



Ocean Protection Council 2011 Research Priority Focal Areas

In order to ensure that the Sea Grant call for proposals includes relevant and timely information on the most pressing research needs, the Ocean Protection Council (OPC) calls on the OPC Science Advisory Team (OPC-SAT) via the Ocean Science Trust (OST) to write research priority descriptions (descriptions) for each of the five research priority focal areas. Prior to engaging the OPC-SAT, the OST seeks the guidance of the OPC and agency staff to compile a series of the most pressing management questions surrounding these focal areas. Once finalized, the OPC-SAT recommends specific research needs for each of the management questions, and synthesizes them into the descriptions.

The OPC-SAT and the OST are currently working through draft descriptions. The following represent the status of ongoing discussions and topics under consideration for each research priority focal area.

Climate Change Adaptation to Address Sea-Level Rise and Other Climate Impacts to Ocean and Coastal Ecosystems - Climate change is the defining environmental issue of our time. Compelling evidence exists that the negative impacts to ocean and coastal resources from climate change will be substantial. Impacts include sea-level rise, ocean warming, ocean acidification, and potentially profound disturbance in ecosystem structure and function. The OPC plans to coordinate policy development across agencies, attract federal funds, and assist local governments in responding to climate change. Information and research is needed to understand how climate change will impact ocean and coastal ecosystems, as well as the impacts of sea-level rise on state and local economies and infrastructure. These issues may include the following:

1. Coastal squeeze: coastal habitats, such as marshes, estuaries, and wetlands that cannot move inland due to human infrastructure.
2. Marine protected areas (MPAs): California's new network of MPAs includes a strong representation of many major marine habitat types. However, will we lose what we thought we were protecting?
3. Identify and make use of existing tools and data to identify the most vulnerable ecosystems and model projected changes.

Coastal and Marine Spatial Planning to Inform Decisions about Ocean Uses Off the California Coast - California's ocean and coastal ecosystems are facing increasing demands and pressure from existing and emerging uses, including offshore energy, marine aquaculture, telecommunications operations, shipping, commercial and recreational fishing, oil and gas extraction, and other human activities. To evaluate the tradeoffs of potentially conflicting uses in an ecosystem-based context, resource managers must set accurate ecological, economic, and social objectives that reflect key attributes of coastal and marine ecosystems as well as the communities that depend on them. Managers must have access to the relevant baseline science and geospatial data as it relates to fundamental concepts such as ecosystem health, structure, and functioning, as well as how humans fit within those systems.

Land-based Management to Reduce Impacts on Ocean and Coastal Resources - For California coastal communities, the ocean margins serve not only as a depository for pollutants from terrestrial sources such as urban and agricultural run-off, wastewater effluent, and thermal effluent from power plants, but also as the basis for sizeable ocean and coastal economies. Coastal decision-makers and managers currently face issues that require understanding of biophysical as well as economic, political, social, and cultural interactions. These issue areas may include the following:

1. Identifying the specific upstream sources and pathways of contaminants and pollutants, particularly land-based activities that are having the greatest impacts on near-shore marine ecosystems.
2. Impacts to marine ecosystems, particularly MPAs and near-shore habitats, such as rocky intertidal.
3. Evaluating approaches to reducing the impacts of land-based sources of runoff.
4. Identifying critical communication gaps between experts that work upstream in the watershed, water quality scientists, and marine ecologists, as well as with scientists that evaluate land-based solutions, such as low impact development.

Preparing for Emerging and Industrial Uses of the Ocean - Despite growing information from the scientific community that the health of global marine ecosystems are in decline, additional human-induced stressors on marine ecosystems continue to emerge. In California, the need for alternative sources of energy, more freshwater, and greater seafood supplies have given rise to more proposals for offshore wind, wave, and tidal energy projects, desalination plants, and open-ocean marine aquaculture. Managers will have to make decisions in the near future on whether and how to permit and regulate these emerging uses, while maintaining ecosystem health and existing uses such as recreation, and commercial and recreational fishing. Some of the issue areas may include the following::

1. Impacts of various offshore energy facilities on various marine habitats and species: the downstream physical effects of lower wave energy, impacts from acoustic noise emanating from facilities, changes in water quality, and impacts from electromagnetic radiation.
2. Desalination: solutions to reduce entrainment at water intakes, diffuse brine at discharges, the potential to combine intakes with existing nuclear power-plant water intakes, and cost/benefit analysis of desalination and other methods of capture/treatment/storage of water.
3. Aquaculture: more research is needed to understand the direct, indirect, and cumulative impacts of aquaculture operations as well as the long-term monitoring needs, and finally social science questions on the impacts of aquaculture on traditional users.
4. Polyculture: more research is needed to understand potential impacts of multispecies aquaculture and the potential for multi-trophic polyculture.

Sustainable Fisheries Management to Ensure Healthy and Thriving Marine Ecosystems and Fishing Communities - The California coast has always been defined by its rich fishing heritage. However, California fisheries are increasingly threatened by a multitude of ongoing impacts, including pollution, habitat destruction, overfishing, and climate change. In order to preserve California's historic fisheries and coastal communities, fisheries managers must seek innovative, ecosystem-based approaches to fisheries management that will increase resiliency of fish stocks

and help fishing dependent communities adapt to predicted changes. Managers in California are exploring innovative ways to improve fisheries management which may involve more community-based, cooperative management that includes fishing participants, tribes, academic scientists, NGOs, and other private partners, as well as encouraging fishing practices that are in accordance with internationally accepted standards of sustainability:

1. Sustainable seafood certification: many fisheries could improve by adopting standards of sustainability, but research is needed to better define sustainability in California waters.
2. Fisheries management and MPAs: very little is known on how best to adapt fisheries management to the new network of MPAs. Also, can MPAs be used to better manage data-poor fisheries, and how could MPAs contribute to sustainability certification?
3. Emerging and/or data-poor fisheries: cooperative research with stakeholders, including directly enlisting fishing participants to contribute data from their boats while fishing, is needed to help establish a process for handling emerging fisheries and collecting much-needed information on data-poor fisheries.
4. Traditional ecological knowledge: greater understanding of how traditional knowledge (commercial, recreational, and subsistence, including tribal and non-tribal) can link to scientific knowledge.