



# A Vision for Our Ocean and Coast

Five-Year Strategic Plan  
2012 – 2017



CALIFORNIA OCEAN PROTECTION COUNCIL

# A Vision for Our Ocean and Coast

## Five-Year Strategic Plan 2012–2017

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OCEAN PROTECTION COUNCIL

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PHOTO: JOHN MEYER



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## THE CHALLENGE

Globally, broad agreement exists that ocean stressors such as climate change, historic overfishing, physical disturbance, and pollution are interacting *synergistically*—with effects greater than their expected combined individual impacts—to harm our oceans. The threats are mounting, and the consequences will be dire unless we continue to take bold action.

## INTRODUCTION

The California Ocean Protection Council (OPC) was created in 2004 to help protect, conserve, and maintain healthy coastal and ocean ecosystems and the economies they support. The OPC works with diverse interests and provides the leadership needed to meet the accelerating and complex challenges of our time as set forth in the California Ocean Protection Act (COPA) (SB 1319, Burton 2004).<sup>1</sup>

The strategic plan that guided the OPC's first five years was deliberately broad and reflected a more generous fiscal climate in which voter-initiated funding was available to support OPC projects. The Council rapidly launched diverse actions and made substantial investments to address critical issues and advance needed policy changes (see Exhibit 1 below). Yet significant challenges remain. Moreover, with fewer available funds and a smaller workforce, California's agencies must now manage coastal and ocean resources with ever greater effectiveness and efficiency.

This new strategic plan for fiscal year 2012/2013-fiscal year 2016/2017 proposes OPC action in areas of critical need where the Council's involvement can yield tangible progress and have the greatest impact.

The OPC will focus on five areas over the next five years:

- A. Science-based decision-making**
- B. Climate change**
- C. Sustainable fisheries and marine ecosystems**
- D. Coastal and ocean impacts from land-based sources**
- E. Existing and emerging ocean uses**

<sup>1</sup>Public Resources Code Section 35500 et seq.



## THE OCEAN PROTECTION COUNCIL IS PREPARED TO MEET THE CHALLENGE

We must continue to meet the challenges ahead with foresight, leadership, sound science, and a deep commitment to making tangible progress. In California, the OPC is positioned to play the critical role of strategically deploying state assets, coordinating across sectors, and productively engaging the state's extraordinary scientific community. California's leadership in ocean management is a model for other states, the nation, and the world.

This plan was developed through a consultative and collaborative process involving the Ocean Protection Council members, the OPC Steering Committee, the OPC Science Advisory Team (OPC-SAT), relevant state and federal agencies, tribes and tribal communities, stakeholders, and the interested public. Public input was invited through three public workshops as well as two formal public comment periods. The OPC formally adopted this strategic plan on February 17, 2012. In undertaking this strategic plan, the OPC intends to work in close partnership with the many state agencies that manage ocean and coastal resources as well as its federal, tribal, academic, nongovernmental, and private sector partners.

The goals, objectives, and actions outlined in this document are designed to reflect the state of California's priorities and interests. They also are consistent with the National Ocean Policy adopted by President Obama in his July 2010 Executive Order No. 14547 and the *Final Recommendations of the Interagency Ocean Policy Task Force*.<sup>2</sup>

<sup>2</sup>Final Recommendations of the Interagency Ocean Policy Task Force July 19, 2010 (The White House Council on Environmental Quality). [www.whitehouse.gov/files/documents/OPTF\\_FinalRecs.pdf](http://www.whitehouse.gov/files/documents/OPTF_FinalRecs.pdf).





PHOTO: ROSS GRISWOLD

## PLAN CONTEXT

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California's coastal and ocean resources are critical to the state's environmental and economic security and integral to the state's high quality of life and culture. A healthy ocean is part of the state's legacy, and is necessary to support the state's human and wildlife populations. Each generation of Californians has an obligation to be good stewards of the ocean, to pass the legacy on to their children. (COPA §35505[a])

California's ocean and coast are among its most valuable assets. They include diverse and highly productive ecosystems; a unique 1,100-mile coastline that encompasses beaches, rocky cliffs, harbors, and estuaries; and coastal communities that range from metropolitan cities to rural towns. In passing COPA, the Legislature recognized that Californians and others benefit in many ways from the state's marine fisheries, abundant wildlife, recreational opportunities, and vibrant coastal communities. The Legislature also recognized that healthy coastal and ocean ecosystems provide habitat, protect shoreside communities from floods and storms, and support important aesthetic, educational, and cultural uses.

California has the largest ocean economy in the United States in terms of employment and gross state product.<sup>3</sup> The state's vibrant tourism industry, diverse fishing industry, international ports and other businesses comprise an ocean-dependent economy of more than \$40 billion per year.<sup>4</sup> Almost 70% of California's citizens live in coastal counties.<sup>5</sup> The state's coastal economy and communities depend on the state's success in protecting the coastal marine environment that fuels and sustains their growth and prosperity.

The OPC was created on September 23, 2004 when Governor Schwarzenegger signed the California Ocean Protection Act. This ambitious statute renewed the state's long standing commitment to forward-thinking ocean protection policies by establishing a new entity to oversee and coordinate state ocean protection activities.

**The mission of the California Ocean Protection Council is to ensure that California maintains healthy, resilient, and productive ocean and coastal ecosystems for the benefit of current and future generations.**

The California Ocean Protection Act **requires the OPC to carry out the following duties and activities** (COPA §35615):

- Coordinate activities of state agencies to improve the effectiveness of state efforts to protect ocean and coastal resources.
- Establish policies to coordinate the collection and sharing of scientific data related to ocean and coastal resources and recommend effective and scientifically sound approaches to protecting ocean resources.

<sup>3</sup>According to the National Ocean Economics Program's California's Ocean Economy, 2005. This report also states that \$43 billion of gross state product attributed to coastal industries is attributed to the following sectors: tourism and recreation, 58%; transportation, including ports, 34.5%; construction, minerals, ship and boat building, and harvesting of marine life, 7.5%. Tourism and recreation accounted for 76.8% of all coastal employment.

<sup>4</sup>California's Ocean Economy, 2005 report. See review of economic assessments of the value of beaches in Pendleton, Linwood, Philip King, Craig Mohn, D. G. Webster, Ryan K. Vaughn, and Peter Adams (2009), *Estimating the Potential Economic Impacts of Climate Change on Southern California Beaches*. PIER Research Report, CEC-500-2009-033-D, Sacramento, CA: California Energy Commission.

<sup>5</sup>Based on the 2010 U.S. census.



- Identify and recommend to the Legislature changes in state law and policy needed to achieve the goals of COPA.
- Recommend to the Governor and the Legislature actions the State should take to encourage needed changes in federal law and policy.

During its initial years, the OPC successfully raised government and citizen awareness of and attention to ocean issues in California. In particular, the OPC demonstrated the benefits of heightened cooperation between the state's two overarching environmental agencies, the California Environmental Protection Agency and the Natural Resources Agency. Accomplishments of the OPC include: initiating new conservation and science-based policies, bringing agencies together to improve state ocean protections, and funding and leading innovative projects that enhance understanding of ocean ecosystems and resource management. Specific accomplishments are listed in Exhibit 1 below. It is widely recognized that through these initiatives, the OPC has helped maintain and build California's role as a national leader in ocean policy.

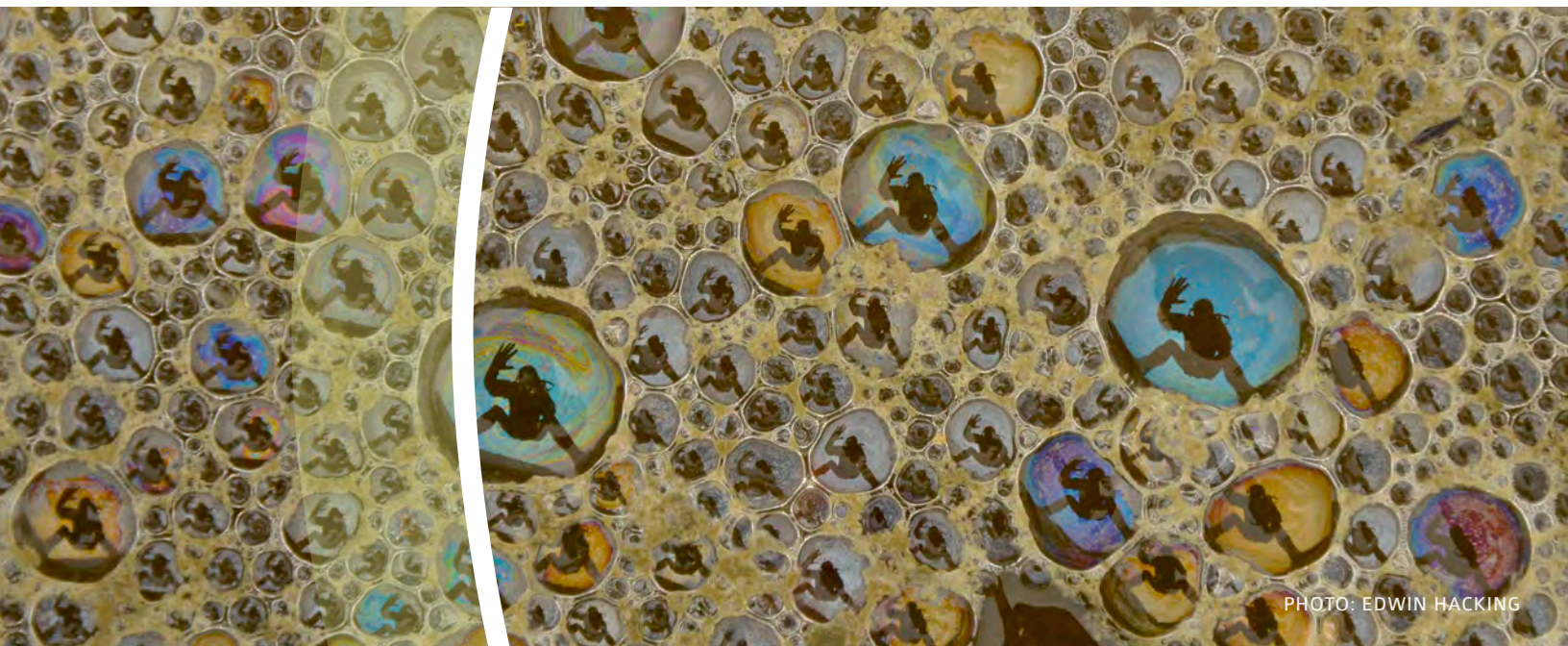
In 2009 the OPC commissioned an independent evaluation<sup>6</sup> of its performance during its first five years. The evaluation highlighted significant

accomplishments and also provided useful guidance for the future. One major recommendation was that the OPC could enhance its effectiveness by improving its strategic focus. This strategic plan builds on this and other recommendations in the evaluation.

Consistent with those recommendations, during the next five years, the OPC will:

- **Emphasize issues** or policies that are consistent with COPA and for which the OPC is strategically suited to have a significant impact.
- **Clearly define desired outcomes** of the OPC actions and expenditures in order to evaluate and communicate successes.
- **Ensure transparency and accountability** by improving outreach to other agencies and partners.
- **Increase inter-agency coordination and collaboration**, and provide initial funding investments for key projects.
- **Ensure durability** of OPC's previous investments and policy innovations and work to expand the acceptance of those actions.
- **Enhance the use of science to inform** decision-making to ensure sound decisions.

<sup>6</sup> *Ocean Protection Council White Paper, "Towards Improving the California Ocean Protection Council"* (prepared for the OPC by NewPoint Group, October 2010).



## Exhibit 1: KEY OPC ACCOMPLISHMENTS DURING FIRST FIVE YEARS

### SEAFLOOR AND SHORELINE MAPPING

Led efforts to complete the first statewide map of the seafloor and developed a national model for seafloor mapping. The OPC's \$15 million investment attracted an additional \$14.5 million for implementing the project. A shoreline mapping effort is now underway to create a seamless onshore-offshore high resolution elevation map of the state's 1,100-mile coastal zone.

### OCEAN OBSERVING – HIGH FREQUENCY RADAR

Spearheaded a collaborative statewide program to monitor and map the surface currents off the coast of California, the Coastal Ocean Currents Monitoring Program (COCMP). The resulting network of more than 50 shore-based HF Radar (high frequency radar) instruments has provided data useful to oil spill response, wastewater discharge monitoring, beach water quality monitoring, plume tracking at urban rivers during storm events, search and rescue efforts, climate change analysis, harmful algal bloom (HAB) tracking and forecasting, and coastal inundation modeling.

### SCIENCE INTEGRATION

Established a team of internationally renowned scientists to provide scientific expertise directly to OPC decision-making, and codified the integration of independent science to support decisions.

### CLIMATE CHANGE AND SEA LEVEL RISE ADAPTATION

Led the development of the 2009 California Climate Adaptation Strategy for the ocean and coast. Followed-up by coordinating development of ground-breaking guidance on sea level rise by a multi-agency team. Continues to coordinate a statewide team to begin implementing these strategies.

### MARINE DEBRIS

Brought widespread attention to the problem of marine debris and spurred statewide legislation and local government action to reduce debris pollution.

### MARINE PROTECTED AREAS (MPAS)

Launched a cutting-edge monitoring program that will support the long-term adaptive management of the state's new network of MPAs and result in improved ocean ecosystem understanding and management.

### INNOVATIVE FISHERIES MANAGEMENT

Invested over \$8 million in innovative approaches for sustaining California fisheries through community-based collaborations, market approaches, and building capacity and data for improved fishery management.

### DIRECTED SCIENTIFIC STUDIES AND RESEARCH

Funded objective technical reports to inform state marine management issues such as decommissioning of offshore oil and gas platforms, reducing harmful impacts of invasive species, and once-through cooling.

### ONCE-THROUGH COOLING (OTC)

Funded studies and adopted a resolution regarding the need to phase out OTC in coastal waters. The State Water Resources Control Board followed with a policy requiring cooling water intake structures to reflect the best technology available for minimizing adverse environmental impact. As a result of these policy efforts, many utilities are planning to re-power without OTC over the next decade.



# THE OPC'S STRATEGIC APPROACH

One of the OPC's primary objectives is to provide a unified vision for ocean governance in California. The OPC draws on and combines the strengths of relevant California agencies and the expertise of the scientific community to create comprehensive and lasting solutions for our oceans. Over the next five years, the OPC's approach to undertaking this task will emphasize the following roles.

**Recommend Policy:** The OPC will lead the development and refinement of policy recommendations at the national, regional, and state levels that advance the OPC's five year plan. At the national and regional levels, it will work with bodies such as the National Ocean Council (NOC) and the West Coast Governors Alliance on Ocean Health (WCGA).

**Lead and Promote Coordination:** The OPC will effectively facilitate collaborative action and communication among public agencies, scientists, tribes, NGOs, and members of the general public with interest in ocean and coastal management. To ensure the most efficient use of public funds, the OPC will reach out to and coordinate where appropriate with other multi-agency state bodies such as the Strategic Growth Council and the Biodiversity Council, as well as key federal entities (e.g., National Oceanic and Atmospheric Administration (NOAA), Department of the Interior, and the Environmental Protection Agency).

**Seek and Leverage Funding:** The OPC will fund high priority projects that strategically advance this plan's goals. The OPC will draw upon existing bond funds, future appropriations, and other new funding sources as they are identified. Consistent with the tightened fiscal climate, OPC recognizes the need to seek and leverage additional funding. In most cases, OPC funding will serve as a catalyst rather than providing ongoing operational support.



PHOTO: BILL BOUTON

**Spur Innovation:** Where appropriate, the OPC will support or help develop new tools or approaches for improving California's management of coastal and ocean resources effectively and efficiently.

**Inform Government Decision-Making with the Best Available Science:** The OPC will work closely with the Ocean Science Trust (OST) to access high quality and independent scientific information and advice to ensure its efforts are grounded in the best available knowledge. It will work with the OST to advance innovative ways to integrate scientific expertise into its decisions, priorities, and opportunities.

**Operate with Transparency and Accountability:** The Council will deliberate in an open, responsive, and inclusive manner and will specify the rationale for its policy and funding decisions. The OPC will identify intended outcomes and outputs for each of its actions.

Through a process involving the OPC Steering Committee, OPC Science Advisory Team, and the OPC Management Team, the OPC selected five areas as the focus of its efforts over the next five years. These areas are: A) Science-based decision-making; B) Climate change; C) Sustainable fisheries and marine ecosystems; D) Coastal and ocean impacts from land-based sources; and E) Existing and emerging ocean uses.

The first focal area—science-based decision-making—emphasizes improved use and sharing of scientific information in ocean governance and management. It is the foundation for all OPC work and cuts across the four subsequent substantive focal areas. Within this strategic framework, the OPC will

continue initiatives begun during its first five years that are consistent with this strategic plan. The Council also recognizes that it must remain agile and responsive to emerging issues and innovative ideas.

**The following criteria guided selection of these issue areas:**

**SIGNIFICANCE** – The issue has a significant effect on the condition and sustainability of coastal and ocean ecosystems and coastal communities.

**CONSISTENCY** – Required actions fulfill the OPC goals and purpose and match the OPC core roles and statutory authorities.

**TIMELINESS** – The issue has developed to a point where the OPC can advance the issue or resolve the problem.

**URGENCY** – Action in the near-term is critical to improve management and protection and reduce the threat to state resources.

**PROBABLE IMPACTS** – The OPC can make a critical, tangible, and lasting difference. The cost-benefit ratio is favorable.

**NEED** – The OPC's core roles are required for effective state action.

**SOUND SCIENCE** – The OPC's actions will be based on sound science and vetted by independent reviewers.

**The objectives and actions that appear in this strategic action plan were selected and evaluated against the criteria listed above as well as the additional criteria listed below:**

**DURATION OF THE OPC'S INVESTMENT** – The OPC will act as a catalyst for projects and programs and primarily will fund initiatives that eventually will be self-sustaining and do not require long-term ongoing OPC funds or staffing commitments for success.

**LEVERAGE PAST INVESTMENTS** – In addition to funding new high priority initiatives, the OPC, where appropriate, will focus on projects that leverage previous investments, build on previous resolutions, and follow up on projects or actions that yielded the most effective results over the last five years. The OPC will continue engagement on specific projects or issues if ongoing work will result in significant, additional impact.





## ACTION PLAN

The sections below set out the OPC's five-year strategy for using a science-based approach to address climate change, sustainable fisheries and ecosystem health, land-sea interactions, and existing and emerging ocean uses. Each articulates an overarching goal and key issues to be addressed. The plan identifies objectives for making tangible progress toward each goal as well as actions that the OPC anticipates undertaking.

## A. SCIENCE-BASED DECISION-MAKING

**GOAL:** Improve decision-making through use of best available science by state entities and agencies charged with ocean and coastal stewardship. Capitalize on and leverage the scientific community to support management and policy directions.

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Improving the use of scientific information in ocean and coastal resource decision-making is one of the OPC's key missions as highlighted in COPA and other state legislation. It is fundamental to achieving all the goals and actions outlined throughout this strategic plan. Further, as additional ocean and coastal uses emerge, drawing on scientific knowledge and technologies will augment the state's ability to balance interests and uses fairly in siting decisions, minimize impacts over time through adaptive management, and maintain and improve the health of ocean ecosystems.

The OPC is committed to basing its decisions and actions on the best available science, and to promoting the use of science among all entities involved in the management of ocean resources. To identify the most relevant and useful science in a timely and constructive manner, scientists and decision makers must overcome communication barriers, and strive to understand each other's capacities and needs. In its first five years, the OPC has put in place models to encourage and promote meaningful best practices, such as independent peer review of proposals and products, thus ensuring that open, transparent, and rigorous scientific information is part of the discussion.

The OPC created a framework for integrating science into state decision-making through its partnership with the OST and the creation of the OPC Science Advisory Team (OPC-SAT). Both OST and the OPC-SAT are engaging the scientific community in transparent ways that ensure the quality and objectivity of the science being advanced to the state.

A dedication to quality and *independent* science in turn promotes public trust in decisions and outcomes.

The OPC has also made substantial investments in data collection, including sea-surface-current and seafloor mapping, nearshore mapping, and the initial ecosystem baseline characterization of the marine protected areas. Through these critical investments, these and other relevant data will support a multitude of decisions going forward, and are available for all to use.

While the OPC does not expect to have the resources to fund large-scale data collection or original research efforts during the next five years, it is in an ideal position to improve the incorporation of science into coastal and ocean management decisions and to promote this practice throughout state agencies. This section describes the objectives that the OPC will pursue to enhance the scientific foundation of management actions that will thoughtfully balance sustainable use of our ocean and coastal resources with conservation of ocean ecosystems.

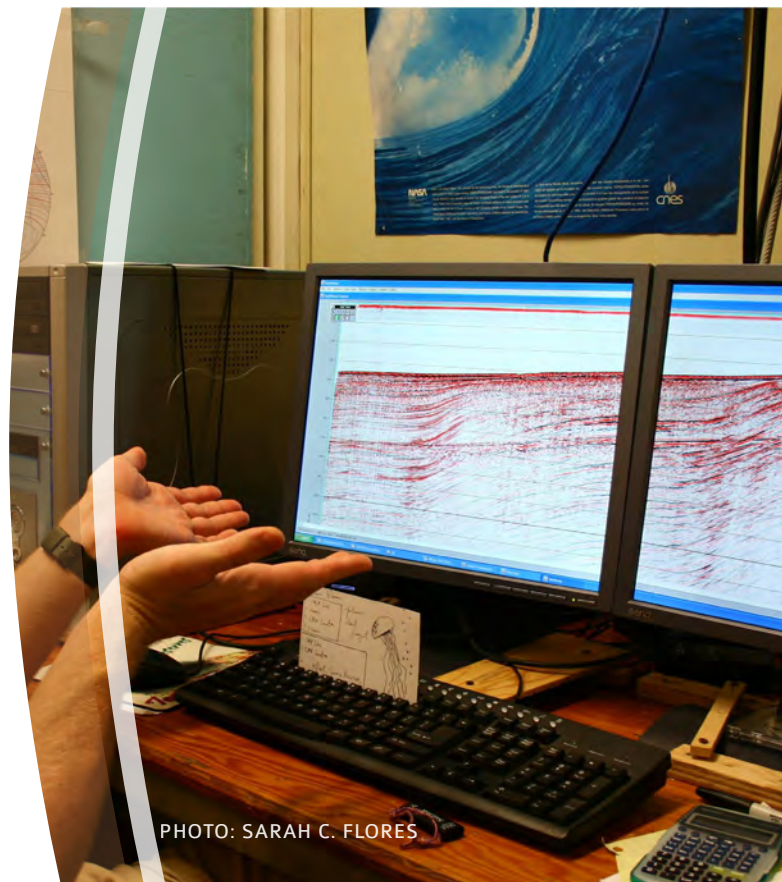
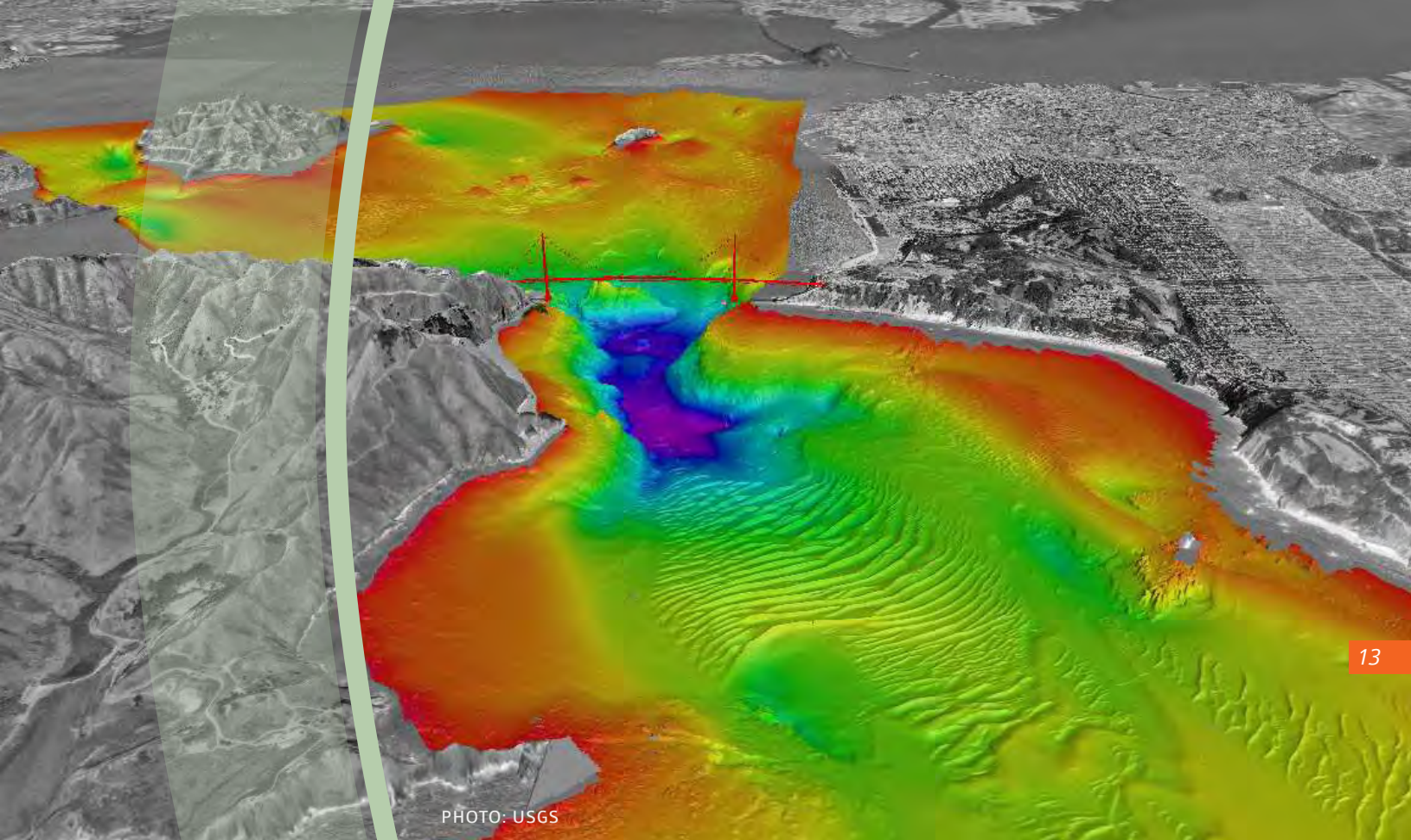


PHOTO: SARAH C. FLORES





## Issue 1: Improving the Use and Sharing of Scientific and Geospatial Information

Over the past five years, the state has made significant investments in the collection of scientific and geospatial information about the ocean, such as seafloor and shoreline mapping and sea-surface-current data. California now has a strong foundation of information to support decisions by managers in the years ahead. To fully realize the value of these investments requires the development of tools and frameworks that are useful and accessible by California's policy makers and resource managers. For example, raw data files are often too large and unwieldy for most managers to use in daily applications; data must be converted into useful information products in order to enable regulatory and planning analyses.

In 2010, the state legislature enacted Assembly Bill No. 2125 (AB 2125, Ruskin 2010), which requires the OPC and state agencies to cooperate in promoting state agencies' use and sharing of scientific and

geospatial information for coastal- and ocean-relevant decision-making. In 2011, the OPC assessed the functional and technical needs of California's coastal and ocean related public agencies with a focus on their abilities to gather, manage, use, and share information and decision-support tools that support agencies' mandate to consider ecosystem-based management in the coastal and ocean environment. A key finding of that study was that California lacks a coordinated statewide system for sharing and accessing coastal and ocean related geospatial information (maps, cadastral data, etc), which limits the ability of these agencies to use information for a variety of management needs. The OPC will continue to implement AB 2125 to improve access to and sharing of geospatial information among coastal and ocean related agencies and the public. For example, multi-agency access to California's repository of geospatial data layers will support efforts to efficiently respond to an oil spill emergency. This need was reinforced by the 2010 *Deep Water Horizon* oil-spill disaster in the Gulf of Mexico.

California has many components in place to advance this effort. In particular, the California Coastal and Marine Geospatial Working Group, co-chaired and facilitated by OPC staff, has identified and begun implementing projects to improve access and sharing of geospatial data for all agencies, stakeholders and the public. This technical working group is collaborating with California's Geospatial Information Officer (GIO), CalGIS, and other regional and federal efforts.

**Objective 1.1: Provide leadership to ensure the availability and use of authoritative geospatial information in decision-making.**

### PROPOSED ACTIONS

- Work with agencies, industry, NGOs, scientists, and other key stakeholders to implement COPA and AB 2125.
- Increase the availability of scientific and geospatial information products and analytical tools useful for informing policy and advancing ecosystem-based management.
- Compile and translate data into accessible information products that can be efficiently applied by coastal managers and decision-makers, as well as prospective permit applicants and the public.
- Continue to provide leadership on state technical working groups, such as the California Coastal and Marine Geospatial Working Group, to promote efficient communication and collaboration.
- Craft memoranda of understanding (MOUs) among partners, agencies, and others that encourage entities to support best practices, data sharing, and collaboration.
- Consider support for agencies to access data and integrate into improved decision-making.



- Identify opportunities for collaborating with California’s West Coast regional partners to meet common needs for collecting, managing, and sharing scientific and geospatial information.

## Issue 2: Identifying High Priority Management Information Needs

OPC plays a significant role in aligning research with the information needs of management agencies. OPC-led partnerships between academic institutions and agencies, such as the ones created to map the state’s entire seafloor and provide for a network of sensors that capture sea-surface currents, directly address coastal and ocean management needs of multiple agencies. Further, the OPC partners with OST to identify crosscutting and emerging priority information needs in collaboration with the OPC-SAT

and relevant agencies. These priorities will inform the development of targeted, synthetic research products that identify and bundle current scientific understanding, as well as advance agencies goals by providing decision-support.

### Objective 2.1: Identify high priority management information needs.

#### PROPOSED ACTIONS

- In partnership with OST and others, determine and prioritize information needs of state agencies.
- Support agency decision making with scientific syntheses that serve their information needs.
- Provide leadership by writing letters and resolutions, convening workshops and panels, and drawing upon the expertise of the OPC-SAT.





PHOTO: JOHN MEYER

### Issue 3: Developing Strategies—and Building Institutional Capacity—to Incorporate Scientific Information into Management Decisions

The OPC is directed to work with Ocean Science Trust and others to improve and manage constructive interactions between scientists and decision-makers. The OPC’s designation of the OST Executive Director as the OPC Science Advisor demonstrates the OPC’s commitment to incorporating independent science into decision-making in an open and transparent manner. OST’s independence from state government allows it to act as an impartial broker among policy-makers and managers and the scientific community. OST further benefits the state by leveraging non-state funding sources for supporting science initiatives that benefit California.

OST engages with numerous science-based entities with similar missions such as the Southern California Coastal Water Research Project (SCCWRP), the Center for Ocean Solutions (COS), the California Water Quality Monitoring Council (CWQMC), and the San Francisco Estuary Institute (SFEI), among others, and is accountable to both the scientific community and the state.

In addition, a key role for OST is management of the OPC-Science Advisory Team (OPC-SAT). *The main mission of the OPC-SAT is to help ensure that sound*

*science is applied to OPC policy recommendations and state agency decisions.* The OPC-SAT is a model approach for effectively tapping into the rich scientific expertise available in California and beyond. The OPC will continue to work closely with OST and support the leadership role of the OPC-SAT to mobilize the scientific community to inform management decisions.

**Objective 3.1: Promote and encourage the institutional support, capacity, and leadership role of the OPC-SAT and harness the substantial scientific expertise within California and beyond to inform policy and management decisions.**

#### PROPOSED ACTIONS

- Work closely with OST and other partners to ensure that the outcomes of previously funded OPC research projects are effectively communicated to managers and, to the extent possible, meet their needs.
- Draw upon the OPC-SAT’s expertise to inform OPC policy recommendations, project proposals, and project deliverables (e.g., studies, reports, etc.).
- Support the OPC-SAT and promote its service to and coordination with other state and local agencies that would benefit from scientific expertise.



## B. CLIMATE CHANGE

**GOAL:** Prepare for and reduce harmful impacts of climate change on coastal development and infrastructure, public health and safety, the economy, and ecosystems by encouraging adaptation to climate change and engaging decision makers at all levels of government.

The changing climate is transforming California's coast and ocean in unprecedented ways. In general, sea level is rising, storm waves are getting larger, temperatures are increasing, and precipitation and runoff are becoming more variable. The ocean is becoming more acidic as it absorbs carbon dioxide from the atmosphere. Other critical drivers of ocean conditions and productivity, such as ocean currents and upwelling, are also likely to change, but in uncertain ways. Scientists anticipate that California's coastline and ecological communities will experience a variety of impacts from climate change, including increased flooding, erosion, changes in ocean

chemistry, and continued saltwater intrusion into groundwater aquifers. Without changes in sediment and land management, some wetlands will be lost as shorelines move inland in some areas. Ecological communities will change as species respond in different ways to increasing temperatures and acidification. Acidification will threaten some fisheries and aquaculture such as crabs, clams, mussels, and other species with calcareous shells. Animals and plants that are unable to move or adapt to new conditions may disappear. Bird and fish populations may shift in some areas due to changes in food availability.<sup>7</sup>

These impacts will intensify over the coming decades and will pose a growing risk to the state as they degrade public health, threaten coastal development and infrastructure, reduce public access to the coast and bays, and impact fisheries, and ecosystem health. Understanding the magnitude of impacts to California's coast and ocean can highlight the need for action to mitigate climate change. California must take pragmatic, tractable steps now to anticipate and reduce the likely harm. The state has already

<sup>7</sup>See [www.climatechange.ca.gov/adaptation](http://www.climatechange.ca.gov/adaptation).





PHOTO: CLAIRE FACKLER, NOAA NATIONAL MARINE SANCTUARIES

undertaken ambitious and bold strategies for reducing greenhouse gas emissions with the passage of the Global Warming Solutions Act (AB 32, Núñez 2006) and the Sustainable Communities and Climate Protection Act (SB 375, Steinberg 2008).<sup>8</sup> In addition, the state is actively developing and implementing approaches for adapting to the changes ahead that will occur under even the most optimistic scenarios for reduced greenhouse gas emissions.

The first *California Climate Adaptation Strategy*, a collaborative product of many state agencies, was released in 2009.<sup>9</sup> The OPC led the development of the section on “Ocean and Coastal Resources,” which identified several strategies to reduce future hazards to coastal ecosystems and infrastructure. Following the strategy’s release, the OPC has continued to lead and coordinate efforts of the Coast and Ocean Climate Action Team (CO-CAT), a broad coalition of state agencies seeking to find practical ways to use their decision-making processes to reduce risks to humans and infrastructure while protecting the environment. In 2010, the team developed the *State of California Sea-Level Rise (SLR) Guidance Document* to assist in incorporating sea-level rise into all relevant planning and decisions. A subsequent resolution of the OPC in 2011<sup>10</sup>, among other things, advises state agencies to implement the guidance document and to adopt adaptation principles from the 2009 state adaptation strategy.<sup>11</sup>

Scientific understanding of the risks posed by climate change is anticipated to improve as new information becomes available, creating the need for effective ways to integrate that information into real-world decisions. For the foreseeable future, California, like other states, will be committed to a course of “learning by doing,” because of uncertainties in the projections of future drivers and impacts and in how to address these impacts through informed decisions and management interventions. One solution will be for the state to implement flexible and agile approaches for managing its coastal and ocean assets that can respond to the evolving knowledge base and unanticipated changes when they occur. The *SLR Guidance Document* is an early example of this approach. Its implementation will require that specific steps be taken to develop, provide, and routinely update the necessary information and tools that decision makers need. Additional steps should also be taken to speed their adoption by decision-makers and the initiation of adaptation planning and actions. The OPC is ideally positioned to catalyze this effort across agencies.

#### Issue 4: Impacts to Coastal Communities by Storms, Erosion, and Sea-Level Rise

Over the next five years, the OPC will take action to reduce the long-term risks to infrastructure and other coastal development, coastal access, public safety, and public health that will result from climate-related changes in storm events, SLR, coastal flooding, and shoreline erosion. The primary focus will be implementing actions identified in the Council’s March 2011 resolution on sea-level rise. The OPC will continue to coordinate, and work in collaboration with, the inter-agency CO-CAT in accomplishing the objectives below. Through these actions, the OPC will help ensure that decision-makers throughout California have the tools, information, and guidance that they need to successfully develop

<sup>8</sup>For more on AB 32 see [www.arb.ca.gov/cc/ab32/ab32.htm](http://www.arb.ca.gov/cc/ab32/ab32.htm); for more on SB 375 see [www.arb.ca.gov/cc/sb375/sb375.htm](http://www.arb.ca.gov/cc/sb375/sb375.htm).

<sup>9</sup>See [www.climatechange.ca.gov/adaptation](http://www.climatechange.ca.gov/adaptation).

<sup>10</sup>For a copy of the guidance document and the OPC resolution related to sea level rise see [www.opc.ca.gov/2010/12/climate-adaptation-and-sea-level-rise](http://www.opc.ca.gov/2010/12/climate-adaptation-and-sea-level-rise)

<sup>11</sup>Ibid.



and implement coastal adaptation plans. The OPC should develop methods to highlight and publicize the most successful adaptation strategies and plans related to coastal flooding, inundation, habitat loss, and shoreline erosion caused by climate change and related sea-level rise.

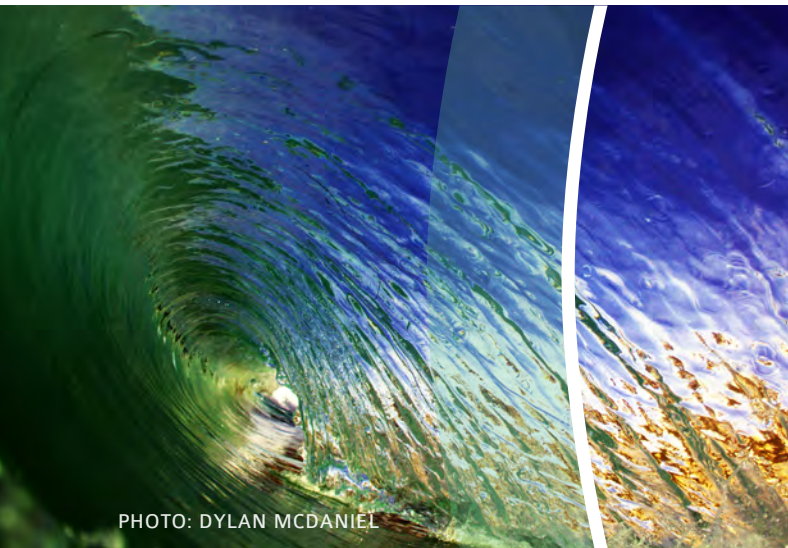


PHOTO: DYLAN MCDANIEL

**Objective 4.1: Improve knowledge and understanding of climate change impacts among state, regional, and local decision-makers.**

**PROPOSED ACTIONS**

- Facilitate regular, structured updates to the *SLR Guidance Document* as appropriate.
- Support development and dissemination of analyses that synthesize science and policy information about impacts, vulnerabilities, and adaptation options, possibly including a five-year update to the 2011 statewide vulnerability study coordinated by the California Energy Commission’s Public Interest Energy Research (PIER) Program.
- Promote the standardized collection and sharing of monitoring data related to coastal flooding, erosion, sea level rise, storm surges, wave heights, and related impacts.

- Seek to ensure that coastal hazard maps are based upon the latest projections.
- Highlight critical gaps in the available data and the implications of these gaps for decision-making and recommend measures to fill those gaps.

**Objective 4.2: Encourage the development and adoption of sea-level-rise adaptation strategies.**

**PROPOSED ACTIONS**

- Identify and recommend emerging “best” and innovative practices, such as model ordinances and habitat protection measures, and promote and support their implementation.
- Work with other entities to develop useful materials to improve adaptation planning and implementation tools and guidance for decision-makers at the local, regional, and state level.
- As appropriate, recommend changes in laws, regulations, guidance documents, and processes that will reduce risks and protect public resources related, for example, to tidal wetlands restoration and shoreline protection.
- As appropriate, directly consult with state agencies to ensure key plans—such as the Statewide Flood Management Planning Program—integrate planning for climate-related coastal flooding.

**Issue 5: Ecosystem Impacts of the Changing Climate**

There is a need to increase the availability of information about the likely impacts of climate change and ocean acidification on coastal and marine species and ecosystems and about the practical steps that might be taken now to plan for and adaptively manage marine resources as the changes increase. California’s networks of marine protected areas (MPAs) and areas of special biological significance (ASBS) provide a unique opportunity for detecting and improving understanding of the effects of climate change and ocean acidification on marine

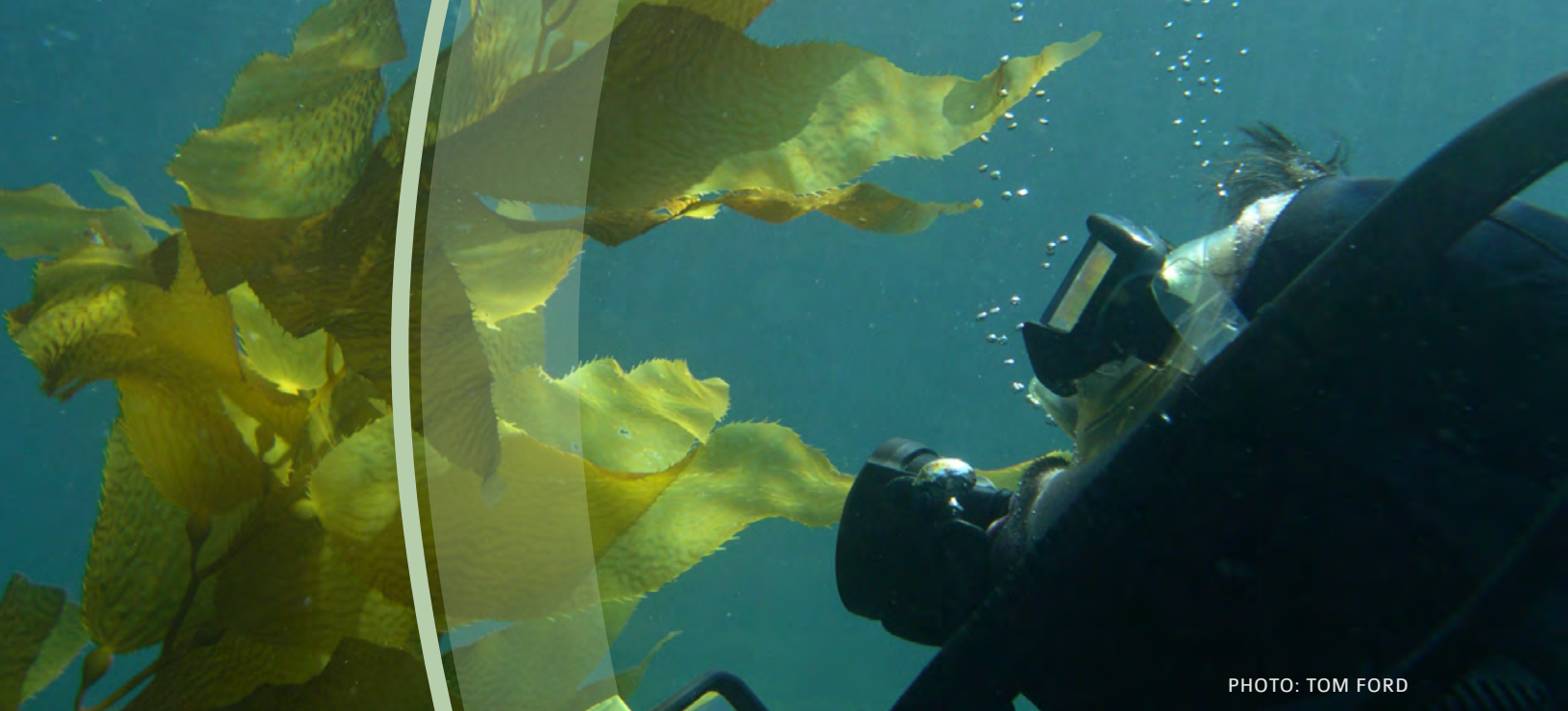


PHOTO: TOM FORD

ecosystems and fisheries. Over the next five years, the OPC will draw on experts to obtain a better understanding of impacts to California’s marine biological resources from climate change and ocean acidification. An understanding is necessary for resource managers and policy makers to make progress in assessing and addressing this critical threat to the state’s fishery and marine conservation goals, as laid out in state laws such as the Marine Life Management Act and the Marine Life Protection Act.

**Objective 5.1: Provide for improved understanding of how changing climate and ocean chemistry will alter California’s ocean and coastal ecosystems and the benefits they produce.**

#### PROPOSED ACTIONS

- Promote and support the development and implementation of monitoring protocols that will provide policy and management relevant information.
- Provide coordination and support to synthesize current scientific understanding of how our marine and coastal ecosystems and ecological assemblages will change in the coming decades as the climate and ocean chemistry changes.

**Objective 5.2: Based on improved understanding of ocean acidification, identify opportunities to reduce impacts by modifying management approaches.**

#### PROPOSED ACTIONS

- Support development of scenario-based analyses of the timing, magnitude, and possible impacts of acidification along the California coastline.
- Work with existing entities such as the California Current Acidification Network (C-CAN) to convene experts from across federal, state, and local government, academia, NGOs, and the private sector to identify practical steps to address acidification impacts on fisheries and ecosystems.
- Promote monitoring, data sharing, and data standardization that will provide information about past and projected acidification trends and its impact on biological resources in a form that is useful for policymaking or management.



## C. SUSTAINABLE FISHERIES AND MARINE ECOSYSTEMS

**GOAL:** Promote the long-term health of marine ecosystems and sustainability of marine fisheries in order to protect California's living marine resources and the communities that rely upon them.

The waters off California's coastline boast some of the most productive and diverse marine ecosystems in the world. However, California's marine ecosystems face numerous threats, including pollution, habitat destruction, historical overfishing, bioaccumulation of toxins, and climate change.<sup>12</sup> It is imperative to understand these risks in order to better protect and manage these priceless resources for current and future generations.



PHOTO: SARAH C. FLORES

California's present fisheries management framework is a result of over 100 years of laws and regulations that were often adopted on a piecemeal and ad hoc basis. Over the last 15 years, the Legislature has directed state agencies to use innovative approaches to managing of California's fishery resources and marine ecosystems—e.g., the Marine

Life Management Act (MLMA) (AB 1241, Keeley 1998) and the Marine Life Protection Act (MLPA) (AB 993, Shelley 1999). While implementation of these landmark statutes, particularly the MLMA, has proven challenging on a variety of levels, much progress has been made. This legislation has required a shift in focus to managing our marine ecosystems, rather than simply managing individual fish stocks.

Over the past five years, the OPC focused on building capacity for sustainable fisheries by working extensively with the fishing communities along the California coast. With support of projects such as the Central Coast Groundfish project, the San Francisco Community Fishing Association, and California's Fisheries Fund, the OPC has been able to leverage funds that result in improved access to fisheries and revitalization of coastal ports, while encouraging sustainable fishing practices. In addition to promoting fishing practices that are less harmful to the marine ecosystem, the OPC has supported efforts to build markets for sustainably caught seafood. As mandated by the California Sustainable Seafood Initiative (CSSI) (AB 1217, Monning 2009), the OPC will develop and implement a voluntary sustainable seafood program for California fisheries. The program will implement a protocol to guide the independent certification of sustainability and create a market assistance program for certified fisheries. This may allow consumers to provide a market-based incentive to fishermen and resource managers to maintain sustainable fisheries resources.

The emerging statewide MPA network developed under the MLPA is unparalleled in the United States, and is one of the most comprehensive networks in the world. The goals of the MLPA include, among other things, protection of marine life, habitats, and ecosystems, rebuilding depleted populations, and providing educational and recreational opportunity. Progress toward these broad goals offers significant opportunity to safeguard and conserve marine

<sup>12</sup>Halpern et al. June 2009. Mapping cumulative human impacts to California Current marine ecosystems. *Conservation Letters*.

ecosystems and the coastal economy. To support adaptive management required by the MLPA, the OPC invested in critically important and time-sensitive data collection to document baseline conditions at the time of MPA implementation. This information provides the foundation for long-term MPA monitoring, and will inform a wide range of management mandates including water quality, climate change and fisheries. The OPC also supported the establishment of the MPA Monitoring Enterprise as a program of the California Ocean Science Trust. The MPA Monitoring Enterprise will continue to develop and implement impartial, scientifically rigorous, and cost-effective MPA monitoring to evaluate and inform the state on the health of our MPAs in support of future management decisions.

Over the next five years, the OPC will build on the foundation laid by the MLMA and the MLPA, and partner with the regulatory bodies charged with implementing these statutes to help advance ocean ecosystem management in the state. In 2010, the California Legislature launched a process to develop a strategic vision that will address, among other issues, how to improve the capacity of the Department of Fish and Game (DFG) and the Fish and Game Commission (FGC) to protect and manage the state's fish and wildlife.<sup>13</sup> The OPC will continue to engage and support this effort and encourage the implementation of the recommendations that result from this process.

### Issue 6: Supporting Sustainable Fisheries Management

The state of California is currently at a turning point in its fisheries management efforts. There are new scientific tools being developed and implemented to take an ecosystem-based approach to management that takes into account climate data and the ecological role of all members of the food web including forage fish. Also, the relationships and interactions among historically disparate groups continue to improve. Concepts of collaborative research and co-management, while yet to be fully



defined, are engaging fishermen, tribes, scientists, and government entities in projects that leverage resources, increase communications, and strengthen relationships. Combined, the new management tools and stronger partnerships will improve our ability to understand and efficiently and effectively manage California's fisheries.

### **Objective 6.1: Support science-based approaches to inform fisheries management.**

#### PROPOSED ACTIONS

- Support, encourage, and help implement as appropriate, the findings of the Strategic Vision process for California fish and wildlife.
- Support improved analytical methods and data reporting tools, and promote their integration into fisheries management; support cost-effective approaches for informing fishery management plan development in data-poor environments.
- Develop recommendations for scientific guidelines to help advance ecosystem-based fisheries management and consider adapting management to respond to climate change impacts.

- Explore new and innovative approaches to fisheries management and support their integration based on evaluation of best practices.
- Support studies to integrate ocean-observing data into fisheries management where appropriate.

### **Objective 6.2: Advance improved governance of California fisheries.**

#### PROPOSED ACTIONS

- Develop recommendations for removing ambiguities in state fisheries management laws and policies.
- Document lessons learned from community-based fishery management efforts and cooperative research projects between fishermen, scientists, and managers, and support the incorporation of these findings into management practices.
- Develop and administer a Dungeness crab task force to advise DFG's development of a Dungeness crab trap limits program as specified in Senate Bill 369 (Evans, 2011).







## Issue 7: Sustainable Seafood

California has determined that it should promote sustainable seafood and improve the sustainability of California fisheries. Legislation passed in 2009 that established the California Sustainable Seafood Initiative (CSSI) (AB 1217) directs the OPC to develop and implement a voluntary sustainable seafood program for California. To the extent funding is provided by the legislature or other sources, the OPC will help certify fisheries as sustainable, enhance marketing opportunities for California fishermen, and support expanded communication about fish toxicity.

### **Objective 7.1: Promote and provide incentives for sustainable fisheries in California's coastal communities.**

#### PROPOSED ACTIONS

- Continue to develop and implement California's voluntary sustainable seafood program, the CSSI.
- Support efforts of relevant state and federal agencies and others, to improve testing and better inform the public about seafood contamination and toxicity issues.

## Issue 8: Leveraging Investments and Realizing Benefits of the State's Marine Protected Areas

California's network of MPAs is intended, among other goals, to protect and conserve marine life, habitat, and ecosystems, and improve recreational, educational, and research opportunities provided by marine ecosystems. In order to help achieve these goals, the OPC must work with partners to effectively advance MPA management, enforcement, monitoring, education, and outreach across a broad range of public and private entities that are engaged in marine resource protection and restoration activities.

MPA monitoring, including input from multiple sources such as tribal governments and volunteer collaborations, will provide information that leads to better understanding of marine ecosystems as well as the status of certain fish stocks. MPA monitoring can also provide information about possible climate change effects on marine ecosystems; and MPAs provide test-case locations for examining water quality impacts on marine resources.



Supporting these activities that provide valuable information for multiple aspects of ocean resources management remains a high priority for the OPC. The OPC's leadership is important for convening public and private entities to ensure effective lasting implementation of the MLPA.

### **Objective 8.1: Support effective implementation of MPAs consistent with the MLPA through strategic partnerships.**

#### PROPOSED ACTIONS

- Support the MPA Monitoring Enterprise to develop and coordinate effective MPA monitoring and deliver timely and meaningful information to support adaptive MPA management.
- Support efforts to increase public awareness of MPAs by participating in a working group with appropriate local, state and federal agencies, tribal governments, private foundations, NGOs, educators, and other relevant entities to facilitate development and implementation of a coordinated public education strategy about MPAs.

### **Objective 8.2: Coordinate MLPA implementation with other ocean management agencies to improve management effectiveness.**

#### PROPOSED ACTIONS

- Support coordination of MLPA partners to facilitate communication, collaboration, and cost effective implementation of the MLPA.
- Develop multi-agency guidance that provides clear information about permit and regulatory requirements for activities or impacts in or around MPAs.
- Identify opportunities to reduce pollution impacts to MPAs by working with the SWRCB and other appropriate entities.
- Advance recommendations from OST's Aquatic Invasive Species (AIS) vector risk assessment research to reduce risk of AIS introduction into coastal and marine environments, including MPAs.





## D. COASTAL AND OCEAN IMPACTS FROM LAND

**GOAL:** Reduce the negative impacts of land-based activities on marine ecosystems and the state's coastal and ocean economy.

The land and sea are inextricably linked. Much of the water pollution in California, from urban or agricultural runoff to municipal discharge, ends up in the ocean. Sources of water supply, groundwater management, land use, infiltration of runoff, legacy toxic contaminants, microbial contamination, nutrient pollution, contaminants of emerging concern, harmful algal blooms (HABs), marine debris, urban runoff, watershed alteration, and sediment management all have enormous impacts on the ocean.

Historically, the legal and policy frameworks and the many institutions that govern land-based activities and freshwater resources have developed and been administered quite separately from those related to the oceans. The unique role for the Ocean Protection Council will be to continue to advance effective management to reduce the impacts of land based activities on the ocean. Many of these issues fall under the regulatory authority of other agencies such as the SWRCB, the Regional Water Quality Control Boards, the Department of Toxic Substances Control (DTSC), and local governments. Other issues are already being addressed by other research and coordination entities such as the Southern California Coastal Water Research Project (SCCWRP), the State's Northern, Central, and Southern California Ocean Observing Systems, the Coastal Sediment Management Workgroup (CSMW) and the California Water Quality Monitoring Council. However there is an important need for the OPC to focus on the ocean impacts of land based activities in partnership with these entities.



The OPC has identified three priority land-based threats to ocean resources where the Council can make tangible progress over the next five years through improved coordination, targeted information sharing and development of policy recommendations. These three issues are: 1) Water Pollution, 2) Marine Debris, and 3) Sediment Management.

Over the past several decades there has been dramatic decrease in coastal pollution through the construction of treatment plants and implementation of water quality regulations. However, California's ocean resources continue to be impacted by pollution and by emerging, complex problems such as HAB events along the coast. Addressing some of these issues may require significant policy changes, enormous infrastructure investments, improved monitoring or advancing our scientific understanding. Though the OPC does not have the financial resources to address major infrastructure investments or to fund ongoing scientific studies, it can help identify targeted studies or policy recommendations to ensure that protection of the ocean is integrated into the state's approach to water management.

Marine debris is persistent solid waste that ends up in the marine environment. Floating marine debris is moved by winds and ocean currents and can cross international boundaries. Marine debris is a problem of international scale, as demonstrated by the North Pacific Subtropical Gyre and the debris field created

by the tsunami in Japan which is moving across the Pacific and expected to impact the west coast in 2013. However, it is also an issue that needs to be addressed at a local level. Marine debris pollutes our beaches, creating a hazard for humans, entangles and poisons wildlife, and imposes costs on local municipalities through collection efforts and lost tourism revenue. The OPC will continue its work to coordinate efforts to reduce marine debris by leading collaborative partnerships, supporting implementation of past recommendations, funding targeted studies to inform management and policy debates, and sharing that information with decision makers.

Sediment management in upland watersheds, along the coast, and in the near shore environment has significant impacts on habitats and coastal resources. Modifications on land including dams, sand and gravel mining, and paving many coastal watersheds continuously diminish sediment input into coastal areas, while coastal armoring and placement of hard structures along the coast exacerbate coastal erosion and impede natural sediment transport. Sediment is an essential resource needed to maintain various coastal environments such as beaches, wetlands, and dunes. However, sediment can also act as a pollutant, carrying contaminants such as metals; it can also smother salmon and steelhead spawning habitat. Improving sediment management will be critical for the state to maintain natural coastal habitats in the face of rising sea levels.



## Issue 9: Downstream Impacts

As discussed above, the inter-related issues of water supply, stormwater runoff, wastewater discharge, pollution, physical processes, and ecosystem function, all have significant impacts on ocean resources. Integrated policies and management strategies that address these inter-related issues will help the state avoid downstream impacts to ocean resources. Opportunities exist for the OPC to promote this type of integrated approach by assisting in the development, revision, and implementation of state water resource policies and by developing and sharing targeted information with managers and decision-makers.

**Objective 9.1: Support an integrated approach to water management that minimizes harm to the health of downstream ocean and coastal ecosystems.**

### PROPOSED ACTIONS

- Work with appropriate agencies to ensure that impacts on ocean and coastal resources are adequately addressed and integrated in the state's water management policies and plans. Important near-term opportunities include the 2013 update to the *California Water Plan* spearheaded by the Department of Water Resources and the ongoing revision to the *California Ocean Plan* led by the State Water Resources Control Board.
- Conduct workshops or fund studies to advance management, improve understanding, and identify opportunities to improve policies to reduce land-based impacts to the ocean related to nutrient pollution, HABs, urban runoff, or other issues.

- Support efforts to improve understanding of or reduce the impacts of water pollution on MPAs and other critical ocean resources.

## Issue 10: Marine Debris

Marine debris was a high priority for the OPC during its first five years, resulting in the adoption of two resolutions, the completion of two scientific studies, and the development of a marine debris implementation strategy.

The OPC's next efforts on marine debris will focus on reducing the amount of plastics and trash that enter the environment. These pollutants persist in the environment and cause long-term negative impacts and harm to wildlife. The OPC will continue its work to coordinate efforts to reduce marine debris through targeted actions, improved implementation of existing and development of new policies, and greater understanding of this issue among policy-makers.

**Objective 10.1: Support collaborative efforts and effective partnerships that measurably reduce existing and new marine debris.**

**Objective 10.2: Provide information to support implementation of policy initiatives and other efforts to reduce marine debris and its impacts.**

### PROPOSED ACTIONS

- Reconvene the Marine Debris Steering Committee to coordinate statewide efforts to reduce trash in the ocean.
- Work with partner agencies and stakeholders to execute the priority actions identified in the OPC's 2008 *Implementation Strategy to Reduce and Prevent Ocean Litter*.
- Support the SWRCB and other agencies in adopting and implementing a statewide trash policy and other relevant trash regulations.
- Work with the State's Ocean Observing Systems, NOAA, and others to track, identify, and prepare for potential California impacts of the debris field from the 2011 Japanese tsunami.







PHOTO: NOAA

## D. COASTAL AND OCEAN IMPACTS FROM LAND

frameworks, and supports the natural shoreline, while continuing to participate with the CSMW.

**Objective 11.1: Improve policies and regulatory practices in ways that restore natural sediment processes, while increasing opportunities for sediment reuse.**

**Objective 11.2: Increase the availability of data and tools that can influence sediment-related planning decisions.**

**Objective 11.3: Further the understanding of coastal impacts resulting from hard structures along the California coast.**

- Collaborate with a broad array of stakeholders, including industries, to support efforts to reduce marine debris from packaging and other products through product redesign, product stewardship, expanded recycling, and other initiatives.
- Inform statewide policy discussions related to marine debris by conducting workshops, sharing information, and funding studies such as an economic analysis of marine debris and derelict fishing gear.
- Identify lessons learned from local or regional efforts to reduce marine debris including local plastic bag ordinances and trash total maximum daily loads (TMDLs).

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### PROPOSED ACTIONS

- Make available to agencies and other users various existing tools and information for improved planning and decision-making related to sediment disposal, reuse, and sea-level rise. These will include results from completed studies (such as the Tijuana Estuary Sediment Fate and Transport Study) and models that are under development that can potentially change sediment management regulatory standards, or from new studies as appropriate.
- Encourage pilot projects that test the efficacy of alternative regulatory standards, such as the existing “80:20 rule of thumb<sup>14</sup>,” to better protect coastal resources while allowing beneficial sediment reuse.
- Support agencies and other stakeholders in efforts to restore natural sediment processes, such as via dam removal.
- Support the Coastal Commission, San Francisco Bay Conservation and Development Commission, and other relevant agencies and partners in efforts to better understand and quantify impacts (both positive and negative) from shoreline armoring and nourishment projects.

## Issue 11: Sediment Management

In California, sediment management is coordinated in large part by the Coastal Sediment Management Workgroup (CSMW), which is a collaboration of local, regional, state, and federal entities that promote the development and implementation of regional sediment management plans in order to augment or restore natural processes. Despite the successes of having a coordinating body, there exist a number of policies, regulatory practices, and long permitting processes that hinder effective sediment management and often impede the beneficial re-use of sediment resources. There exist many opportunities for the OPC to bring to the forefront scientific information that promotes the beneficial re-use of sediment, challenges inefficient regulatory

<sup>14</sup>Sediment containing 80% sands and 20% fines (i.e. 80:20) has typically been considered to contain the maximum amount of fine-grained materials suitable for use in a beach nourishment project. The 80:20 ratio is a “rule of thumb” not a science-based regulation with a demonstrated ability to prevent adverse impacts on marine environments or human health.

## E. EXISTING AND EMERGING OCEAN USES

**GOAL:** Ensure that existing and emerging uses of California’s coast and ocean are planned and managed in a manner that balances their social and economic benefits with the long-term protection and sustainability of the state’s marine and coastal resources.

30 The state’s marine environment currently hosts a variety of industrial coastal and marine uses, such as shipping, fishing, offshore oil production, power plants, and aquaculture. Several emerging industrial uses of the ocean are also now being proposed or expanded, in California including (1) desalination, (2) marine renewable energy development, and (3) offshore aquaculture. These industries often share infrastructure—provided by the state’s three major ports and a collection of smaller harbors—to maintain their facilities and to convey goods to other parts of the state, the rest of the nation, and worldwide.

California’s marine waters also host noncommercial uses that are important to society, such as coastal military bases used for training, research, and security purposes; and significant recreational opportunities for coastal communities and visitors such as surfing, boating, fishing, and swimming. These activities are also significant contributors to the state’s economy.

The demand for the use of California’s marine environment is increasing, and there is a need to balance the existing uses of our ocean environment with potential new uses and to manage all uses to the mutual benefit of our economy and the preservation of a healthy ocean ecosystem. Smart planning for emerging and future industrial uses of the ocean is best accomplished through spatial planning tools and science-based evaluations that address conflicts among users as well as uses of the marine environment. The OPC should seek to increase the availability of scientific and geospatial information products and analysis tools useful for informing regulatory and siting decisions as discussed in the first focal area.

There is growing understanding among scientists and managers that impacts to our marine environment are cumulative. Although a single activity or project may have insignificant impacts on the marine environment when considered in isolation, its interaction with other marine uses and natural phenomena may yield disproportionately significant impacts. A scientific understanding of these interactions is paramount and essential for evaluating tradeoffs in planning decisions for existing and future ocean uses.

The OPC will focus on (1) desalination, (2) marine renewable energy, and (3) offshore aquaculture because these industrial uses are currently active or are under development. The OPC may continue to advance projects consistent with existing resolutions as well as engage in other potential uses as they become more developed and are determined to be an efficient deployment of its organizational capacity.

### Issue 12: Desalination

California has strong goals for both addressing the state’s water needs and protecting the state’s coastal and ocean resources. The state’s current recommendation is that desalination should be considered a future water source where it is economically and environmentally appropriate,







PHOTO: ALLAN FOSTER

and as an element of a balanced water supply portfolio that also includes conservation and water recycling to the maximum extent practicable.<sup>15</sup> There is an immediate role for the OPC to play regarding desalination as facilities are both presently operational and under consideration. In some coastal communities, desalination is considered a local and reliable component of the water supply portfolio. In some cases, desalination has a relatively high cost and energy usage compared with other water sources, but as new technology comes on line and other sources increase in cost, it is anticipated that desalination will become more cost competitive and efficient.

Although some current desalination technologies may have minimal adverse impact to the environment, the impacts of other conventional or emerging desalination technologies may include adverse effects on marine life. These can be due to seawater intakes that allow significant entrainment and impingement of marine organisms, brine discharges, and high energy consumption that may result in significant greenhouse gas emissions. There is a need to evaluate desalination technologies and identify methods for minimizing damage to marine life and the environment. The OPC and the State Water Resources Control Board (SWRCB) have

taken previous actions to address entrainment and impingement caused by use of once-through cooling (OTC) technology at many coastal power plants.<sup>16</sup> As a result of the SWRCB's 2010 policy, many of these plants are planning to re-power without OTC over the next decade.

The Department of Water Resources (DWR) is coordinating a multiagency effort to update the California Water Plan, and the 2013 update will be the first time coastal and marine elements will be incorporated. The Water Plan will address integrated water management, including water supply, water quality, environmental stewardship, and integrated flood management. The OPC will continue to work with DWR and other agencies and stakeholders over the next two years to assist with needed analyses and provide policy input, and to help shape recommendations about desalination that are based on the best available science.

The SWRCB is updating the California Ocean Plan, and the 2012 amendments are anticipated to address salinity objectives, brine discharges, and marine intakes. The OPC will work with other agencies and stakeholders to assist the SWRCB to better define impacts from desalination facilities and identify best site, design, technology, and mitigation and

<sup>15</sup> *Water Desalination – Findings and Recommendations* (Department of Water Resources (DWR), 2003); *California Water Plan Update* (DWR, 2009).

<sup>16</sup> In April 2006, the OPC adopted a resolution regarding the use of OTC in coastal waters; in May 2010, the SWRCB adopted a policy requiring cooling water intake structures to reflect the best technology available (BTA) for minimizing adverse environmental impact, and setting an implementation schedule.



PHOTO: SCOTT TOEWS

## E. EXISTING AND EMERGING OCEAN USES

### PROPOSED ACTIONS

- Coordinate agencies and entities that have a role in setting policy, guidelines, or regulations for desalination, including the Coastal Commission and others, to assist the SWRCB in better-defining impacts from desalination facilities, and identifying criteria related to siting, design, appropriate technology, feasibility, and mitigation.
- Seek review of existing information about alternative intake system designs that can minimize damage to marine life.
- Work with the SWRCB, the Coastal Commission, and other appropriate entities to assess the effectiveness of interim mitigation projects proposed through the OTC policy process to address impacts to the marine environment from OTC intake structures.<sup>19</sup>

encourage the use of scientific information in making these decisions and definitions.<sup>17</sup> In development of the SWRCB's desalination policy, there is a particular opportunity to consider consistency with the goals to reduce impingement and entrainment that underlie the OPC's OTC resolution and the SWRCB's May 2010 policy.

**Objective 12.1: Work with all appropriate entities in updating and revising the California Water Plan to provide statewide and regional context for policy recommendations on desalination, and the California Ocean Plan to better define and address impacts from industrial uses.**

### PROPOSED ACTIONS

- Coordinate with DWR, SWRCB, the Coastal Commission and other agencies and entities that have a role in setting policy and guidelines for desalination, and support studies that will be useful in the California Water Plan Update and California Ocean Plan update.

**Objective 12.2: Work with relevant state agencies to develop and help implement policies that are consistent with OPC resolutions related to existing and emerging uses, such as development of a statewide desalination policy that addresses marine intakes, in-plant dilution,<sup>18</sup> and brine disposal.**

### Issue 13: Marine Renewable Energy

California has robust goals for both increasing renewable energy production and protecting the state's coastal and ocean resources. Marine renewable energy is an emerging industry that involves technologies that harvest wave, tidal, offshore wind, and ocean thermal energy for both small scale and commercial energy production. Over the last decade, an increasing number of these developments have been deployed around the world. In California, these industries as well as their permitting process and regulations are still in a nascent development stage; however, manufacturers and developers have a strong interest in pursuing demonstration and larger scale marine renewable energy projects within and adjacent to the state's waters. Facilitation of this will require greater clarity and predictability in the state's regulatory and permitting framework to pursue permits for installations.

<sup>17</sup>CA Water Code Section 13142.5(b) state that for each new or expanded coastal power plant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life.

<sup>18</sup>Withdrawing additional seawater in order to dilute brine waste before it is discharged back into marine waters.

<sup>19</sup>The SWRCB's May 2010 policy on the use of coastal and estuarine waters for power plant cooling (requiring that cooling water intake structures reflect best technology available for minimizing adverse environmental impact) specifies the SWRCB's preference that power plant owners or operators mitigate interim impacts by providing funding to develop mitigation projects directed toward increases in marine life associated with the State's marine protected areas in the geographic region of the facility. Mitigation projects would be pursued within the established legal limits, i.e., not in lieu of best technology available under Clean Water Act and related litigations.



No single agency has primary responsibility for managing the offshore marine renewable industry. In conjunction with the California Energy Commission, the OPC co-funded an initial report evaluating potential impacts of this industry, and established a California Marine Renewable Energy Working Group to facilitate a dialogue among state and federal agencies, developers, and stakeholders on siting, planning, and regulatory challenges related to this emerging industry. Through this working group, OPC also facilitated the development of a memorandum of understanding (MOU) with the Federal Energy Regulatory Commission (FERC) to promote early consultation and coordination on federal and state regulatory processes for wave and tidal energy projects.

Over the next five years, the OPC will continue to lead the California Marine Renewable Energy Working Group and focus on policy actions needed to address regulatory overlaps and inconsistencies both at the state and federal level, including the development of formal agreements, such as MOUs, when appropriate. The OPC will also improve access to geospatial data and other scientific information that is useful for reducing conflicts between existing uses of the ocean and these emerging developments and evaluating cumulative impacts of siting and planning decisions as part of its efforts to implement AB 2125.

**Objective 13.1: Anticipate and address regulatory issues, policy development, and information needs associated with the development of marine renewable energy through coordination activities and other means.**

### PROPOSED ACTIONS

- With the California Marine Renewable Energy Working Group, lead the development of statewide guidance for pilot and test hydrokinetic developers.
- Continue to implement the MOU between California and FERC, and facilitate other coordination strategies with the Bureau of Ocean Energy Management (BOEM) and other federal entities, as appropriate to ensure the development and application of clear criteria and standards related to siting, design, appropriate technology, feasibility, and mitigation.
- Improve access to information for marine renewable energy siting, planning, and regulatory processes.





PHOTO: SCOTT TOEWS

## E. EXISTING AND EMERGING OCEAN USES

### Issue 14: Offshore Aquaculture

Based on the Sustainable Oceans Act (SB 201, Simitian 2005) and other recommendations, the state's mission and objectives with respect to aquaculture are to:

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- a. Provide for environmentally-safe aquaculture in state waters to augment food supplies, expand employment, promote economic activity, and increase native fish stocks while ensuring protection of public trust resources of the state
- b. Not unreasonably interfere with fishing or other uses or public trust values
- c. Not unreasonably disrupt wildlife and marine habitats, or unreasonably harm the ability of the marine environment to support ecologically-significant flora and fauna
- d. Minimize risk of introduction of non-permitted non-native or invasive species into state waters

The OPC is currently funding an aquaculture programmatic environmental impact report (PEIR), that consists of a new management framework that will govern leasing and permitting authorities over marine aquaculture, will allow for finfish aquaculture, and provide guidance on siting considerations, maintenance of existing regulatory controls, and leasing program requirements. The OPC will continue to work with the California Department of Fish and Game toward developing a PEIR that provides a forward-looking, scientifically-robust framework to regulate current and future ocean aquaculture facilities at an ecosystem scale.

The state has an opportunity to work with federal agencies in their implementation of national aquaculture policies that were released in June 2011. The OPC should ensure that potential issues in state waters, or conflicts with current users that may arise from operations in federal waters, are resolved in ways that are consistent with SB 201. Specifically, there may be opportunities to coordinate around state-federal regulatory authority, regulatory and permit review, and/or implementation of pilot projects. The OPC can also provide support in ensuring that proposed activities in state or federal waters advance the protection, recovery, restoration, or enhancement of native fish stocks.

**Objective 14.1: Anticipate and assess the impacts of emerging aquaculture technologies on the health of California's coast and oceans and encourage science-based decision-making.**

#### PROPOSED ACTIONS

- The OPC will continue to work with the California Department of Fish and Game toward developing an aquaculture PEIR that provides a forward-looking, scientifically-robust framework to regulate current and future ocean aquaculture facilities.
- Coordinate with state agencies regarding emerging aquaculture operations in adjacent federal waters to promote sustainable aquaculture operations consistent with the OPC's mandate to protect California's ocean ecosystems.
- Support the completion of the Guide to Aquaculture Registration, Permits, Licenses, Laws, and Regulations in California to facilitate coordination of permit review.
- Articulate state funding and research needs to federal agencies, help position California to receive federal funds should they become available, and promote research that addresses potential issues associated with expansion of marine aquaculture in adjacent federal waters.