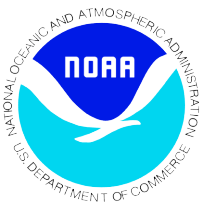


# USC Sea Grant Strategic Plan 2014 - 2017



University of Southern California Sea Grant  
The Urban Ocean Program



Published 2012 by  
USC Sea Grant  
University of Southern California  
University Park, Los Angeles, CA 90089-0373  
(213) 740-1961  
www.usc.edu/org/seagrants

© 2012 University of Southern California Sea  
Grant Program

This publication has been produced with support from the National Sea Grant College Program, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, under grant number NA10OAR4170058, and by the California Natural Resources Agency.

The views expressed herein do not necessarily reflect the views of NOAA or any of its sub-agencies. The U.S. Government is authorized to reproduce and distribute copies for governmental purposes.

The National Sea Grant Program is a network of 33 university-based programs in coastal and Great Lakes states involving more than 300 institutions nationwide in research, education and the transfer of technology regarding coastal, marine and Great Lakes issues.

#### Editorial and Design Staff:

Phyllis Grifman, M.A., Executive Editor  
Juliette Hart, Ph.D., Editorial Assistant  
Charlotte Stevenson, M.S., Editor/Designer

#### Photo Credits:

Cover shot and back cover clockwise from top: (Charlotte Stevenson, CINAPS, Bonnie Rodgers, Phyllis Grifman, Phyllis Grifman, Linda Chilton, Charlotte Stevenson, CINAPS)

Page 4 clockwise from upper left: (Phyllis Grifman, Bob Wohlers, Kevin Kelley, Charlotte Stevenson, Phyllis Grifman, CINAPS, Linda Chilton, Phyllis Grifman, Phyllis Grifman)

## Table of Contents

Introduction.....	3
Mission Statement.....	4
Sea Grant at the University of Southern California.....	5
Leadership.....	6
Strategic Plan Development.....	10
National Perspectives.....	10
Regional Perspectives.....	11
State and Local Perspectives.....	12
Focus Area: Healthy Coastal Ecosystems.....	14
Focus Area: Safe and Sustainable Seafood.....	18
Focus Area: Resilient Communities and Economies.....	20
Focus Area: Environmental Literacy and Workforce Development.....	24
Cross-Cutting Performance Measures.....	27
Appendices.....	28

# Introduction



(Photo credit: Charlotte Stevenson)

Sea Grant was created by the U.S. Congress in 1966 as a federal and state partnership to help fund and coordinate the intellectual capacity of the nation's universities to solve ocean, coastal, and Great Lakes problems. Sea Grant is a national network, which includes the National Sea Grant Office, the National Sea Grant Advisory Board, the National Sea Grant Law Center, the National Sea Grant Library and 33 university-based state programs. Sea Grant is administered and supported by the National Oceanic and Atmospheric Administration (NOAA), is implemented through leading research universities, and provides unique access to scientific expertise and to new discoveries.

The Sea Grant Program at the University of Southern California (USC) in Los Angeles, California, is unique among the 33 state programs in the national Sea Grant network. It is among the smallest, with an annual federal budget of approximately \$1 million. USC, one of the largest private universities in the United States, has participated in the National Sea Grant College Program for over 40 years, and has more than a one hundred year history of marine science research in Southern California. USC's facilities, research, and curricula make it the principal university in the Los Angeles region for ocean studies.

Using a network of scientists, government agency personnel, and private and public sector advisors, USC Sea Grant is able to anticipate research needs in a relatively short time frame. USC's strategic plan goals for 2014-2017 reflect America's most urgent coastal and ocean needs, the NOAA's priorities, and the National Sea Grant's goals, while still addressing the specific needs and priorities of the state and region. USC's location in the middle of Los Angeles has made the Sea Grant Program at USC an important regional resource, concentrating on issues arising out of the necessity of managing people and natural resources in an intensely urban and developed coastline. For this reason, in the 1980s, the USC Sea Grant program adopted as its programmatic theme the "Urban Ocean," a theme that continues to characterize our focus on the needs of this region.

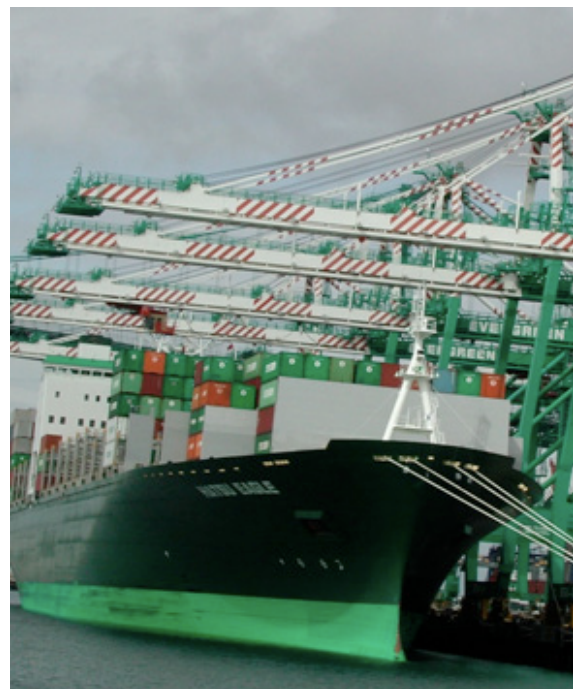
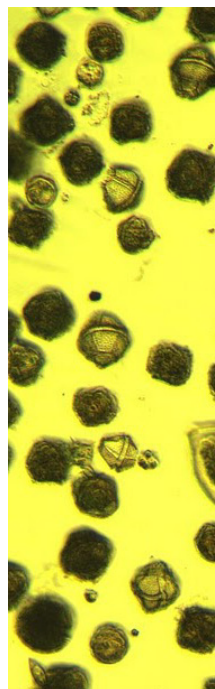
Under the larger umbrella of the urban ocean programmatic theme, our program's focus areas are congruent with the National Sea Grant College Program Strategic Plan for 2014-2017 (henceforth referred to as the National Plan) and include: Healthy Coastal Ecosystems; Sustainable Fisheries and Aquaculture; Resilient Communities and Economies; and Environmental Literacy and Workforce Development. We continue to foster innovative research to help find solutions for pressing coastal management problems and to demand that science truly help resolve the issues of greatest ecological and social importance. USC Sea Grant fosters the public's understanding of the science, so that it motivates better decisions and continues to bring decision makers, scientists and the public together to find solutions that are informed by the best available science, understood by all, and supported by local communities.





### Mission Statement

USC Sea Grant's primary responsibility is to contribute to solving the problems of the urban ocean, while recognizing the opportunities for coastal commerce, recreation and improving the quality of life in coastal regions such as Southern California.



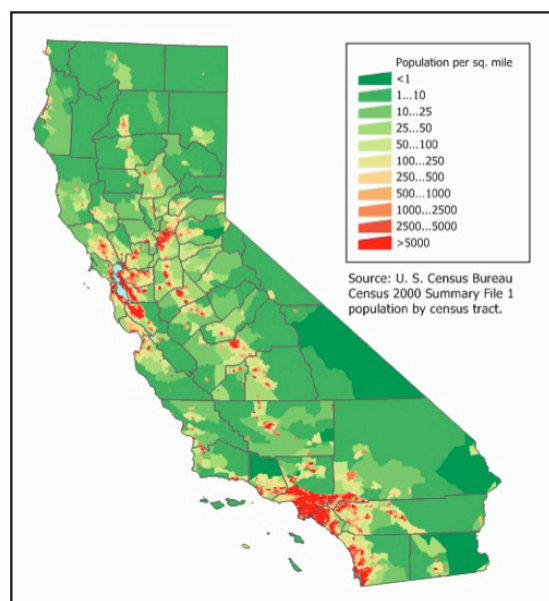


## Sea Grant at USC

Despite its relatively small budget and staff compared to other Sea Grant programs, USC Sea Grant serves one of the largest (nearly 17 million) and diverse populations in three coastal counties of Southern California (Orange, Los Angeles, and Ventura) and two adjacent inland counties (San Bernardino and Riverside). Los Angeles County is the most populous and diverse county in the United States, with 10 million residents speaking over 140 languages, making this a prime location to study the effects of urbanization on our coastlines. This is especially true in the Southern California culture of “endless summer,” that places such a unique value on its beaches and coastal ocean. Recreational environmental amenities draw over 4 billion dollars<sup>1</sup> in international tourism to the Los Angeles area each year. Los Angeles County is home to the busiest port complex in the United States; close to 45% of all marine freight entering the country comes ashore through the twin ports at Los Angeles and Long Beach.<sup>1</sup> In addition, these ports contribute to a vibrant economy with an estimated 960,000 jobs.<sup>1</sup>

California’s 1,100-mile coastline is approximately the same length as the U.S. east coast from Norfolk, Virginia to the northern border of Maine, and the character of coastal terrain and ecosystems vary greatly from north to south. Northern California, with the exception of the San Francisco Bay area, has a more rural character. The region known as the Southern California Bight, stretching from Point Concepción in the north to south of Tijuana, Mexico, is highly developed – an urbanized coast characterized by nearly uninterrupted commercial and residential development. With 75% of California’s population living within coastal communities it is critical to address the ever-increasing challenges to coastal cities and ecosystems such as sea level rise and other threats from climate change.

While water quality today in the Southern California Bight is the healthiest it has been in decades, there continues to be tremendous influence from concrete rivers and channels that rapidly deliver massive amounts of urban contaminants to recreational beaches and marine habitats during the relatively short rainy season. However, the problems found in the urban ocean environment of Southern California are not unique to the region, which is evident by the growing use of the term “urban” in titles for marine/coastal organizations and programs across the country. In addressing the range of issues found here, we will continue to provide information and models serving other urban coastal regions in the United States and around the world. We consider Los Angeles a city of the future and treat it as an urban ocean laboratory. More than any other location in the country, Sea Grant can pioneer research and solutions for issues that will only become more common along the steadily developing coastlines of the United States and the world.



Los Angeles County is the most populous and diverse county in the United States, with 10 million residents speaking over 140 languages, making this a prime location to study the effects of urbanization on our coastlines. (Source: U.S. Census Bureau, 2010)

<sup>1</sup> Los Angeles County Annual Report, 2011

---

## Leadership

USC Sea Grant is administered within the USC Wrigley Institute for Environmental Studies (WIES) an “organized research unit,” for which Dr. Roberta Marinelli serves as the Director. From 2005-2011, Dr. Marinelli served as the Program Director of the Antarctic Organisms and Ecosystems Program at the National Science Foundation (NSF). Prior to that, she was an associate professor at the University of Maryland’s Center for Environmental Science.

WIES is part of the newly renamed Dana and David Dornsife College of Letters, Arts and Sciences (Dornsife College). Dornsife College is the largest administrative unit at USC and the heart of teaching and research in the Natural Sciences, Humanities, and Social Sciences. The present reporting line from Sea Grant runs from Linda Duguay (Sea Grant Director and Deputy Director, WIES); to Dr. Roberta Marinelli (WIES Director); to Dr. Steven Kay, Dean of the Dornsife College; to Elizabeth Garrett, Provost and Senior Vice President for Academic Affairs of USC; to President Dr. C. L. Max Nikias.

This location and reporting structure is advantageous for USC Sea Grant for several reasons. First, it is housed in the same university revenue center as most of the academic departments and principal investigators likely to apply for Sea Grant support. Second, the close affiliation with WIES provides a symbiotic relationship, providing a solid focus for marine science, policy, and education research and outreach programs. Further, collaborative efforts with WIES, such as position sharing and joint research and education efforts are easily facilitated.

Sea Grant is housed in the Allan Hancock Foundation building on USC’s main campus, which also houses faculty and labs in the Marine Environmental Biology program, WIES and the National Science Foundation-funded Science and Technology Center - Center for Dark Energy Biosphere Investigations (C-DEBI), as well as USC’s new Institute for Spatial Sciences (formerly the GIS Laboratory). The Hancock Building is in the center of the USC campus, and has been the historic home for marine biology laboratories and offices since it was constructed in 1940. In 2008, the Sea Grant staff offices were relocated to the Hancock Director’s Suite, so that all professional and administrative staff are co-located.



Left: The Alan Hancock Foundation building (Photo credit: Charlotte Stevenson); Right: Wrigley Institute for Environmental Studies research complex on Catalina Island, off the coast of Los Angeles. (Photo credit: Ann Close).



---

The USC Sea Grant Program has a clear advantage in having the Director also serve in WIES leadership. Because Sea Grant is one of the chief research arms of WIES, the Director helps to insure that results from Sea Grant-funded research and outreach are well represented in WIES' annual reports to its Board of Directors. Since its reinvigoration in 1996, the Wrigley Institute has been recruiting new faculty in marine sciences, in biology and earth sciences. The growing cadre of marine scientists fostered by WIES – several new faculty positions, and a new institutional commitment to marine sciences – has allowed Sea Grant to foster the work of a growing group of excellent faculty researchers in the pursuit of solutions to local and regional urban ocean problems.

Our small staff size allows close cohesion of the various program elements and the invaluable cross-fertilization of ideas, plans, and programming. Research administration, planning, extension, education, and communications efforts combine seamlessly to provide Southern California, State and National constituencies with information and services that are naturally interdisciplinary and coordinated.



**Director, Linda Duguay, Ph.D.**

Dr. Duguay also serves as the Director of Research for the Wrigley Institute for Environmental Studies and is a Research Associate Professor in the Marine Environmental Biology section of the Department of Biological Sciences, enabling a close connection with research scientists and teaching programs at graduate and undergraduate levels. She is a leader in the national Centers for Ocean Science Education Excellence (COSEE), an NSF-funded program aimed at linking top research scientists with K-12 and informal educators to increase the public's knowledge and understanding of ocean science. Linda serves on several state, regional, and national level boards and links USC marine programs with respected scientists around the U.S. and the world. Through her leadership and service, Linda keeps Sea Grant knowledgeable about the advancing edge of science and the emergence of new issues in science and education.



**Associate Director, Phyllis Grifman, M.A.**

Ms. Grifman serves as the Program Research Coordinator and Communications Director, and she manages the extension and outreach program. She is an active partner in numerous state and national activities, linking Sea Grant with the research and information networks in such areas as national marine sanctuaries, state marine protected areas, and other scientific, communications and education endeavors. Ms. Grifman maintains close contact with current and former Sea Grant scientists, and develops Sea Grant's new research capabilities.



**Extension Leader, Marine Transportation Specialist, James Fawcett, Ph.D.**

Dr. Fawcett is a well-known expert in ports and maritime transportation, and provides key liaisons with the Ports of Long Beach and Los Angeles as well as key Asian seaport researchers and managers. An urbanist by training, Jim holds adjunct associate professorships in the School of Policy, Planning and Development, teaching in the Public Policy section, as well as in the Dornsife College where he teaches in USC's Environmental Studies Program. He is a board member of the Marine Conservation Research Institute at the Aquarium of the Pacific as well as the honorary land economics society, Lambda Alpha International and is a member of the editorial board of two journals. His research interests are in marine policy, coastal management and marine transportation policy.



#### **Regional Research and Planning Specialist, Juliette Finzi Hart, Ph.D.**

Dr. Hart is a Research Assistant Professor at USC in the Marine Environmental Biology section within the USC Department of Biological Sciences. Dr. Hart's current work focuses on climate change - from the perspective of both the natural and built environments. Her research interests also include coastal marine policy, regional ocean governance, and sustainable ecotourism. Dr. Hart also works with the communications department to edit the quarterly newsletter, the *Urban Mariner*, and helped to redesign the USC Sea Grant website. In 2006, she was a Knauss Marine Policy Fellow in Washington, D.C., where she worked at the National Oceanic and Atmospheric Administration's National Ocean Service.



#### **Education Coordinator, Linda Chilton, M.A.**

As the Education Program Coordinator, Ms. Chilton is responsible for developing, implementing, and coordinating a wide range of educational programs focusing on students, teachers and families. She participates with COSEE-West, bringing scientists and educators together to exchange and facilitate learning on current marine science topics. Ms. Chilton is leading the development of a regionwide HAB (Harmful Algal Bloom) watch program and works with educators to reduce the introduction of aquatic invasives through education pathways. She runs the Island Explorers Program, the Parent Child Education Program, and Youth Science Summer Programs on Catalina Island. Linda dedicates much of her time and energy to connect informal science experiences with current research and ocean issues, creating partnerships to support underrepresented audiences pursuing and understanding the marine environment.



#### **Director of Pre-College Education for WIES, Lynn Whitley, M.A.**

Lynn Whitley is Director of Pre-College Education for the USC Wrigley Institute for Environmental Studies, and her work focuses on outreach programs and K-12 education projects. Ms. Whitley serves as co-director of the NSF-funded Center for Ocean Sciences Education Excellence -West (COSEE-West) in cooperation with USC Sea Grant. In this position, she is active in facilitating connections between scientists in the marine research community and formal and informal educators through lectures, workshops and networking opportunities. Ms. Whitley also manages a student science challenge, QuiKScience, funded by Quiksilver, Inc., professional development workshops funded by Southern California Edison, and supports other grant programs that bring science content and educational training to teachers, as well as other outreach and education projects.



#### **Science Communication Specialist, Charlotte Stevenson, M.S.**

Ms. Stevenson has a Masters of Science in Marine Biology in the field of toxicology. As a Knauss National Sea Grant Fellow in 2006, Ms. Stevenson worked for the Natural Resources Committee in the House of Representatives, concentrating primarily on the reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act. Ms. Stevenson writes Sea Grant's quarterly newsletter, the *Urban Mariner*, helped redesign Sea Grant's website, manages Sea Grant's online social media, participates in the National Sea Grant Communications Network, writes and designs USC Sea Grant's program documents such as this strategic plan, and contributes writing and design skills to other ongoing Sea Grant projects.





### **Office Coordinator/Manager and Fiscal Officer, Ruth Dudas**

Ruth Dudas is USC Sea Grant's Office Manager, bringing with her 20 years of administrative experience varying from Executive Assistant to Office Manager in the fields of printing and logistics. Ruth is USC Sea Grant's fiscal officer and budget coordinator. She is also responsible for providing administrative and secretarial support for Sea Grant, in addition to the efficient execution of daily office procedures.



### **Information Technology Specialist, Rick Hayduk**

Rick Hayduk is the computer specialist for USC Sea Grant. His responsibilities include researching and advising on computer, presentation and information system technologies, providing system support and software advice, and working with the Purchasing, Telecommunications and Internet Services Division within USC and with outside vendors. He is webmaster for the USC Sea Grant website as well as webmaster / data-maintainer for COSEE West.



The tide-pool lined Lechuza shoreline, just north of Los Angeles.  
(Photo credit: Phyllis Grifman).

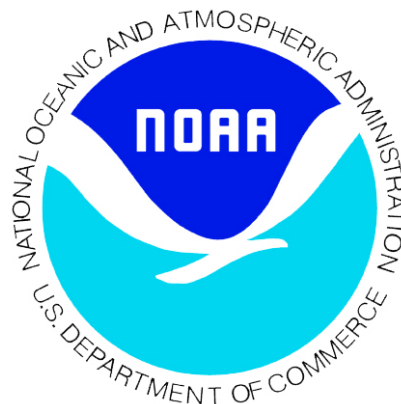
---

## Strategic Plan Development

USC Sea Grant developed this Strategic Plan in 2012, relying on input from the range of interests and stakeholders at the national, regional, state and local levels. The USC Sea Grant Strategic Plan for 2014-2017 is broad in scope and vision, but with a recognition of the boundaries attendant upon limited resources. We continue to prioritize the elements of our research, extension and education portfolio in order to focus on the most pressing concerns of the greater urban Southern California region.

### National Perspectives

The National Sea Grant College Program Strategic Plan for 2014-2017 (henceforth referred to as the National Plan) states as its mission “to provide integrated research, communication, education, extension and legal programs to coastal communities that lead to the responsible use of the nation’s ocean, coastal and Great Lakes resources through informed personal, policy and management decisions.” This follows closely upon the broad goal of the National Oceanic and Atmospheric Administration (NOAA), which envisions “healthy ecosystems, communities and economies that are resilient in the face of change.” Our intent is to contribute to implementing the twin visions in the context of Urban Ocean environment of Southern California.



The National Plan was developed with input from the state Sea Grant programs, national stakeholder groups, and representatives from NOAA programs, other federal agencies, and nonprofit environmental organizations. The National Plan thus provides the primary context for USC Sea Grant’s plan. For the suite of challenges presented in the Southern California coastal region, the USC Sea Grant plan refocuses those priorities, continuing our major emphasis on water quality, coastal ecosystem health, coastal community resilience, and a robust education effort. As part of our resilient communities and economies emphasis, we continue work on land use planning and marine transportation and ports, both of which are particularly important as economic drivers in the Southern California metropolitan region.

We have aligned USC Sea Grant’s major focus areas with the National Plan focus areas, including: Healthy Coastal Ecosystems; Sustainable Fisheries and Aquacultures; Resilient Communities and Economies; and Environmental Literacy and Workforce Development. Our plan was developed based on input from the diverse constituencies with whom we work, along with formal input from our Advisory Council, Academic Coordinators, and the California Resources Agency Sea Grant Advisory Panel (RASGAP).


HCE

SFA

RCE

ELWD





Each focus area has goals, outcomes, and performance measures. The goals describe the desired long-term direction for each focus area. The outcomes are benchmarks from which USC Sea Grant can track progress toward achieving each goal, and they are characterized in three categories to better track the progression of work toward each goal.

- **Short-term outcomes** lead to increased awareness, knowledge, skills, changes in attitudes, opinions, aspirations or motivations through research and constituent engagement.
- **Medium-term outcomes** lead to behavior change, social action, adoption of information, changes in practices, improved decision-making or changes in policies.
- **Long-term outcomes** in most cases require focused efforts over multiple strategic planning cycles. Long-term outcomes in a four-year strategic plan serve as reference points toward reaching focus area goals between the current and future strategic plans.

Performance measures are quantitative ways of measuring outcomes. Overall, USC Sea Grant has aligned the goals, outcomes and performance measures for its 2014-2017 strategic plan with the goals, outcomes and performance measures of the National Plan. In some cases, small changes were made to better suit the particular needs of the Los Angeles region.

### **Regional Perspectives**

In 2007, the California, Washington, and Oregon Sea Grant Programs conducted a large-scale scoping project to determine the research and information needs for the Large California Current Marine Ecosystem that spans the West Coast of the United States. In California, four scoping meetings were held. One of those meetings took place in Southern California, attracting over 100 people active in marine resource planning, management, and research. For this plan, we were especially cognizant of the input provided in the Southern California meeting, but our new plan reflects the research and information needs of the region as a whole as well, as reported in “West Coast Regional Marine Research and Information Needs,” published by Oregon Sea Grant in 2009.

In addition, the governors of California, Oregon and Washington work together to protect and manage ocean and coastal resources through the West Coast Governors’ Alliance on Ocean Health (WCGA). The WCGA Action Plan concentrates on the areas of: climate change; integrated ecosystem assessments; marine debris; ocean awareness and literacy; polluted runoff, regional data frameworks; renewable ocean energy; seafloor mapping; sediment management; spartina eradication; and sustainable coastal communities. USC Sea Grant’s Director, Dr. Linda Duguay, sits on the WCGA Ocean Awareness and Literacy Action Coordination Team. In addition, Sea Grant Fellows selected by the four West Coast Sea Grant programs for two year terms assisted the WCGA in connecting Sea Grant research, data management, and policy to regional initiatives. USC Sea Grant’s work complements many topical areas identified by the WCGA, providing science and policy information that supports its goals. We will continue to coordinate and collaborate in the landmark regional initiative in the future.

## State and Local Perspectives

At the local level, several advisory bodies to Sea Grant are regularly consulted for guidance and strategic planning advice. These are councils on academic research, local, state and regional research and outreach needs, and educational initiatives. All were consulted in the development of this Strategic Plan and regularly contribute ideas and insight to USC Sea Grant.

USC Sea Grant has an active, diverse and interested Advisory Council (Appendix 1). Membership of the Council is comprised of representatives of public and quasi-public agencies and non-governmental organizations (NGOs) with an interest or stake in Sea Grant's research, outreach or education programs. Advisors represent the City and County of Los Angeles, the California Water Resources Control Board, the California Coastal Commission, the Santa Monica Bay Restoration Program, the Southern California Coastal Water Research Project, private industry, and others. USC Sea Grant keeps the Council informed about research and outreach progress and consults with members formally on an annual basis. Advisory Council members advise planning and request for proposal development and often informally review project proposals in their areas of expertise. Sea Grant staff call upon them informally for program advice on new and existing initiatives, keeping an ongoing dialogue between the Council and staff year-long, not just through annual in-person meetings. Advisors formally reviewed and contributed to Sea Grant's most recent Strategic Plan during a meeting held on October 17, 2012.

USC Sea Grant's Academic Coordinators (Appendix 2) come from several academic departments at USC, helping to ensure that a range of scientific disciplines are represented. A member from the Southern California Marine Institute—a consortium of USC, UCLA, California State University campuses in Southern California, and Occidental College—also serve on this committee. The Academic Coordinating Committee contributes to the development of Sea Grant's strategic planning and research solicitations, reviews preliminary proposals and provides input on external research opportunities and other programs.

A third advisory group, the Resources Agency Sea Grant Advisory Panel (RASGAP), is a state panel comprised of representatives from the Departments and Programs within the California Natural Resources Agency, the state agency that provides state matching funds for the two Sea Grant programs in California (Appendix 3). The RASGAP panel meets with Sea Grant Directors and Associate Directors twice a year during those years when proposals are being considered – first, for review and ranking of preliminary proposals, and second, after peer and technical review have been conducted – to help rank projects in the context of Agency information needs. In years when proposals are not being reviewed, Sea Grant consults members of RASGAP for guidance on upcoming state priorities.

Close to 45% of all marine freight coming into the United States comes through the twin ports of Los Angeles and Long Beach, the busiest seaport complex in the country. (Photo credit: Phyllis Grifman)

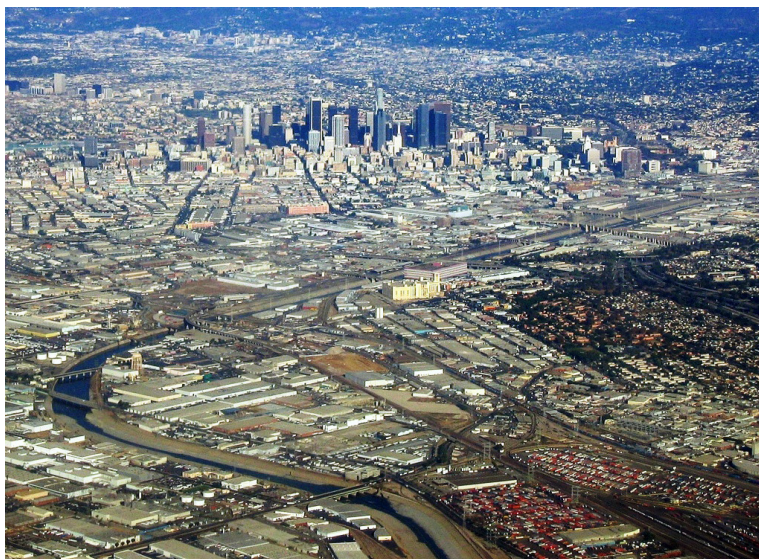




The California Ocean Protection Council (OPC) was created in 2004 to ensure California maintains healthy, resilient, and productive ocean and coastal ecosystems for the benefit of current and future generations. The Governor-appointed council is charged with providing leadership and coordinating the activities of ocean-related state agencies to better manage ocean resources. The OPC guides much of California's ocean policy initiatives, provides input for the solicitation of annual or biennial research proposals as well as funding for Sea Grant selected projects. Sea Grant staff attend meetings of the OPC in order to stay abreast of new policy directions and to obtain input on the research and outreach Sea Grant can contribute to state management programs. In the OPC's FY2012-2017 Strategic Plan, there are five areas of focus: science-based decision-making; climate change; sustainable fisheries and marine ecosystems; coastal and ocean impacts from land-based sources; and existing and emerging ocean uses. These focus areas overlap with many of USC Sea Grant's area of focus over the next five years.

USC Sea Grant also maintains close contact with the California Ocean Science Trust (OST), a nonprofit public benefit corporation established pursuant to the California Ocean Resources Stewardship Act of 2000. OST's mission is "to ensure that the best available science is applied to California policies and ocean management to successfully maintain a healthy, resilient, and productive ocean and coast." OST provides scientific guidance and support for a number of California state agencies, including the California Ocean Protection Council. USC Sea Grant has partnered with OST on projects in the past and will continue our collaboration to ensure research priorities are being met in the State.

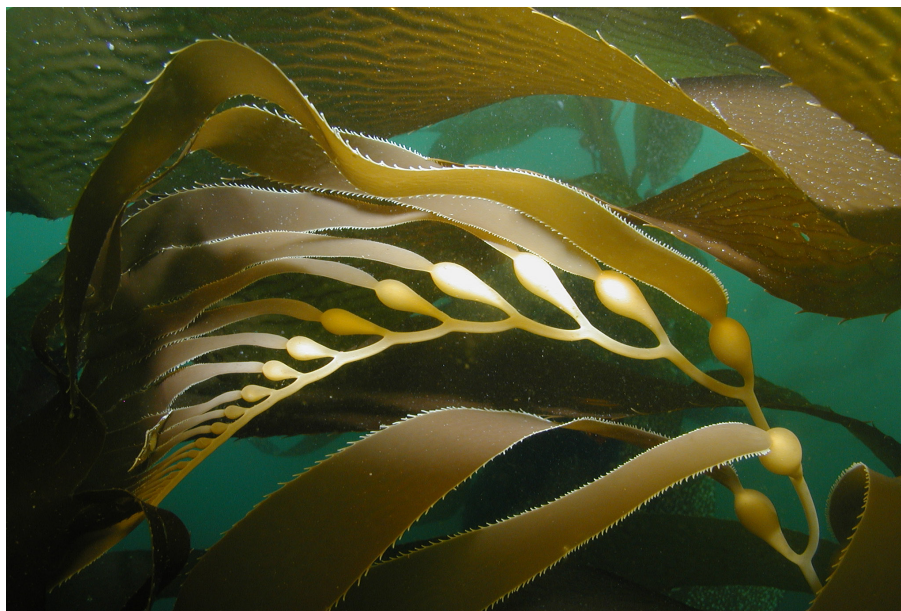
Finally, USC Sea Grant's "K-Grey" marine education program works closely with the COSEE West education initiative, an education grant to USC and UCLA funded through the National Science Foundation (Centers for Ocean Science Education Excellence). The COSEE West Advisory Board (Appendix 4) provides guidance on K-12 education programs for both formal (classroom) and informal audiences, reaching both local constituents and international participants through an on-line presence.



The Los Angeles River winds its way around downtown Los Angeles.  
(Photo credit: Wikipedia Commons by Flickr user kla4067).

## Focus Area: Healthy Coastal Ecosystems

HCE



Giant Kelp or *Macrocystis pyrifera*. (Photo Credit: Charlotte Stevenson)

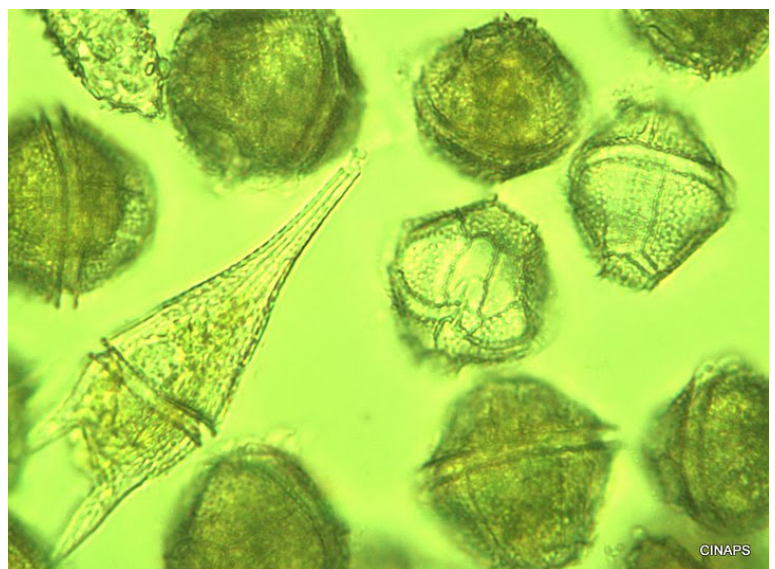
USC Sea Grant's vision is for a healthier urban coastal environment, reflected by cleaner coastal waters that afford better opportunities for recreation and commerce and the protection of both human and ecosystem health. USC Sea Grant works towards healthier coastal ecosystems and habitats by focusing its research funding and outreach programs on pressing issues in the Urban Ocean environment.

Water pollution problems in the Los Angeles region can be severe. Human health and the health of coastal and marine ecosystems are tightly linked; and both public health and that of marine ecosystems are at risk. The Southern California region has one of the largest wastewater effluent systems in the country, contributing more than one billion gallons of treated wastewater to the ocean daily, making treated wastewater the largest source of fresh water inputs to marine waters. Although enormous strides have been made in the treatment of point-source pollutants, non-point source pollution, such as stormwater runoff from streets, channels and rivers continues to contribute large concentrations of pathogens to the urban coast. USC Sea Grant has been and will continue to be involved in a number of collaborative projects to address watershed and coastal ocean pollution by bacteria and viruses, heavy metals, as well as contaminants of emerging concern. Many of the projects USC Sea Grant funds or manages not only try to determine the level of contamination throughout urban watersheds and along the Southern California coast, but also develop faster and less costly ways to measure these levels. From an ecotoxicological perspective, USC Sea Grant will continue funding and managing projects that determine responses of marine organisms to contaminants and pathogens and develop effective bio-indicators of contamination. Finally, marine debris is a quickly growing water quality issue, especially along urban coastlines, and USC Sea Grant will continue looking for ways to encourage and support more research, education and collaborative work on marine debris issues.

Sea Grant also supports observations and studies of long-term trends and effects of oceanic events associated with climate change, such as sea surface warming, sea level rise, ocean acidification, and anthropogenic activities such as the introduction and spread of invasive species. With these broad geographical and long-term studies, partnerships and coordination are critical for success. For instance, invasive species do not respect the arbitrary jurisdictional boundaries humans create, so it is critical to establish national and international partnerships to study, monitor invasive species, investigate potential pathways of introduction, and finally develop policies and tools to prevent the introduction and spread of these organisms. Equally important to research is the development and dissemination of effective outreach and education methods, resources, and technical assistance to reduce the sale and potential spread of marine invasive species.

Harmful algal blooms (HABs) are another pressing issue in the urban ocean, along with their potential cascading effects of hypoxia, fish kills, and health advisories for marine mammals and even humans. USC Sea Grant supports research to acquire predictive understanding of massive algal accumulations, to develop methods to establish whether they are noxious or truly toxic, and to provide a template that coastal municipalities might employ in managing HABs in shallow coastal embayments. Scientists still do not know what conditions trigger a toxic algal species to bloom and produce toxin, but understanding complex coastal oceanographic processes is certainly a key to unraveling this mystery. Such an understanding is also important for sustainably managing human use and enjoyment of the coast. USC Sea Grant focuses its HABs research and outreach programs on answering these questions.

Marine protected areas (MPAs) are considered to be an essential part of ecosystem based management regimes. In California, the Marine Life Protection Act (MLPA) of 2001 mandated the designation of an integrated state network of marine reserves along the entire coast, and a new system of MPAs went into effect in Southern California on January 1, 2012. Now, ensuring adequate monitoring of these MPAs, science-based adaptive management, and public education will be critical for the future success of these protected areas. USC Sea Grant also supports healthy coastal ecosystem function and protection: by representing the neutral science-based perspective and facilitating wide involvement in the constituent community in the federal process for developing, maintaining, and evaluating the Channel Islands National Marine Sanctuary; by linking research, education, and outreach initiatives to the role of restored wetlands; by continuing to support education and outreach efforts to reduce human impact to coastal ecosystems; and by supporting the development of indices of ecosystem health.



*Lingulodinium sp.* and other species of algae are capable of rapid bloom growth, sometimes generating harmful effects. (Photo Credit: CINAPS)



**GOAL 1: Ecosystem services are improved by enhanced health, diversity and abundance of fish, wildlife and plants.**

HCE

**Short-Term Outcomes**

- 1.1 Develop and calibrate new standards, measures and indicators of ecosystem sustainability.
- 1.2 Identify critical uncertainties that impede progress toward achieving sustainability of ecosystems and the goods and services they provide.

**Medium-Term Outcomes**

- 1.3 Resource managers, policy- and decision-makers use standards and indicators to support ecosystem-based management.

**Long-Term Outcomes**

- 1.4 USC Sea Grant contributes to the ability of dynamic ecological systems to provide a wide range of ecological, economic and societal services and are more resilient to change.
- 1.5 USC Sea Grant contributes to greater public stewardship, which in turn leads to participatory decision-making and collaborative ecosystem-based management decisions.

**GOAL 2: Ecosystem-based approaches are used to manage land, water and living resources.**

**Short-Term Outcomes**

- 2.1 Stakeholders have access to data, models, policy information and training that support ecosystem-based planning, decision-making and management approaches.
- 2.2 Baseline data, standards, methodologies and indicators are developed to assess the health of ecosystems and watersheds.
- 2.3 Residents, resource managers, businesses and industries understand the effects of human activities and environmental changes on coastal resources.
- 2.4 Resource managers have an understanding of the policies that apply to coastal protected species.

**Medium-Term Outcomes**

- 2.5 Methodologies are used to evaluate a range of practical ecosystem-based management approaches for planning and adapt to future management needs.
- 2.6 USC Sea Grant contributes to the ability of resource managers to apply ecosystem-based management principles when making decisions.
- 2.7 USC Sea Grant contributes to the ability of resource managers to incorporate laws and policies to facilitate and implement ecosystem-based management.
- 2.8 USC Sea Grant contributes to the ability of residents, resource managers and businesses to integrate social, natural and physical science when managing resources and work with all sectors in the decision-making process.

**Long-Term Outcomes**

- 2.9 USC Sea Grant contributes to the efforts to manage land, water and living resources using ecosystem-based approaches.



The Southern California region has one of the largest wastewater effluent systems in the country, contributing more than one billion gallons of treated wastewater to the ocean daily, making treated wastewater the largest source of fresh water inputs to marine waters. (Photo credit: Phyllis Grifman)

## GOAL 3: Ecosystems and their habitats are protected<sup>2</sup>, enhanced or restored

HCE

### Short-Term Outcomes

- 3.1. Residents, resource managers and businesses understand the importance of the benefits provided by preserving non-degraded ecosystems.
- 3.2. Residents, resource managers and businesses understand the threats to ecosystems and the consequences of degraded ecosystems.
- 3.3. Scientists develop technologies and approaches to restore degraded ecosystems.

### Medium-Term Outcomes

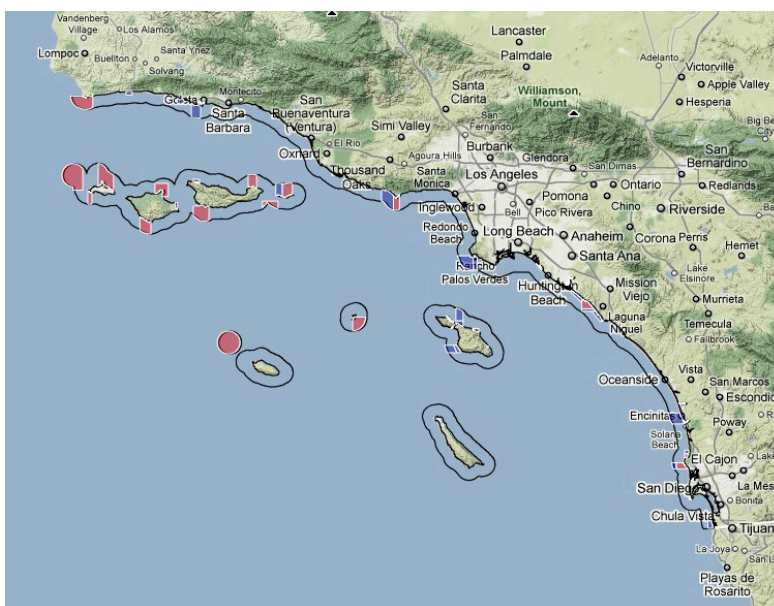
- 3.4. USC Sea Grant contributes to the ability of resource managers to set realistic and prioritized goals to protect and restore habitats by incorporating scientific information and public input.
- 3.5. USC Sea Grant contributes to the ability of resource managers, businesses and residents to adopt innovative approaches and technologies to maintain or improve the function of ecosystems.

### Long-Term Outcomes

- 3.6. USC Sea Grant contributes to efforts to ensure habitats are protected, enhanced or restored.
- 3.7. USC Sea Grant contributes to efforts to ensure degraded ecosystem function and productivity are restored.

### Healthy Coastal Ecosystems Performance Measures

1. Number of Sea Grant-supported tools, technologies and information services that are used by our partners/customers to improve ecosystem-based management.
2. Number of ecosystem-based approaches used to manage land, water and living resources in coastal areas as a result of Sea Grant activities.
3. Number of acres of coastal habitat protected, enhanced, or restored as a result of Sea Grant activities.



Southern California's network of marine protected areas went into effect January 1, 2012. (Image courtesy of Marine Map)

<sup>2</sup> In the context of this goal, protected areas are those places in some form of conservation management program. This is the same definition used by the National Sea Grant College Program Strategic Plan, 2014-2017.

## Focus Area: Sustainable Fisheries and Aquaculture

SFA



There are dozens of species of rockfish in California, and many are caught in the commercial groundfish fishery in Southern California. (Image credit: Bonnie Rodgers)

It is USC Sea Grant's vision to have a safe, sustainable seafood supply and a public that understands how to make healthy and sustainable seafood choices. As has been the case throughout the nation, Southern California has witnessed the decline of fisheries over several decades. This is of particular concern in the Los Angeles region's urban ocean where environmental impacts from increased runoff and pollution, as well as the increased activity of recreational fishing, negatively impact fish stocks. This is indeed the case of the spotted sand bass, to name just one impacted species.

Creating educational materials related to seafood safety, quality, and security, and making them available to all consumers is a first step in guiding the public to make safe and sustainable seafood choices. Enlightened consumers will make wiser choices about buying domestic products, versus imported ones that may not be harvested in sustainable ways. Moreover, those who understand the seafood markets and production practices will be better able to make healthy choices not only about the food they eat, but the manner in which it is produced, harvested, and processed. Along the diverse and urban coast of the Los Angeles region, there are over 140 spoken languages and many different cultural practices when it comes to catching, preparing and eating seafood. Making sure that our education resources can be understood within the context of these various cultures will be important for reaching the diversity of stakeholders that populate the Los Angeles region.

Sustainable aquaculture is currently an important societal need that will continue to grow in the future. With collapsing fish stocks and an increasing national demand for seafood, it is clear that natural fish stocks, even with the help of marine protected areas (MPAs), will not be able to sustain the fisheries markets. Currently, 86 percent<sup>3</sup> of seafood consumed in the U.S. is imported, leading to a seafood deficit over \$10 billion per year.<sup>4</sup> Aquaculture will be necessary to avoid larger foreign imports of seafood. That being said, it is critical that any coastal or open ocean aquaculture is done sustainably; therefore, soliciting and initiating research on sustainable practices and reducing the potential environmental impacts of aquaculture will be important moving forward. In addition, research has shown that increasing levels of carbon dioxide in the atmosphere results in ocean acidification that has impacts on fish stocks, particularly those with carbonate shells such as shellfish; fisheries research and aquaculture based-studies to investigate ocean acidification threats and possible adaptations will be equally important.

<sup>3</sup> Food and Agriculture Organization of the United Nations.

<sup>4</sup> U.S. Department of Agriculture Foreign Agricultural Service statistics.



Finally, MPAs are considered to be an essential part of ecosystem based management regimes and have become a successful tool in many parts of the world to ensure sustainable and healthy fisheries. Research from around the world has shown that both biomass and abundance of fish increase inside marine protected areas. In California, the Marine Life Protection Act (MLPA) of 2001 mandated the designation of an integrated state network of marine reserves along the entire coast, and a new system of MPAs went into effect in Southern California on January 1, 2012. Although most of our work on MPAs is encompassed under the Healthy Coastal Ecosystems Focus Area within this strategic plan, some of our outreach work on MPAs with recreational anglers, consumers and harvesters will also contribute to more sustainable seafood supply.

#### **GOAL 4: A safe, secure and sustainable<sup>5</sup> supply of seafood to meet public demand.**

##### **Short-Term Outcomes**

- 4.1 Commercial and recreational fishermen are knowledgeable about efficient and responsible fishing techniques.
- 4.2 Commercial, recreational and subsistence fishermen are knowledgeable about avoiding contaminated fish.
- 4.3 The commercial fishing industry is aware of innovative marketing strategies to add value to its product.

##### **Medium-Term Outcomes**

- 4.4 Fishermen apply techniques to reduce negative impacts on depleted, threatened or endangered species through research initiatives and MPA-related outreach.
- 4.5 Resource managers establish policies and regulations that achieve a better balance between economic benefit and conservation goals through MPA-related outreach.

##### **Long-Term Outcomes**

- 4.6 USC Sea Grant contributes to an expansion of the sustainable domestic fishing and aquaculture industries.

#### **GOAL 5: Informed consumers who understand the health benefits of seafood consumption and how to evaluate the safety and sustainability of the seafood they buy.**

##### **Short-Term Outcomes**

- 5.1 U.S. seafood consumers have the knowledge to evaluate sustainable seafood choices.
- 5.2 U.S. seafood consumers have an increased knowledge of the nutritional benefits of seafood products and know how to judge seafood safety and quality.

##### **Medium-Term Outcomes**

- 5.3 U.S. seafood consumers preferentially purchase sustainable seafood products.

##### **Long-Term Outcomes**

- 5.4 USC Sea Grant contributes to the improvement of consumer health through increased consumption of safe and sustainable seafood products.

#### **Sustainable Fisheries and Aquaculture Performance Measures**

- 4. Number of fishermen, seafood processors and aquaculture industry personnel who modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Sea Grant activities.
- 5. Number of seafood consumers who modify their purchases using knowledge gained in fisheries sustainability, seafood safety and the health benefits of seafood as a result of Sea Grant activities.

<sup>4</sup>We use a working definition of “seafood sustainability” that is based on the NOAA Fishwatch concept and used in the National Sea Grant College Program Strategic Plan, 2014-2017. Sustainability involves “meeting today’s needs without compromising the ability of future generations to meet their needs. In terms of seafood, this means catching or farming seafood responsibly, with consideration for the long-term health of the environment and the livelihoods of the people who depend upon the environment.”

## Focus Area: Resilient Communities and Economies

RCE



Los Angeles is the largest urban center on the West Coast and the second largest in the nation, making it the perfect location for Sea Grant to encourage sustainable economic growth in conjunction with environmental health and resiliency. (Image credit: Charlotte Stevenson)

Almost a decade into the 21st century, California's coastal cities continue to face unprecedented population growth and associated development pressures, placing demands upon ecosystems and threatening the survival of vibrant, economically sustainable, and diverse coastal communities. USC Sea Grant's vision is to support a balance between the robust economic opportunities of the ocean and the continued sustainability of marine ecosystems and resources, as well as to play a major role in helping decision-makers, citizens, and teachers, develop, implement and communicate plans to reduce risks and respond to natural and human-induced hazards.

In addition to being the largest urban center on the West Coast and the second largest in the nation, Los Angeles County is home to the twin ports of Los Angeles and Long Beach, constituting the busiest seaport complex in the country. Close to 45% of all marine freight entering the U.S. comes through these ports. However, the movement of goods to the region and throughout the nation causes significant environmental impacts upon the coast and upon residents of the region, affecting air quality, water quality, transportation, and thus the area's population through both increased traffic and pollution. USC Sea Grant's long-standing relationships with coastal communities and industries make it ideally suited to provide expert advice in port planning in conjunction with environmental management and protection; to support analysis and development of plans for a major marine laboratory and outreach center on the waterfront in the Port of Los Angeles; to provide widely available public education on the balance between economic development of seaports and environmental protection; and to provide accurate scientific information to reduce conflicts over proposed multiple uses of coastal spaces and to increase efficient land use practices.

Sustainable land-use practices and especially low impact development have a great affect on water quality in urban watersheds and along the coast. In addition to the large amount of water quality research and outreach to be accomplished under the Healthy Coastal Ecosystems Focus Area of this strategic plan, USC Sea Grant works with managers and the public to ensure an improved understanding of the content, fate, and effect of point and non-point source discharges in urban watersheds; to develop regional strategies for managing the effects of hydromodification on natural arid streams; and to leverage local and state partnerships to make progress in Southern California municipalities for implementing alternative storm water management practices (e.g. low impact development, green infrastructure).

To compound the complexities of both providing for a vibrant economy, while protecting natural resources, coastal Californians have the added challenge of the imminent impacts of climate change. Sea level rise threatens coastal infrastructure and wetlands and increased storminess could lead to damaging floods and mudslides. Rising carbon dioxide in the atmosphere is dissolving into the oceans, resulting in ocean acidification. This has impacts on organisms with carbonate shells or skeletons such as shellfish and corals. Water current patterns and temperatures are changing, leading to shifts in species habitats and ranges. All these natural and human-induced impacts pose substantial threats to coastal ecosystems and communities and coastal communities have recognized the need to begin planning for these impacts. USC Sea Grant is not only funding research and developing outreach products and education tools to help understand the impacts of climate change on the biology and chemistry of the ocean, but also working with local and state governments to help coastal managers and aquaculturists understand and engage in early adaptation strategies to prepare for climate change. USC Sea Grant believes that with the proper information, tools and technical assistance, regions, cities and even individuals will be able to limit economic losses by preparing and adapting for climate change early.



In the City of Los Angeles' AdaptLA Program, USC Sea Grant helps the city plan for future city land-use and existing infrastructure adaptations based on sea level rise modeling projections. (Image credit: Marika Schulhof)

## **GOAL 6: Development of vibrant and resilient coastal economies.**

### **Short-Term Outcomes**

- 6.1 Communities<sup>6</sup> are aware of the interdependence between the health of the economy and the health of the natural and cultural systems.
- 6.2 Communities have access to information needed to understand the value of waterfront- and tourism-related economic activities.
- 6.3 Communities understand the strengths and weaknesses of alternative development scenarios on resource consumption and local economies.
- 6.4 Communities are aware of regulatory regimes affecting economic sustainability.
- 6.5 Communities are knowledgeable about economic savings from energy planning and conservation.

### **Medium-Term Outcomes**

- 6.6. Citizens are actively engaged in management and regulatory decisions.
- 6.7. Communities engage in economic development initiatives that capitalize on the value of their natural and cultural resources while balancing resource conservation and economic growth.

### **Long-Term Outcomes**

- 6.8 Communities have diverse, healthy economies and industries without displacing traditional working waterfronts.

## **GOAL 7: Communities use comprehensive planning to make informed strategic decisions.**

### **Short-Term Outcomes**

- 7.1 Communities understand the connection between planning and natural resource management issues and make management decisions that minimize conflicts, improve resource conservation efforts and identify potential opportunities.

<sup>6</sup>Communities are defined broadly to include governments, businesses, residents, visitors and non-governmental organizations. This is the same definition as used in the National Sea Grant College Program Strategic Plan, 2014-20



### Medium-Term Outcomes

- 7.2 Communities make use of tools and information to explore the different patterns of coastal development, including community visioning exercises, resource inventories and coastal planning.
- 7.3 Communities are encouraged to adopt coastal and land-use plans.
- 7.4 The public, leaders and businesses work together to implement plans for the future and to balance multiple uses of coastal areas.

RCE

## GOAL 8: Improvements in coastal water resources sustain human health and ecosystem services.

### Short-Term Outcomes

- 8.1. Communities are aware of the impact of human activities on water quality and supply.
- 8.2. Communities understand the value of clean water, adequate supplies and healthy watersheds.
- 8.3. Communities understand water laws and policies affecting the use and allocation of water resources.

### Medium-Term Outcomes

- 8.4. Communities engage in planning efforts to protect water supplies and improve water quality.
- 8.5. Communities adopt mitigation measures, best management practices and improved site designs in local policies and ordinances to address water supplies and water quality.

### Long-Term Outcomes

- 8.6 Water quality improves.

## GOAL 9: Resilient coastal communities adapt to the impacts of hazards and climate change.

### Short-Term Outcomes

- 9.1 Residents and decision-makers are aware of and understand the processes that produce hazards and climate change and the implications of those processes for them and their communities.
- 9.2 Decision-makers are aware of existing and available hazard- and climate-related data and resources and have access to information and skills to assess local risk vulnerability.
- 9.3 Communities have access to data and innovative and adaptive tools and techniques to minimize the potential negative impact from hazards.
- 9.4 Decision-makers understand the legal and regulatory regimes affecting adaptation to climate change, including coastal and riparian property rights, disaster relief and insurance issues.

### Medium-Term Outcomes

- 9.5 Communities apply best available hazards and climate change information, tools and technologies in the planning process.
- 9.6. Decision-makers apply data, guidance, policies and regulations to hazard planning and recovery efforts.
- 9.7. Communities develop and adopt comprehensive hazard mitigation and adaptation strategies suited to local needs.
- 9.8. Residents take action to reduce the impact of coastal hazards on their life and property.
- 9.9. Communities adopt a comprehensive risk communications strategy for hazardous events.



Along Broad Beach, emergency rock revetment was built to protect homes built too close to the shoreline. Now, sea level rise due to climate change will bring exacerbated flooding to parts of the coast such as Broad Beach (Image credit: Phyllis Grifman)

## Long-Term Outcomes

9.10 Communities effectively prepare for hazardous events and climate change.

9.11 Communities are resilient and experience minimum disruption to life and economy following hazard events.

RCE

## Resilient Communities and Economies Performance Measures

6. Number of communities that implemented sustainable economic and environmental development practices and policies (e.g., land-use planning, working waterfronts, energy efficiency, climate change planning, smart growth measures, green infrastructure) as a result of Sea Grant activities.

7. Number of communities that implemented hazard resiliency practices to prepare for, respond to or minimize coastal hazardous events as a result of Sea Grant activities.



The twin ports of Los Angeles and Long Beach constitute the busiest seaport complex in the country. USC Sea Grant's long-standing relationships with coastal communities and industries make it ideally suited to support the port community by providing leadership and guidance to explore port growth in the context of environmental considerations (Image credit: Jim Fawcett)



## Focus Area: *Environmental Literacy and Workforce Development*

ELWD



USC Sea Grant's goal is to make current marine science available and local scientific experts accessible to all people in Los Angeles. (Image credit: Linda Chilton)

Although the ocean covers 71% of the planet, is a large and steadily growing source of the world's of protein (due to aquaculture), and is responsible for regulating the earth's climate, ocean science education is not always available to young students. This is often due to constrained resources, especially for many inner-city schools and students. USC Sea Grant's vision is to connect ocean science and policy to on-the-ground formal and informal education, making sure that all people in Southern California, particularly all students, have exposure to environmental science, career opportunities, and even the ocean itself. Where connections are made, learning takes place, across many environments, bridging generations and resource gaps.

Ocean literacy is an understanding of the ocean's influence on you and your influence on the ocean. Ocean literacy is critical for individuals to make informed and responsible decisions regarding the ocean and its resources. Providing the scientific and technical information to inform the development of classroom curricula and informal education programs (e.g. through aquaria, science centers, museums) has long been an important goal of USC Sea Grant's marine science education program. Educators must be supported to develop creative methods that ensure not just learning but application of knowledge for all audiences including those who are underserved. Helping learners to develop the critical thinking skills to make wise decisions and to engage as citizen volunteers for meaningful stewardship experiences is essential to achieving literacy. USC Sea Grant believes in the value of linking researchers and graduate students with formal and informal educators to help use real scientific data as an educational tool, to enable teachers to create and implement standards-based marine science lessons, and to develop marine and aquatic science education and ocean literacy strategies as a prominent part of the state, regional, and national education agendas.



USC Sea Grant's education programs go beyond formal educational settings and curricula. Our goal is to make current marine science available and local scientific experts accessible to all people in Los Angeles, regardless of age, primary language, or prior educational experience. It is important to provide a variety of methods to informal educators to help the public understand coastal and ocean science—including its applications—to help to foster a sense of stewardship in our society. USC Sea Grant believes that a key to public environmental education is to enable cross-generational learning, building connections among educators, children, and parents.

ELWD

Training new generations in science and policy means that the lessons we learn in science and the lessons we teach in the classroom, in aquariums, and in museums will continue to help society cope with difficult environmental problems. Ocean science education is an investment in the future of the coastal ecosystems. Our early childhood education programs, as well as our undergraduate teaching, graduate research investment, and fellowship opportunities help students prepare for careers in science, technology, engineering, mathematics (STEM) and other disciplines critical to local, regional and national needs. Traineeships help train graduate students at both Master's and Doctoral level for careers in academia, government and private enterprise, and fellowships (Knauss especially) place the very best graduates in positions that prepare our students to lead the nation in sustainable and forward thinking environmental management.

#### **GOAL 10: An environmentally literate public supported and informed by a continuum of lifelong formal and informal engagement opportunities.**

##### **Short-Term Outcomes**

- 10.1 Formal and informal educators are knowledgeable of the best available science on the effectiveness of environmental science education.
- 10.2 Formal and informal educators understand environmental literacy principles.
- 10.3 Lifelong learners are able to engage in informal science education opportunities focused on coastal topics.

##### **Medium-Term Outcomes**

- 10.4 Engagement professionals use environmental literacy principles in their programs.
- 10.5 Engagement programs are developed and refined using the best available research on the effectiveness of environmental and science education.
- 10.6 Formal and informal education programs incorporate environmental literacy components.
- 10.7 Formal and informal education programs take advantage of the knowledge of Sea Grant-supported scientists and engagement professionals.
- 10.8 Formal and informal educators, students and/or the public collect and use coastal weather data in inquiry and evidence-based activities.
- 10.9 Lifelong learners make choices and decisions based on information they learned through informal science education opportunities.
- 10.10 Educators work cooperatively to leverage federal, state and local investments in coastal environmental education.

##### **Long-Term Outcomes**

- 10.11 Members of the public incorporate broad understandings of their actions on the environment into personal decisions.



Ocean science education is an investment in the future of the coastal ecosystems. (Image credit: Dieuwertje Kast)

**GOAL 11: A future workforce reflecting the diversity of Sea Grant programs, skilled in science, technology, engineering, mathematics and other disciplines critical to local, regional and national needs.**

ELWD

### **Short-Term Outcomes**

11.1 Students and teachers are aware of opportunities to participate in science, technology, engineering, mathematics and active stewardship programs.

### **Medium-Term Outcomes**

11.2 A diverse and qualified pool of applicants pursues professional opportunities for career development in natural, physical and social sciences and engineering.

11.3 Graduate students are trained in research and engagement methodologies.

11.4 Research projects support undergraduate and graduate training in fields related to understanding and managing our coastal resources.

### **Long-Term Outcomes**

11.5 USC Sea Grant contributes to a diverse workforce trained in science, technology, engineering, mathematics, law, policy or other job related fields that is employed and have high job satisfaction.

### **Environmental Literacy and Workforce Development Performance Measures**

8. Number of Sea Grant facilitated curricula adopted by formal and informal educators.

9. Number of people engaged in Sea Grant supported informal education programs.

10. Number of Sea Grant-supported graduates who become employed in a career related to their degree within two years of graduation.



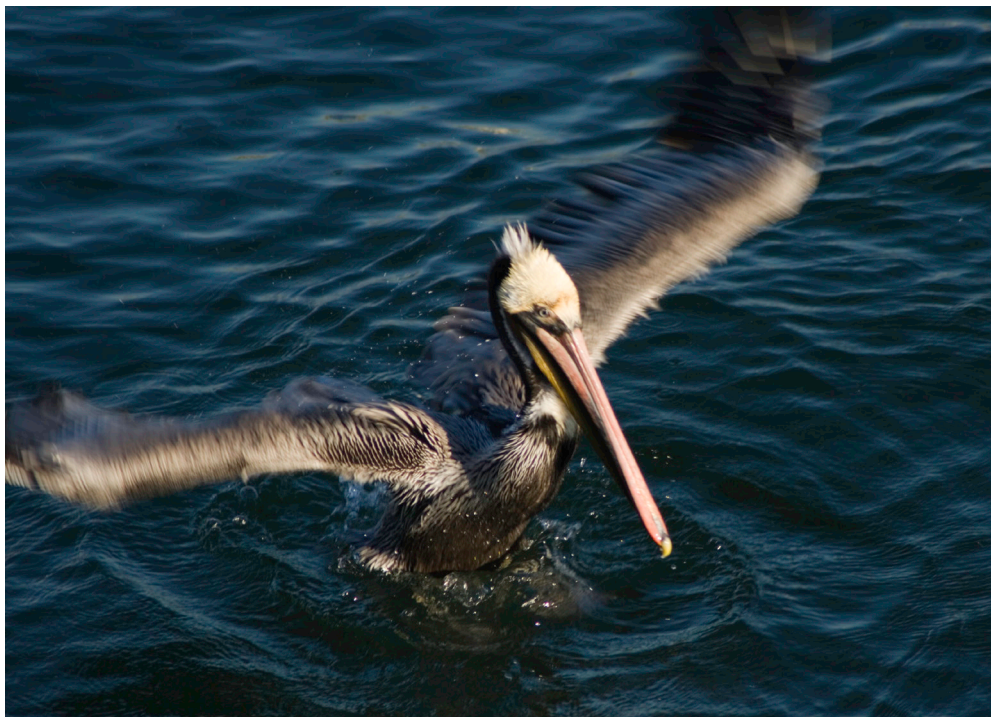
Our early childhood education programs, as well as our undergraduate teaching, graduate research investment, fellowship opportunities help students prepare for careers in science, technology, engineering, mathematics and other disciplines critical to local, regional and national needs. (Image credit: Linda Chilton)

## Cross-Cutting Performance Measures

In addition to the performance measures we will use to track our progress in each of the four focus areas of this strategic plan, USC Sea Grant, in alignment with the National Sea Grant Strategic Plan, will track the progress of the people whom we fund and with whom we interact. Our work is not just about science and results; rather, we know that we are investing in individuals, some of whom will share what they learned in our workshops with others, and some of whom will eventually graduate, enter the workforce, and apply the knowledge and experiences they have gained.

11. Economic (market and non-market; jobs and businesses created or retained) benefits derived from Sea Grant activities.

12. Number of peer-reviewed publications produced by the Sea Grant network, and number of citations for all peer-reviewed publications from the last four years.



California brown pelican. (Image credit: Charlotte Stevenson)



## Appendix 1: Advisory Council

	Sector								Focus Area			
	Federal Government	State Government	Regional Local Gov't	NGO	Education	Industry	Academics	Research Institution	Healthy Coastal Ecosystems	Sustainable Fisheries and Aquaculture	Resilient Communities and Economies	Environmental Literacy and Workforce Development
Dr. Ralph Appy, Port of Los Angeles (Retired)						X					X	
Mr. Brian Baird, Aquarium of the Bay/Bay Institute (Former California Assistant Secretary for Ocean Policy)		X		X					X	X	X	X
Dr. Gary Bane, Nauticos, Ocellus Productions Division						X						
Dr. Melinda Bartlett, Bureau of Sanitation, Los Angeles			X								X	
Dr. Norman Bartoo, NOAA National Marine Fisheries Service	X									X		
Dr. John Dorsey, Loyola Marymount University					X		X	X	X		X	X
Mr. Dennis Eschen, Department of Parks, Rec & Marine, City of Long Beach (Retired)			X								X	
Ms. Lesley Ewing, California Coastal Commission		X									X	
Mr. Russell Galipeau, Channel Islands National Park	X								X	X	X	X
Dr. Mark Gold, UCLA Institute of the Environment and Sustainability							X	X	X	X	X	X
Dr. Dominic Gregorio, California Water Resource Control Board		X			X				X	X	X	X
Dr. Mark Helvey, NOAA National Marine Fisheries Service, Southwest Regional Office	X									X		
Ms. Beth Jines, City of Los Angeles Department of Water and Power			X								X	
Dr. Robert Kanter, Port of Long Beach						X					X	
Dr. Charles D. Kopczak, California Science Center				X	X				X	X	X	X
Dr. Dani Lipski, Channel Islands National Marine Sanctuary	X				X				X	X		X
Mr. Michael Lyons, Los Angeles Regional Water Quality Control Board			X						X		X	
CAPT Richard B. McKenna, Marine Exchange of Southern California						X					X	
Mr. Craig A. Moyer, Manatt, Phelps & Phillips, LLP					X	X			X	X	X	
Mr. Victor Omelczenko, National Sea Grant Office and Internal Revenue Service (Retired)	X								X	X	X	X
Dr. Jonathan T. Phinney, Southwest Fisheries Science Center, NOAA National Marine Fisheries Service	X								X	X	X	
Mr. Fred Piltz, BOEM (Retired)	X								X		X	
Dr. Jerry Schubel, Aquarium of the Pacific				X	X				X	X	X	X
Dr. Guang-Yu Wang, Santa Monica Bay Restoration Commission		X	X		X			X	X	X	X	X
Dr. Stephen Weisberg, Southern California Water Research Project				X				X	X	X	X	

## Appendix 2: Academic Coordinators

Dr. Hilda Blanco, Professor  
Interim Director, Center for Sustainable Cities  
USC Sol Price School of Public Policy

Dr. Suzanne Edmands, Professor  
USC Dana and David Dorsife College of Letters, Arts and Sciences,  
Department of Biological Sciences, Marine Environmental Biology

Dr. Kenneth Nealson, Professor  
Wrigley Chair in Environmental Studies  
USC Dana and David Dorsife College of Letters, Arts and Sciences,  
Department of Earth Sciences

Dr. Rick Pieper, Director (Retired)  
Southern California Marine Institute

Dr. Costas Synolakis, Professor  
USC Viterbi School of Engineering, Civil/Environmental Engineering



A beach sign warns the public of poor water quality conditions due to stormwater runoff.  
(Image credit: Phyllis Grifman)

## Appendix 3: RASGAP Members

Ms. Catherine Kulhman, Chair  
Deputy Secretary for Oceans and Coastal Matters  
State of CA

Ms. Debbie Aseltine-Nielson  
California Dept. of Fish and Game

Ms. Marina Brand  
California State Lands Commission

Dr. Kenneth Coale  
CSU, Moss Landing Marine Laboratories

Dr. Fred Conte  
UC Davis, Bodega Marine Laboratory  
Departments of Environmental Toxicology and Nutrition

Mr. Don Disraeli  
Kanaloa Seafood

Dr. Reinhard E. Flick  
California Dept. of Boating and Waterways

Ms. Margy Gassel  
Office of Environmental Health Hazard Assessment

Dr. Dominic Gregorio  
State Water Resources Control Board

Ms. Susan Hansch  
California Coastal Commission

Dr. James Moffett  
USC, Department of Biological Sciences  
Marine and Environmental Biology Section

Ms. Deborah Orrill  
California Dept. of Conservation

Mr. Dirk Rosen  
Marine Applied Research & Exploration

Ms. Deanna Spehn  
39th State Senate District, California

Mr. Peter Struffenegger  
Sterling Caviar LLC



Curlews scan the Malibu coastline. (Image credit: Phyllis Grifman)



## Appendix 4: COSEE West Advisory Board

Dr. Paula Arvedsen  
California State University, Los Angeles, CA

Mr. Dave Bader  
Aquarium of the Pacific, Long Beach, CA

Dr. Steve Bay  
Southern California Water Coastal Water Research Project

Mr. LaRoyce Bell  
Gifted and Talented Programs  
Los Angeles Unified School District

Ms. Julie Bursek  
Channel Islands National Marine Sanctuary

Dr. Victor Chow  
Cabrillo Marine Aquarium, San Pedro, CA

Ms. Heather Doyle  
Heal the Bay, Santa Monica Pier Aquarium

Ms. Rachel Espinoza  
Hollenbeck Middle School, Los Angeles, CA

Mr. Robert Grove  
Southern California Edison

Dr. Jim Kisiel  
California State University, Long Beach, CA

Dr. Chuck Kopczak  
California Science Center, Los Angeles, CA

Ms. Maria Madrigal  
SeaLab, Redondo Beach, CA

Mr. Alfonso Montiel  
Cabrillo Marine Aquarium, San Pedro, CA

Mr. Ron Ozuna  
Marine Science Academy, Roosevelt High School, Los Angeles

Ms. Annie Richardson  
Jet Propulsion Laboratory, Caltech

Dr. Robin Savoian  
Natural History Museum, Los Angeles, CA

Dr. Gary Scott  
USC Rossier School of Education

Dr. Ilene Straus  
Beverly Hills Unified School District

Ms. Tara Treiber  
Heal the Bay, Santa Monica Pier Aquarium

Ms. Jennifer Trochez-MacLean  
Foshay Learning Center, Los Angeles, CA

Dr. Guangyu Wang  
Santa Monica Bay Restoration Commission

Ms. Diane Watkins  
Los Angeles Unified School District  
Secondary Science Education

Dr. Raymond Wells  
Pierce College, Woodland Hills, CA

Mr. Gary Widdison  
Los Angeles County Office of Education



In a COSEE workshop, teachers learn from local researchers and develop ways to demonstrate difficult concepts to students. (Image credit: Linda Chilton)



USC Sea Grant Strategic Plan: 2014 - 2017  
University of Southern California  
The Urban Ocean Program

  
**Sea Grant**