2014–2017

California Sea Grant College Program Strategic Plan

Sea Grant
California

Nicole Lee, CASG

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Sea Grant is a unique partnership of public and private sectors, combining research, extension, education, and outreach for public service. It is a national network of universities meeting changing environmental, social and economic needs of people in our coastal, ocean, and Great Lakes regions. A searchable database of publications from all Sea Grant programs is available at the National Sea Grant Library: http://nsgl.gso.uri.edu.

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Introduction

M. Redfield, UC Santa Cruz

California Sea Grant serves the communities, industries and people of California and the nation through research, extension, education and outreach. By identifying important coastal and marine issues (echoed in this strategic plan) and supporting research, extension and outreach efforts on these issues, we strive to provide better scientific and socioeconomic information to promote the sustainable use of coastal and marine resources.

First funded by the National Oceanic and Atmospheric Administration (NOAA) in 1968, California Sea Grant (CASG) began as a pilot project at Scripps Institution of Oceanography to create a graduate marine science education program for California. Since then, CASG has grown and diversified to the point that it manages an average of $35 million annually in federal and state funds to support research, extension, education and outreach. CASG aligns its strategic foci with those of the National Sea Grant College Program to develop shared programmatic areas for investment. CASG also partners with several key state agencies in California to support basic research and education programs with direct state relevance. From its headquarters at Scripps Institution of Oceanography, CASG annually funds more than 75 research and outreach projects at public and private institutions throughout the state and nation.

The Strategic Plan that unfolds below provides our vision, mission, goals and approach in light of the position of CASG within the nation and the state of California. It identifies key partners, audiences, stakeholders and constituents, who were all consulted in defining our key areas of focus and our strategies for addressing these focus areas.

Nicole Lee, CASG

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Vision & Mission

CASG Vision

The California Sea Grant College Program envisions a future in which people live in balance with coastal and marine resources, noting that the well being of California is closely tied to its human and natural resources. We envision an educated and engaged public that makes decisions based on sound, scientific information, resulting in sustainable, thriving human and natural communities.

CASG Mission

CASG's mission is to provide integrated research, extension, outreach, and education to help Californians balance diverse coastal and marine interests and adapt to changing conditions and needs. We accomplish this by collaborating with a network of local, state, tribal, regional, national and international partners. California is large and diverse both geographically and in terms of its population. In addition to more than 37 million residents, California draws millions of visitors and tourists from around the world each year.

Key Audiences & Stakeholders

CASG believes that informed use and decision making about coastal and marine resources depends on peoples' awareness of issues and access to reliable information. CASG strives to communicate sound scientific information to the many people who can benefit from it. Accordingly, CASG has identified a wide array of key audiences and stakeholders for its program. These include, in no particular order:

- Coastal community residents/business people
- Business and recreational groups/associations
- Coastal and marine resource managers
- Coastal and marine scientists, university extension personnel and students
- Federal and state legislators
- State and local/municipal government officials
- Non-governmental and conservation organizations
- NOAA and National Sea Grant Office
- Recreational users of coastal and marine resources
- K–12 teachers and students
- General public
- International partners

To achieve its mission, CASG will rely on the following set of core values. These reflect the program's strengths and experience, and guide its management and decision-making.

Marsha Gear, CASG

Program Values

To achieve its Mission, CASG will rely on the following set of core values. These reflect the program's strengths and experience, and guide its management and decision-making.

- Excellence and innovation
- Accountability and scientific integrity
- Impartiality
- Responsiveness to societal issues
- Problem-driven and solution-oriented focus
- Engagement in partnerships
- Bridging communities and academia
- Promoting diversity
- Flexibility and adaptability
- Stewardship and leadership

Dan Robinette; PRBOCS

Program Setting

The priorities and activities of the California and National Sea Grant Programs are supported by recommendations made within major, national guidance documents, including the Draft National Ocean Policy Implementation Plan issued by the National Ocean Council in January 2012 (http://www.whitehouse.gov/administration/eop/oceans/implementationplan), and the recommendations of the Interagency Ocean Policy Task Force adopted by Executive (Presidential) Order in July 2010 (http://www.whitehouse.gov/administration/eop/ceq/initiatives/oceans). Sea Grant shares their commitment to: (1) ensure the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources, (2) enhance the sustainability of ocean and coastal economies, (3) support sustainable uses of and access to the coastal ocean and estuaries, and (4) provide for adaptive management to enhance our understanding of and capacity to respond to climate change and ocean acidification.

In addition, the CASG program has developed important partnerships with a wide array of state agencies that are charged with protecting and responsibly managing the use of California's diverse coastal and estuarine resources. CASG consults with these agencies to develop and modify its own priorities for research and outreach, and to collaborate to administer research programs of mutual interest.

The setting of CASG's program; its alliances with national, regional and state programs; and its strategy for science outreach are summarized next, in sequence.

Program Setting | *National Sea Grant*

California Sea Grant functions as part of a national network of 33 programs under the National Sea Grant College Program (NSGCP) within NOAA. NSGCP provides core federal funds to support California Sea Grant research, extension, education and outreach activities and requires the individual Sea Grant programs to support the national goals and objectives with a significant amount of individual program resources. In its 2014–2017 strategic plan (http://www.seagrant.noaa.gov/other/admininfo/ppe/index.html), the NSGCP identified the following Focus Areas:

- Healthy Coastal Ecosystems
- Sustainable Fisheries and Aquaculture
- Resilient Communities and Economies
- Environmental Literacy and Workforce Development

The broad activities of the California Sea Grant Program will align significantly with the Focus Areas identified by the NSGCP, as outlined below.

PROGRAM SETTING | *West Coast Region*

Christina Johnson, CASG

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* (http://www.westcoastoceans.org).

California Sea Grant also collaborates substantively with the other West Coast Sea Grant Programs (the Washington, Oregon and Southern California Sea Grant Programs), as well as the National Sea Grant College Program and other NOAA agencies, to promote and support regionally focused research programs. Recent examples of regionally collaborative activities include outreach on aquatic invasive species, and social science questions related to national Sea Grant goals. Regional activities of this type are expected to grow in number and scope given the breadth of issues the West Coast faces and given that coastal problems are not delimited by political boundaries.

PROGRAM SETTING | *California*

California is the most populous U.S. state, with more than 37 million residents and the largest ocean-based economy in the country. The state occupies nearly two-thirds of the contiguous U.S. West Coast. Including the perimeter of the San Francisco Bay estuary, California's coast stretches more than 1,100 miles from the Mexican border to Oregon.

The highly urbanized, industrialized and arid southern coast contrasts sharply with the redwood groves along the rural and agricultural north coast. There are three distinct oceanographic regions along the California coast – the Southern California Bight, defined by the region south of Point Conception; a central coastal region; and the waters north of Cape

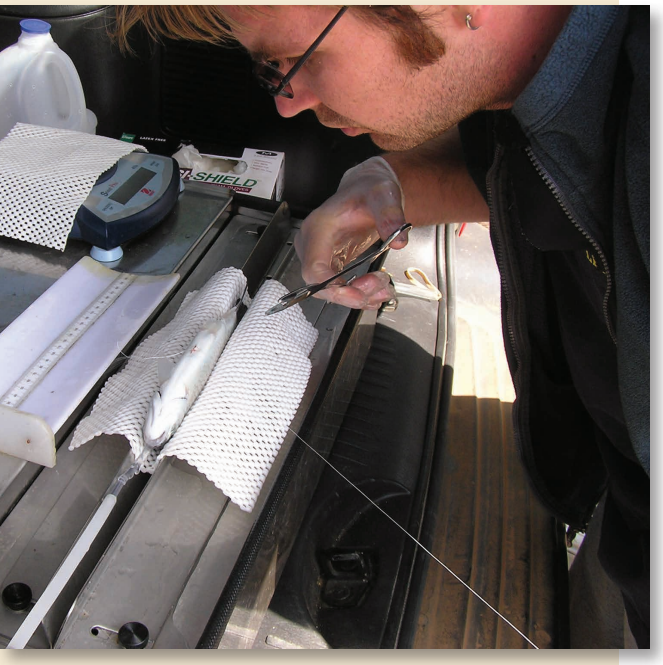
San Diego Oceans Foundation

Mendocino, which are oceanographically more linked to the frigid waters of the coastal Pacific Northwest. Each region of California has challenges and opportunities in coastal and marine resource preservation and management that surpass the state and federal resources available to them. The size and diversity of California and its population creates special challenges for statewide and regional policy development.

California is home to six major seaports, more than 200 marinas and harbors – including fishing communities – and more than 1,000 coastal recreation areas that receive about 100 million visitors a year. This level of activity in the coastal zone places immense pressure on natural resources, poses opportunities and challenges, and creates a need for science-based information and novel approaches to resource management and conservation.

Among the many opportunities, issues and risks facing California are:

- coping with the demands of continued population growth that increasingly stress our marine and coastal resources
- minimizing the social, economic and environmental costs of energy production
- understanding and addressing the effects of climate change, such as sea-level rise and ocean acidification
- reducing the impacts of shoreline development and beach erosion
- maintaining revenue from coastal-related businesses
- sustaining harbor infrastructure, fishing communities and fisheries
- balancing the need for healthy marine resource populations while meeting seafood demand; and
- restoring degraded habitats.



Biotelemetry Lab, UC Davis

PROGRAM SETTING | *State Agency Partners*

For nearly 40 years, CASG has successfully applied its unique capability to combine coastal and marine research, education and outreach to benefit the communities, industries and people of California, the region and the nation. The CASG program has collaborated, and continues to collaborate, with state agencies to administer research programs of mutual interest that are designed to meet specific state priorities using designated funds.

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. Since 2006, CASG has worked with the OPC as one of its state partners and has administered dedicated OPC funds to assist the state in implementing a coordinated program of applied interdisciplinary research and training, linked to manager needs and uses. CASG has managed OPC investments in excess of $4.8M to address focused research and outreach initiatives to:

- study the extent and effects of ocean acidification on California shelf ecosystems
- study factors influencing California chinook salmon declines and restoration options
- forecast harmful algal blooms (HABs) in California's coastal waters, and
- develop new ways to manage California's near-shore fisheries using catch data from marine protected area monitoring.

In February 2012, the OPC adopted its Strategic Plan for FY 2012–2017 (http://www.opc.ca.gov/webmaster/ftp/pdf/2012-strategic-plan/OPC_042412_final_opt.pdf). The OPC selected five areas as the focus of its efforts over the next five years:

1) Science-based decision-making
2) Climate change
3) Sustainable fisheries and marine ecosystems
4) Coastal and ocean impacts from land-based sources, and
5) Existing and emerging ocean uses.

These foci have obvious overlap with the focus areas identified by the National and California Sea Grant Programs, and lead to continued collaboration and partnership. In the next five years, CASG will continue to support OPC's activities to improve the effectiveness of state efforts to protect ocean and coastal resources. CASG will work with OPC to ensure that the outcomes of previously funded SG-OPC research are effectively communicated and linked to policy and management.

CASG collaborates with the California Department of Fish and Game (DFG), the California Ocean Science Trust's Marine Protected Areas (MPA) Monitoring Enterprise, and the OPC on a cutting-edge monitoring initiative, the MPA Baseline Programs (http://monitoringenterprise.org/role/implementing.php). The purposes of these regional programs are to provide an initial assessment of ecological and socioeconomic conditions in each MPA study region at or near the time of implementation, and to measure initial ecological changes and socioeconomic impacts to consumptive and non-consumptive user groups following implementation. For the on-going Baseline Programs authorized by OPC, CASG will continue to oversee the Request-For-Proposals (RFP) process, grant administration for fieldwork and data acquisition for bio-physical monitoring studies, and socioeconomic research for the designated MPAs in four study regions. CASG will collaborate with MPA Monitoring Enterprise and DFG to launch the fifth Baseline Program in the North Coast, the final study region for monitoring and research in MPAs designed and designated under Marine Life Protection Act (MLPA).

In support of OPC's Collaborative Fisheries Research Program West, California Sea Grant managed the competitive RFP process to solicit and fund research projects that create partnerships among fishermen, resource managers and academic scientists to address the fishery data needs of DFG and the California Fish and Game Commission.

 Wuertz Lab, UC Davis

M. Redfield, UC Santa Cruz

Increasing Capacity of State Agencies

Another significant area of collaboration for CASG with state constituents has been through the creation and administration of highly successful Fellows Programs.

Delta Science Fellowship Program

Beginning in 2003, the Delta Science Fellows Program (previously known as the CALFED Science Fellows Program) has paired graduate students and postdoctoral researchers with Bay-Delta agency scientists and senior research mentors. Fellows work on collaborative data analysis and research projects applicable to the California Bay-Delta system under the mentorship of both agency and academic scientists. The Science Program has funded 43 Fellows, totaling over $6 million dollars. The program's goals are to invest in knowledge that will fundamentally advance the understanding of the complex environments and systems within the Bay-Delta system, to aid policy-makers and managers, and to train the next generation of research scientists for water issues in California. Plans are in place to continue the Science Fellows Program to support fellowship research addressing priority topic areas identified in the Fifth Staff Draft Delta Plan (http://deltacouncil.ca.gov/delta-plan/current-draft-of-delta-plan).

California Sea Grant State Fellowship Program

Many agencies in California are involved in the management and planning of coastal resources, and in the future these agencies will need a large number of trained, politically astute individuals to manage ocean and coastal problems. There are only a few statewide educational programs that provide technically trained graduate students with practical experience in marine resource management needs. Recognizing the need for educating the next generation of marine and coastal policy makers, the *California Sea Grant State Fellowship Program* was established in 1987 (http://www.csgc.ucsd.edu/EDUCATION/SeaGrantFellows.html). Modeled after the highly successful, federal Knauss Marine Policy Fellowship Program, our State Fellowship Program provides recent graduates an opportunity to acquire "on the job" experience in the planning and implementation of marine and coastal resource policies and programs in the state of California. In recent years, the program has expanded to include multiple agencies, and Fellows have been assigned to work with:

- California Coastal Commission
- California Department of Fish and Game
- California Department of Parks and Recreation
- California Ocean Protection Council
- California Ocean Resources Management Program (CA Natural Resources Agency)
- California Ocean Science Trust
- California State Lands Commission
- Delta Science Program
- NOAA Coastal Services Center – West Coast Regional Office
- NOAA Marine Protected Area Center – Monterey, CA
- NOAA's Monterey Bay and Channel Islands National Marine Sanctuary Programs
- San Francisco Bay Conservation and Development Commission
- State Water Resources Control Board

The State Fellowship Program will continue to strive to meet the dual objectives of increasing capacity of state agencies with highly motivated and qualified graduate students while facilitating the training and development of the next generation of ocean and coastal leaders.

PROGRAM SETTING | *California Sea Grant Extension*

PBS

CASG maintains an Extension Program that consists of a statewide team of eight marine advisors with diverse areas of expertise. Extension Advisors are geographically spread along the California coast, with "home" bases ranging from San Diego in the south to Eureka in the north. They are well known for identifying emerging marine resource problems and opportunities, conducting applied research, and sharing findings with relevant stakeholders. Environmental stewardship, long-term economic development and responsible use of California's resources are at the heart of CASG's mission. In addition to federal Sea Grant funds, the CASG Extension program receives competitive grant funding from a variety of sources that support research, education and outreach projects that:

- Protect water quality, including effects of fresh water inputs
- Ensure safe and sustainable seafood
- Control aquatic invasive species
- Recover endangered salmon, restore watersheds and protect marine habitats
- Study socioeconomic factors affecting fishing and fishing communities
- Develop ecosystem-based management involving a diverse group of stakeholders in an era of climate change
- Create partnerships to address critical needs in aquaculture, coastal community development and fisheries management, among others

More detailed descriptions of our diverse Extension Program can be found at our website: (http://ca-sgep.ucsd.edu).

Strategic Focus Areas

As the preceding pages make clear, the opportunities for investment by CASG are extremely broad, necessitating that we establish a deliberate plan for wisely allocating available funds and the efforts of our personnel. Our current Strategic Plan (and those that preceded it) defined broad themes of activity that have built on the incredible academic strengths of California's scientists; the needs of state regulators, managers and citizens; and have served CASG well to this point. Upon consultation with our Advisory Board, we were strongly encouraged to continue with this strategy. We then solicited additional advice from our Extension Program academic staff, stakeholders and partners distributed throughout California, as well as opening up our penultimate draft plan for public comment and input. The result is presented here: CASG's priority focus areas, goals and strategies for the years 2014–2017, plus at least one projected key outcome for each goal. The projected outcomes represent example benchmarks from which Sea Grant can track progress toward achieving each goal. For this time period, CASG will concentrate efforts within the following three strategic Focus Areas, all of which align directly with focus areas highlighted by the National Sea Grant Office:

Haven Livingston

- Healthy Coastal and Marine Ecosystems
- Resilient Coastal Communities
- Safe and Sustainable Fisheries & Seafood Supply

We describe next our interests and approach to addressing our Focus Areas. It is worth noting that embedded within these Focus Areas CASG maintains a strong interest in understanding and helping to plan for effective responses to climate change. The wide-reaching effects of climate change, including ocean acidification, sea level rise and changes in storm frequency/intensity, on the people, property and living organisms in the coastal and marine environment, are being increasingly recognized as important and operative at national, regional and local scales. CASG has identified strategic goals in this quickly evolving arena that fall within two of our Focus Areas: ***Healthy Coastal and Marine Ecosystems*** and ***Resilient Coastal Communities.***

STRATEGIC FOCUS AREA |
Healthy Coastal & Marine Ecosystems (HCME)

Nicole Lee, CASG

Healthy coastal and marine ecosystems are foundational to life along the West Coast. They have intrinsic ecological and aesthetic value, and are essential for sustaining the diversity of coastal and marine life that draws people to the coast and supports many coastal communities. The health of California's coastal ecosystems is under assault from multiple stressors, many of which are of anthropogenic origin, including nutrient and pollutant discharge, harmful algal blooms, changes in water turbidity and sediment transport, species invasions, and climate change (resulting in ocean acidification and hypoxia). CASG is committed to providing evidence of the driving forces and connectedness within ecosystems that define their productivity, sensitivity and health. Our goal is to be a leader in regional approaches to understanding and maintaining healthy ecosystems to identify information gaps, set research priorities, and coordinate information and technology transfer to those who need it. For 2014–2017, CASG will focus on the following goals and strategies.

HCME GOAL 1

Support research and provide information to conserve, restore and manage coastal and marine ecosystems to ensure their long-term health and productivity

- Strategy 1–1: Study interactions between coastal and marine living resources and their physical and chemical environment. Study how these relationships vary over time, especially as driven by climate change, changes in fisheries management, water quality, or establishment of marine protected areas.
- Strategy 1–2: Identify habitats that support areas of high biodiversity or provide key "nursery areas".
- Strategy 1–3: Support the development of new instruments, techniques and computer models to assist in detection and quantification of living marine resources and their relationship to their environment.
- Strategy 1-4: Identify and measure deleterious impacts of human activity on ecosystems and provide information that would allow managers or regulators to seek scientifically sound options to reduce or eliminate these impacts.

- Strategy 1–5: Study watershed processes as they impact coastal and marine ecosystems and contribute science-based information to ecosystem-based management.
- Strategy 1–6: Evaluate impacts of policy and governance on ecosystems.
- Strategy 1–7: Study and evaluate new strategies for coastal and marine conservation.
- **Outcome:** Stakeholders have access to data, models, policy information and training that support ecosystem-based planning, decision-making and management approaches.

HCME GOAL 2

Document the introduction and spread of invasive, non-native plants and animals in estuarine and coastal marine environments, their impacts on the local ecosystem, and help manage established invading populations

- Strategy 2–1: Improve the basic biological understanding of non-native species and their dispersal.
- Strategy 2–2: Evaluate the relative social, economic and ecological consequences of established and invading non-native species to better prioritize and coordinate management strategies.
- Strategy 2–3: Develop and test the efficacy of methods to minimize the spread of invasive species, and understand the consequences of controlling methods.
- Strategy 2–4: Study the effectiveness of invasive species eradication and management practices, including ecosystem recovery and vulnerability to re-infestation.
- **Outcome:** Scientists develop technologies and approaches to restore degraded ecosystems and eradicate or manage invasive species.

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HCME GOAL 3

Understand and help reduce water and sediment contamination in the coastal and marine environment

- Strategy 3–1: Study sources of contamination and the transport, fate and implications of contaminants for coastal and marine life and public health.
- Strategy 3–2: Develop tools for detecting natural and anthropogenic contamination. Support the application of technology from other disciplines to improve water quality, coastal and marine toxin testing systems.
- Strategy 3–3: Facilitate partnerships and collaborations to minimize the impacts of biological and chemical contamination on the coastal and marine environment and coastal communities.
- **Outcome:** Water and sediment quality improves in the coastal and marine environment

HCME GOAL 4

Support research to understand the impacts of climate change on coastal and marine species and environments

- Strategy 4–1: Identify coastal and marine ecosystems, communities and resources that are at particular risk related to climate change.
- Strategy 4–2: Support research to understand, and the development of models and tools to evaluate and forecast, the ecological and socio-economic effects of climate change on coastal and marine species, environments and related communities.
- **Outcome:** 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.

STRATEGIC FOCUS AREA | *Resilient Coastal Communities (RCC)*

Coastal communities throughout California today face a multitude of opportunities and risks. From its rural towns, to working harbor communities, to mega-cities, predicting sea-level rise, managing population growth, resolving competing uses for natural resources, maintaining infrastructure, managing shortages of fresh water, and developing local responses to regional issues are among the state's needs. CASG will help acquire and provide the best available science-based knowledge to engage a diverse and growing coastal population. It will use its capabilities to support the development of resilient coastal communities that are economically and socially inclusive, are supported by diverse and vibrant economies, mitigate and respond effectively to natural and technological hazards, and function within the carrying capacity of their ecosystems. With this commitment in mind CASG will focus effort and work with strategic partners toward the following goals.

RCC GOAL 1

Support communities and stakeholders to sustainably use and effectively manage coastal and marine resources

- Strategy 1–1: Study the dynamic connections between human uses and natural resources.
- Strategy 1–2: Document and quantify the social, cultural and economic values of coastal resources and communities
- Strategy 1-3: Document and quantify the value of the consumptive or non-consumptive use of resources by communities.
- Strategy 1–4: Facilitate community/stakeholder involvement in coastal resource management.
- Strategy 1–5: Work cooperatively with community leaders and other partners to improve the social, economic, and ecological sustainability of coastal communities.
- Strategy 1–6: Document and quantify the cumulative impacts of population growth, coastal development and increased beach use on natural resources and harbor communities.
- **Outcome:** Communities understand the connection between planning and natural resource management issues and make management decisions that minimize conflicts, improve resource conservation efforts and identify new opportunities for sustainable management.

RCC GOAL 2

Work with communities to improve coastal environmental quality

- Strategy 2–1: Provide information and develop tools to improve coastal conditions for public and environmental health.
- Strategy 2–2: Develop approaches to help individuals and organizations meet environmental needs and regulations.
- **Outcome:** The public, leaders and businesses work together to implement plans for the future and to balance multiple uses of coastal areas.

RCC GOAL 3

Assist communities in reducing vulnerability to coastal hazards

- Strategy 3–1: Study vulnerability of coastal communities to shoreline erosion, sea level rise, tsunamis, and other natural and anthropogenic marine hazards in terms of risk to safety, property and quality of life.
- Strategy 3–2: Provide science-based information to those involved in land-use decisions, development, emergency planning and other relevant activities.
- **Outcome:** 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.

San Diego Anglers

RCC GOAL 4

Work with communities and partners to plan for and adapt to the effects of climate change (including temperature change, sea-level rise, ocean acidification and hypoxia).

- Strategy 4–1: Serve as an important contributing resource for California-specific information about climate change impacts on coastal and marine species and environments.
- Strategy 4–2: Evaluate data and develop tools to provide and analyze information about climate change.
- Strategy 4–3: Analyze public understanding of and motivations for responding to climate change.
- **Outcome:** 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.

Wuertz Lab, UC Davis

Strategic Focus Area |
Safe and Sustainable Fisheries and Seafood Supply (SSFS)

Fish and shellfish provide an important source of protein to many citizens, and the state of California is well positioned to help supply the growing demand for seafood through commercial fisheries and aquaculture. California's advantageous location on the Pacific Rim also makes it an excellent candidate for developing marine aquaculture techniques, enhancing marine fish stocks and exchanging scientific information with other nations. California's long coastline and rich coastal waters produce a wide variety of seafood. Some of the commercially important fisheries within the California Current have been sustainably harvested and thus remain at low levels of exploitation. Many others, however, such as groundfish and salmon, have suffered commercial fishing closures in recent years. CASG has key roles to play in advancing public understanding of the nature of problems and opportunities related to fisheries sustainability and aquaculture. Through the use of its research, extension, and education capacities, CASG will provide information to support the kind of informed public and private decision-making that will lead to a sustainable supply of safe seafood long into the future. With this challenge in mind CASG has identified the following goals for this focus area.

SSFS Goal 1

Provide information to promote the sustainable use of living coastal and marine resources and associated communities

- Strategy 1–1: Collect scientific and socio-economic information on fisheries (including species essential life history information), their use and management, and share with policy makers and other stakeholders.
- Strategy 1–2: Work with stakeholders to encourage the sustainability of fisheries and California's fishing communities.
- Strategy 1–3: Evaluate impacts of fisheries policies on people and fishery species, and share information with managers and stakeholders.
- **Outcomes:**
    1) Fishery managers and fishermen understand the dynamics of wild fish populations.
    2) The commercial fishing industry is aware of innovative marketing strategies to add value to its product.
    3) Fishermen apply techniques to reduce negative impacts on depleted, threatened or endangered species.

SSFS Goal 2

Provide science-based information to support a sustainable California aquaculture industry to help meet the growing demand for seafood, and minimize socio-economic and environmental impacts of aquaculture

- Strategy 2–1: Improve the economic viability of aquaculture operations and animal health through research on the performance of culturing systems and cultured species.
- Strategy 2–2: Support research that might identify new species suitable for culture.
- Strategy 2–3: Study interactions between cultured and wild species and ecosystems, including implications for disease transmission, genetic diversity, and water quality.
- Strategy 2–4: Apply culturing technologies to further conservation goals, including the recovery of rare species and restocking.
- Strategy 2–5: Study the synergies and socio-economic interactions between capture and culture fisheries as they affect coastal communities and working waterfronts.
- **Outcome:** There is an expansion of the sustainable domestic aquaculture industry.

SSFS Goal 3

Provide technical information to improve production and processing techniques to ensure safe, high-quality and profitable seafood products

- Strategy 3–1: Develop tools, techniques and training to help producers and consumers maximize seafood quality, safety and value.
- Strategy 3–2: Support research to develop seafood products and processing technologies and tools to improve seafood quality, safety and profitability.
- **Outcome:** The seafood processing industry learns and understands economically viable techniques and processes to ensure the production and delivery of safe and healthy seafood.

Cross-Cutting Themes

Education, Training & Public Information

CASG embraces the ideals of promoting marine science literacy and educating the next generation of marine and coastal scientists and policy makers. As required by the federal legislation authorizing the Sea Grant programs, CASG makes the results of its publicly funded projects widely available. We accomplish this by asking CASG-supported researchers to incorporate educational and outreach components into their Sea Grant-funded research, and to publish their work. In addition, we accomplish this through the activities of our Extension and Communications staff, who collaborate with a variety of partners.

PBS

Taking many factors into account, our program has chosen to invest the majority of its resources allocated to "education" in graduate and undergraduate traineeships. We are especially proud of our support of graduate-level students in marine science and policy. This is an area where CASG education dollars have demonstrated significant impact in training new generations of marine scientists and policy makers. Several factors contributed to this programmatic approach to education. First, California is a large state with an immense number of students and a large education infrastructure. Second, the state has two COSEE (Centers for Ocean Sciences Education Excellence) programs funded by the National Science Foundation. Third, our sister program based in the Los Angeles area, the University of Southern California Sea Grant Program, employs a full-time Sea Grant educator and supports an education program that targets K–12 education. Fourth, there are already a wide range of excellent informal marine science educational and outreach programs that target K–12 students throughout the state.

Our choice to invest in Education and Training aligns our efforts directly with one of the primary Focus Areas identified by the National Sea Grant Office: Environmental Literacy and Workforce Development. Our choice of how to invest in education and training ensures that these investments intersect efforts within our other primary areas of interest, identified above as CASG's Strategic Focus Areas.

Goals

CASG's program-wide education, training and public information strategies are designed to address the following goals.

- Involve stakeholders in coastal and marine research and outreach projects.
- Study, evaluate and use a variety of tools to disseminate and transfer scientific information.
- Support undergraduate and graduate student stipends, fellowships and scholarships to attract talent to coastal and marine disciplines.
- Provide academic enrichment opportunities for students and educators, such as applied/outdoor educational experiences, scholarships, mentoring and curriculum development.
- Provide opportunities for students and post-graduates to study and gain on-the-ground training in coastal and marine management.
- Translate technical scientific information into language appropriate for non-scientists
- Disseminate scientific research findings broadly.
- Produce and distribute educational and training programs/materials.
- Facilitate and participate in conferences, discussions, workshops and other events to exchange information and enhance its relevance to real-world issues.

Outcomes

Our efforts in this area are intended to lead to multiple outcomes, including:

- Formal and informal education programs take advantage of the knowledge of Sea Grant-supported scientists and outreach professionals.
- A diverse and qualified pool of applicants pursues professional opportunities for career development in natural, physical and social sciences and engineering.
- Graduate students are trained in research and outreach methodologies.
- Research projects support undergraduate and graduate training in fields related to understanding and managing our coastal resources.
- Members of the public incorporate into personal decisions broad understandings of their actions and impacts on the environment.

Linking Science to Stakeholders

Another cross-cutting theme is the need to provide the best available scientific knowledge to stakeholders who need it. CASG is committed to facilitating partnerships (among academics, resource managers, the public, etc.) that ensure the collection and sharing of relevant information obtained by research and outreach activities falling under all Focus Areas. Such collaborations support and cut across each of the Focus Areas.

CA Dept. of Fish and Wildlife

CASG has developed or engages in several activities devoted to this cross-cutting theme. First, each member of CASG's network of Extension Advisors (described above) holds this goal as fundamental to his/her professional activities. Each advisor maintains a network of constituent contacts and works with them to keep them apprised of and engaged in the most important scientific developments relevant to their interests.

In addition, CASG consults regularly with a state-chartered panel — the Resources Agency Sea Grant Advisory Panel (RASGAP) (http://resources.ca.gov/ocean/rasgap.html). RASGAP is charged with the responsibility to:

- identify State needs that might be met through Sea Grant research projects, including but not limited to such fields as living marine and estuarine resources, aquaculture, ocean engineering, marine minerals, public recreation, coastal physical processes, coastal and ocean resources planning and management, and ocean data acquisition and dissemination;
- establish State priorities concerning research needs;
- periodically review progress of continuing research projects; and
- submit research needs and priorities to the Legislature each year.

The RASGAP consists of representatives from the:

- California Natural Resources Agency
- California Department of Boating and Waterways
- California Department of Conservation
- California Department of Fish and Game
- Office of Oil Spill Prevention and Response
- Office of Environmental Health and Hazard Assessment
- State Water Resources Control Board
- State Lands Commission
- California State Senate
- California State Assembly
- University of California
- University of Southern California
- California State University
- Fishing Industry
- Aquaculture Industry
- Ocean Engineering Industry

Christina Johnson, CASG

CASG's work with RASGAP ensures that there is healthy communication between researchers, state agencies and stakeholders, and advice is provided to CASG to help establish research priorities with these needs in mind.

Finally, the CASG Director, Associate Director and Extension Director each regularly meet and talk with representatives of key state and federal agencies and other stakeholder groups, identified above. Maintaining open lines of communication between CASG and stakeholders is fundamental to ensuring CASG's science and outreach activities retain their high level of quality and relevance.

Managing for Success

Leadership

CASG is dedicated to playing a leadership role in coastal and marine resource conservation and management to benefit the state, the West Coast region and the nation. This strategic plan is designed to take advantage of CASG's unique ability to combine coastal and marine research, extension, education and outreach into effective program planning and implementation.

Management

The CASG management team (comprised of the CASG Director and Associate Director, Extension Director, Communications Director and Business Manager) meets regularly to review program progress and make decisions about new opportunities, such as short-term proposals submitted for program development funding. The balance of our investments among our Focus Areas is also discussed. Prospects for new partnerships and funding sources are regularly explored and evaluated. The program has been especially successful at attracting additional state funding in recent years and plans to continue seeking similar partnerships at the state, regional and federal levels.

Christina Johnson, CASG

Balancing Priorities

The three Focus Areas described above, each with multiple Goals and Strategies, create a broad umbrella under which CASG will invest in research and extension efforts. Inevitably, we will not invest evenly among our Focus Areas and Goals. For example, historically the suite of scientists we support as a whole have greater interests and expertise in HCME than in SSFS, and we have invested less still in topics related to RCC. CASG is committed to identifying and addressing unevenness in our portfolio to help create a more balanced program.

One important means by which we address imbalances is by managing our core research proposals and awards under an "alternating year plan." For proposals submitted in odd-numbered years, we solicit proposals for "Standard Core Awards" across the full spectrum of topics covered by our three Focus Areas. For proposals submitted in even-numbered years, we solicit requests only for 1-year "Special Focus Awards." The Focus Areas and Goals targeted for "Special Focus Awards" can be restricted to those deemed to deserve special attention that year (e.g., due to under-investment), or from especially important and timely topics.

Reporting

The program routinely reports progress and expenditures related to federal funds throughout the year through two online systems: NOAA's Grants Online database, and Sea Grant's Planning, Implementation and Evaluation Resources (PIER). The lead investigators of all funded projects are required to submit annual financial and progress reports to the program.

Each of other sources of funds provided by grants or agreements to CASG have their own unique reporting requirements. CASG maintains a project-management database to ensure timely progress and compliance with its many federal and state reporting requirements.

Program Resources

Rick Starr, CASG

CASG continues to seek collaborations and partnerships to supplement and leverage the core federal funding received from NOAA's National Sea Grant College Program and to maintain CASG's excellence and flexibility. Recent examples of these partnerships include: focused research specially selected and funded by California's Ocean Protection Council, a series of baseline characterizations in support of adaptively managing the recently implemented network of marine protected areas along California's coast, and the Delta (previously termed CALFED) Science Fellowships, which have provided graduate and post-doctoral research opportunities for more than 43 Fellows. As mentioned earlier in this document, the program invests and manages financial resources averaging $35 million annually that support its current level of activity.

Evaluation & Feedback

Evaluating Success

Given that the value of knowledge unfolds and becomes apparent over a very long time horizon, CASG maintains a strong belief that the ultimate importance of our activities, including the research we support, cannot be measured solely by quantitative metrics that reflect the most immediate products of these activities. Nevertheless, recognizing that there is a need for evaluating performance at some level, CASG requires funded researchers to report annually on their activities. Researchers report quantitative data, including metrics of impact (such as numbers of papers published in refereed literature, numbers of students supported, numbers of presentations delivered at conferences and numbers of attendees, number of students reached through K-12 educators). They also report project-specific metrics, such as:

- numbers of jobs created;
- number of acres of degraded habitat restored;
- number of models or methods developed to improve resource management; number of commercial or recreational fishermen who modify fishing operations to collect data needed for management;
- number of businesses that have adopted techniques to improve sustainability, quality or profitability of seafood;
- number of coastal beaches provided with information about local coastal hazards, tools, techniques or best practices; and
- number of aquatic invasive species (AIS) targeted for study, removal or eradication.

These data plus other data related to impacts and accomplishments more directly relevant to management products are entered into databases maintained by the National Sea Grant Office. CASG adopts and reports on National Performance Measures as defined by the National Sea Grant Office in their Strategic Plan (http://www.seagrant.noaa.gov/other/admininfo/ppe/index.html).

We also regularly publish and distribute summaries of key research findings, and include key stakeholders in our distributions. Feedback from our stakeholders regarding current research products is important in considering our future research directions.

Program Review

CASG balances its obligation to wisely invest and account for the public funds it receives while also being alert to emerging trends and opportunities. The program is regularly reviewed and evaluated by a national review panel assembled by NOAA's National Sea Grant College Program (NSGCP). This review solicits external comments from stakeholders and provides feedback to program management to encourage its continual improvement. This information is also incorporated into future program strategic plans and funded activities. In addition, CASG is reviewed annually by federal officials employed within NSGCP and related branches of NOAA.

CASG will regularly revisit this Strategic Plan and its priorities to ensure that it maintains its vision and focus, and continues to play a leadership role in coastal and marine resource research, extension, education and outreach to benefit California, the region and the nation.

Feedback

CASG welcomes input on our Strategic Plan and is open to suggestions regarding future directions. Draft versions of this plan were distributed to members of our Advisory Board and key state and public stakeholders, as well as being made available for review by and comment from the general public. The Strategic Plan presented here was improved greatly as a result of comments received.

We welcome comment and suggestions by all interested parties for evolving this plan and on any dimension of our program. The ideal means of contributing advice is via email: sgdirector@ucsd.edu

Rick Starr, CASG