## MEMORANDUM

TO: Ocean Protection Council

FROM: Doug George, Ocean Protection Council

DATE: November 30, 2009

RE: Concurrence with OPC priority scientific research projects selected for 2010 Sea Grant awards

ATTACHMENTS: 1 – [November 21, 2008 Staff Recommendation](#)  
2 – [2009 Ocean Protection Council Focused Research and Outreach Initiative Priorities for Sea Grant Research 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 2009 Ocean Protection Council/Sea Grant Research Priorities.”

## BACKGROUND

At its November 21, 2008 public meeting, the council authorized a grant of \$1,000,000 to the State’s two Sea Grant programs to select and fund scientific research projects that support the council’s research priorities (Attachment 1). The council resolution and grant agreements require that prior to awarding funds the council’s concurrence must be obtained for the selected research projects recommended for each of the Sea Grant programs: University of California (UC) Sea Grant and University of Southern California (USC) Sea Grant. The OPC priorities and guidelines for Sea Grant research proposals can be found in Attachment 2.

## RECOMMENDED PROJECTS

### University of California

As detailed in the November 2008 staff recommendation, the approach to 2009 funding for UC Sea Grant continued the approach established in the previous year to support a single research

and outreach initiative to address one priority issue area. To improve coordination between scientists and resource managers, the approach focuses on assembling a team of researchers from diverse scientific backgrounds, who together will examine all facets of an issue, including how state managers can apply the research findings to improve decision making.

In February 2009 the UC Sea Grant program released a request for proposals (RFP) soliciting preliminary grant proposals. The RFP required the multidisciplinary teams to discuss how they would synthesize the current state of the knowledge for that research topic into a series of policy papers, produce applied tools or products (such as useful indicators or predictive models), and disseminate their results to policy makers and other interested communities. The priority topics available to initiative teams were:

- Climate change
- Harmful algal blooms (HABs)
- Land-ocean interactions and water quality
- Salmon-ocean conditions
- Wave and tidal energy development

Seven 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. The selected research teams were provided extensive comments from the reviewers; OPC staff and the OPC Science Advisor also provided guidance for improvements and modifications. Each final proposal was again reviewed by both RASGAP and technical reviewers, including outside peer-reviewers who submitted extensive written comments on each of the research proposals.

### ***Preferred Project***

The staff recommends funding the project titled, *The Future of the California Salmon Fishery: Roles of Climate Variation, Habitat Restoration, Hatchery Practices, and Biocomplexity*. The collapse of the California salmon fishery has had a devastating impact to communities and, despite large amounts of research, fundamental questions regarding salmon science remain.

### ***Project Team***

Brian K. Wells, NOAA, Southwest Fishery Science Center, Fisheries Ecology Division (FED), (lead PI)  
Steven Lindley, FED  
Eric Bjorkstedt, FED  
Louis Botsford, University of California, Davis  
John Field, FED  
John Carlos Garza, FED  
Churchill Grimes, FED  
David Hankin, Humboldt State University  
Sean Hayes, FED  
Bruce MacFarlane, FED  
Melodie Palmer-Zwahlen, California Department of Fish and Game/ Ocean Salmon Project  
Michael O'Farrell, FED  
William Sydeman, Farallon Institute  
Cindy Thomson, FED

In response to a sudden collapse of the 2005 brood year Sacramento River fall Chinook (SRFC) salmon and poor status of many West Coast coho salmon populations, the Pacific Fishery Management Council (PFMC) mandated a complete closure of commercial and recreational Chinook fisheries south of Cape Falcon, Oregon in 2008 and 2009. While salmon fisheries off California have been strong over the years, fish representing the 2004 and 2005 SRFC brood years (juvenile emigration in spring 2005 and 2006) showed the worst returns on record in 2007 and 2008. The negative impact of the closure was so drastic that West Coast governors asked for \$290 million in disaster relief; the U.S. Congress appropriated \$170 million.

Improving the diversity and function of freshwater and estuarine habitats and changing hatchery practices should reduce variability in ocean abundance of Chinook salmon; many actions could be taken toward these ends. Tools are critically needed that will allow resource managers to assess the potential costs and benefits of restoration scenarios in the context of the full salmon life cycle and the freshwater, estuarine, and marine ecosystems upon which salmon depend. The objective of the project is to create these tools, after improving understanding of the complex linkages among climate variation, human activities, and salmon population response as much as possible with existing data.

The goal of this project is to determine the influence of biotic and abiotic factors on Klamath River and Central Valley salmon runs at each life stage and to quantify those impacts. The information would then be used to evaluate the effects of various management strategies, including promoting a more diverse population structure. A retrospective analysis will be performed to investigate the relationships among salmon survival, growth and maturation, and climate. A prospective analysis will follow where simulation models will examine management options to improve fishery stability and average fishery yield. The end products of the project will be conceptual and simulation models of California salmon ecosystems that will identify solutions most likely to improve the plight of the salmon fishery and illuminate the tradeoffs with other resources and users.

The interdisciplinary team includes oceanographers, fishery stock assessment scientists, ecologists, geneticists and economists with expertise in statistical and numerical modeling, data analysis, and familiarity with the salmon fishery, its management regime and the underlying databases. The project is also an excellent example of a state-federal partnership. The results will be presented to PFMC and continue a working relationship with the council to assure that the models continue to adapt to future conditions. In addition, these results will help to manage other fisheries along the Pacific Coast. If managers are to mitigate the increasing variability and reduced resiliency of salmon, it is critical that there be a tool for estimating the likely importance of various managerial actions at each life stage of the fish. It is also important to determine the economic costs and benefits of each of the mitigation actions. This project will provide a complete accounting of possible mitigation actions (e.g., hatchery practices, habitat restoration, control of freshwater flow rates) as well as the cost and benefits of each to the fishery.

### **The University of Southern California**

Funding for the USC program was directed at individual proposals, following the same mechanism that has been used in previous years. Proposals were required to illustrate a strong

connection to management by specifying outreach mechanisms to integrate results with state management needs.

USC Sea Grant released an RFP in February 2009 specifying urban water quality as the single overarching priority. The top research priorities were:

- 1) identifying chemical and biological metrics and methods for rapid, scientifically-valid water quality assessments and identifying best indicators of harmful water quality conditions, with an emphasis rocky intertidal and subtidal communities
- 2) quantifying impacts on human and ecosystem health to help prioritize the most harmful pollutants
- 3) evaluating the effectiveness of Low Impact Development (LID) and other techniques in reducing polluted runoff in coastal systems and examining the potential application of LID-type principles at local and regional scales
- 4) using marine managed areas (e.g. MPAs and ASBS), particularly those adjacent to Critical Coastal Areas, as natural laboratories to elucidate the effects of land-based pollutants on species and communities.

Fourteen pre-proposals were submitted and nine projects were chosen for a full proposal review. The review process for these proposals was the same as with UC Sea Grant, with each being reviewed by RASGAP and technical reviewers.

### ***Preferred Projects***

OPC staff recommends fully funding the project titled, *Quantifying Contaminants of Emerging Concern in Urban Watersheds Using Bivalves and Passive Samplers*, and partially funding the project titled, *Impacts of Algal Toxins on Species Composition of Coastal Plankton Communities*. The first project would receive almost 75 percent of the USC Sea Grant OPC allocation of \$200,000 with the balance of OPC funds applied to the second project. 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) Quantifying Contaminants of Emerging Concern in Urban Watersheds Using Bivalves and Passive Samplers***

#### ***Project Team***

Keith A. Maruya, Principal Scientist, Southern California Coastal Water Research Project Authority (SCCWRP)

Rachel G. Adams, Assistant Professor, Loyola Marymount University (LMU)

Although tens of thousands of different constituents/contaminants of emerging concern (CECs) are utilized today in commerce, little is known about their sources, occurrence, levels and potential for biological effects in coastal marine systems. Among the highest priority CECs in heavily anthropogenic-impacted oceans are those with the potential for sub-lethal impacts at very low concentrations, so called endocrine disrupting compounds (EDCs). Recently, the NOAA National Status & Trends Mussel Watch Program (NS&T MWP) has rededicated itself to serve as an early warning system for CECs/EDCs in the coastal zone. As part of this effort, SCCWRP

and other coastal environmental quality agencies have partnered with NOAA to expand the list of routinely monitored chemicals to include several high priority CECs using California as the backdrop.

Passive sampling devices (PSDs) are slowly gaining acceptance as cost-effective alternatives to conventional water quality measurement tools for quantifying ultra-low levels of toxic contaminants like CECs. In a previous USC Sea Grant project, the PIs demonstrated the utility of two types of PSDs for detecting minute concentrations of legacy organic pollutants (e.g., PCBs) *in situ*. These same PSDs may also be amenable to several classes of CECs, including PBDEs, problematic current use pesticides (e.g., pyrethroids) and very high use consumer-based chemicals that have been implicated with deleterious health effects (e.g., triclosan).

The overall goal of this project is to develop passive sampling techniques for ultra trace detection of high priority CECs, compare their measurements with accumulation by sentinel bivalve species, and apply these techniques to address data gaps on occurrence and source contributions in coastal urban and marine systems. This effort includes the continued development and refinement of CEC prioritization frameworks and predictive models, related studies using passive samplers for CECs, and occurrence and fate investigations supported by SCCWRP and its collaborators, including NOAA's NS&T MWP.

## ***2) Impacts of Algal Toxins on Species Composition of Coastal Plankton Communities***

### ***Project Team***

Astrid Schnetzer, Research Assistant Professor, University of Southern California  
David A. Caron, Professor, University of Southern California

Coastal waters off Southern California have been the site of recurrent harmful algal blooms (HABs) in recent years. Many adverse effects can be caused by these events ranging from low-oxygen conditions in enclosed environments (harbors and marinas) to shellfish poisoning in humans that consume toxin-contaminated shellfish. Adverse impacts on wildlife and human health coupled with the notion that HABs are increasing in their frequency and severity has stimulated efforts to understand the relationships between the emergence of HABs and the potential environmental impacts they cause. In particular, coastal waters adjacent to highly developed and populated urban areas, such as the Los Angeles metropolitan area, can be affected by eutrophication-related issues (e.g., increased nutrient load in river runoff, storm or sewage drainage). This situation makes coastal cities, such as Los Angeles, increasingly prone to HAB-related water quality problems.

This project focuses on how algal toxins affect species composition within phytoplankton assemblages. Do these toxins act as suppressive agents that give algal producers a competitive advantage by inhibiting the growth of co-occurring species? This research question will be addressed for phytoplankton communities from King Harbor, located in the South Bay area of Los Angeles County, where previous work by the group has shown that potentially toxic species are common members of the assemblage.

King Harbor represents a case study for many harbors and marinas along the Southern California coast that receive increasingly high anthropogenic inputs of nutrients. Coastal municipalities have struggled to maintain high levels of water quality of harbors and beaches in the face of an onslaught of a wide variety of contaminants originating from the activities within their own

communities, or through the transport of contaminants from inland sources via storm drains, rivers or creeks. Knowledge on the cause-effect relationships that drive a bloom from initiation to demise will be vital for cities to make more informed and educated decisions when being faced with these events in the future.

## **NEXT STEPS**

Proposition 84 bond funds to support these grants are frozen because of the current fiscal climate. Because this grant was authorized before December 19, 2008, this concurrence is not a new authorization under the current directions from Department of Finance in Budget Letter 09-15.

If the council concurs with the recommended projects and when funds are available, 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**

These projects are consistent with the OPC Five-year Strategic Plan, California Ocean Protection Act, and the OPC Funding Guidelines, as described in the November 21, 2008 staff recommendation. Specifically, these projects are consistent with Goal B, Objective 1 of the Strategic Plan which identifies improving scientific understanding of our ocean and coastal resources as a priority, which these projects will do. The Ocean Protection Trust Fund identifies allowable projects in Pub. Res. Code Section 35650 (b)(2)(F), as including projects that “improve management, conservation, and protection of coastal waters and ocean ecosystems,” and Section 35650 (b)(2)(G), as including projects that “provide monitoring and scientific data to improve state efforts to protect and conserve ocean resources.” Similarly Section 35650(b)(2)(I) authorizes funding for projects that “[a]ddress coastal water contamination from biological pathogens, including collaborative projects and activities to identify the sources of pathogens and develop detection systems and treatment methods.” Research funded through the Sea Grant programs will meet these directives because the projects chosen will directly focus on collecting and disseminating information to ocean and coastal resource managers.

## **COMPLIANCE WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT**

The proposed projects are categorically exempt from review under the California Environmental Quality Act (“CEQA”) pursuant to 14 Cal. Code of Regulations Section 15306 because each of the project 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 follow-up actions by public agencies, those actions, if any, have not yet been approved, adopted or funded.