University of Southern California Sea Grant

Strategic Plan

2024 - 2027

The Urban Ocean Program

December 2022

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Editorial and Design Staff:
Leah Shore, M.S., Editor in Chief
Charlotte Stevenson, M.S., Editor in Chief
Phyllis Grifman, M.A., Executive Editor

The plan also includes the contribution of the
following current and recently retired USC Sea Grant staff members:

Dr. Karla Heidelberg, Director
Dr. Linda Duguay, Director (retired 2022)
Dr. James Fawcett, Maritime Policy Specialist/Extension Director (retired 2023)
Dr. Amalia Almada, Science, Research, and Policy Specialist
Karina Alvarez, M.S., Coastal Extension Specialist
Linda Chilton, M.A., Education Programs Manager
Maria Madrigal, M.S., Education Program Assistant
Ruth Dudas, Contracts & Grants Coordinator

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USC Sea Grant
3454 Trousdale Pkwy, CAS 200, Los Angeles, CA 90089-0153; 213-740-1961

http://dornsife.usc.edu/uscseagrant/

Table of Contents

Vision & Mission

Vision: USC Sea Grant envisions a resilient and thriving Urban Ocean supported by a diverse, environmentally-literate public and informed decision-makers who protect and enhance our regional coastal and inland communities and economies in a changing climate.

Mission: USC Sea Grant's mission is to contribute to solving the problems of the Urban Ocean; foster the public's understanding of coastal, ocean, and social science; recognize opportunities for the blue economy, coastal commerce, and recreation; solicit and fund relevant, innovative science to inform better decision-making, and improve the quality of life in coastal regions across Southern California.

Core Values

Sea Grant's core values are essential and enduring tenets that influence the organization and support its mission. These core values support a culture of integrity and scientific neutrality, enabling Sea Grant to serve as a trusted broker of information. These core values reflect USC Sea Grant's core strengths and experience, and guide its management and decision-making:

Leadership: USC Sea Grant is a leader and prominent national and regional resource for scientific, policy, and educational marine and coastal information. USC Sea Grant is a boundary organization that bridges the gaps between science, community, and policy to support better decisions.

Innovation: USC Sea Grant advances creative, innovative solutions that address emerging and chronic challenges through engagement, science, and stewardship. USC Sea Grant is responsive to local, regional, state, and national research needs and develops responses in a timely manner.

Accountability: USC Sea Grant is dedicated to its transparent role as a neutral broker of science that serves the people, wildlife, and ecosystems of such a diverse region. USC Sea Grant upholds the highest standards of scientific integrity.

Diversity, Equity, Inclusion, Justice and Accessibility (DEIJA): USC Sea Grant is dedicated to the full inclusion and participation of individuals from a broad diversity of backgrounds, who bring a range of perspectives, values, knowledge, tools, history, experience, abilities and systemic challenges to bear on major scientific problems.

Collaboration: USC Sea Grant is committed to its role in building capacity and connections across people, resources, and knowledge to solve our most pressing problems. USC Sea Grant leverages partnerships and collaborations with diverse community members for broader impacts, especially with marginalized, underserved, and underrepresented communities, including Native peoples and Tribal representatives, Black, Latinx, and other peoples of color.

Sustainability: USC Sea Grant prioritizes advancing environmental stewardship practices and

communicating the value of the services that the coastal, watershed, ocean, and Southern California ecosystems provide to the region and nation.

Non-Advocacy: USC Sea Grant maintains a commitment to objective research and programming that avoids bias and advocacy in the development and delivery of information, tools, and services.

[breakout box] Sea Grant & The Blue Economy
For more than 50 years, USC Sea Grant has advanced community progress in creating a sustainable economy across its focus areas, growing what has become known as the blue economy. Our local presence provides support for pressing needs like workforce development and business continuity, that improve livelihoods and support coastal economies.

USC Sea Grant: The Urban Ocean Program

The University of Southern California (USC) Sea Grant Program is part of a national Sea Grant network of 34 university-based programs located throughout the nation, and administered and supported by the National Oceanic and Atmospheric Administration (NOAA). Sea Grant programs work with community members to generate, translate, and deliver cutting-edge, unbiased, science-based information to address complex issues in the nation's coastal marine and aquatic ecosystems. The United States Congress created Sea Grant in 1966 as a highly-leveraged federal and state partnership harnessing the intellectual capacity of the nation's universities and research institutions to solve coastal and aquatic challenges and generate opportunities with coastal and inland communities and partners to create a more sustainable economy and environment. Sea Grant engages individuals, communities, educators, scientists, lawyers, organizations, industries, Indigenous nations and governments to sustain and enhance the vitality, value, and use of the nation's coastal resources.

A journey down California's 1,100-mile coastline reveals rocky seashores, sandy beaches, and dramatic cliffs that are home to diverse plants, seabirds, and a wide variety of marine life. Offshore islands along the Southern California coastline provide a lens into the history of the coast and provide protected habitats for both terrestrial and marine species. One can also see thriving cities, superhighways, power plants, concrete river channels, trash, poor water quality, and two of the busiest ports in the United States.

USC's location in the middle of Los Angeles has made the Sea Grant Program here an important regional resource, concentrating on issues arising out of the necessity of managing people and natural resources in an intensely populated and developed coastline. For this reason, in the 1980s, the USC Sea Grant program adopted as its programmatic focus the "**Urban Ocean**," a theme that continues to characterize our perspective on the needs of this region and makes us a national leader in tackling issues that accrue at the urban-coastal interface.

USC Sea Grant is unique in the national Sea Grant network; it is among the smallest, with an annual base federal budget of approximately $1 million. USC is one of the largest private universities in the United States and was one of the original participants in the National Sea Grant College Program, receiving some of the earliest funding in 1969 and officially establishing its Sea Grant program 50 years ago. USC has conducted marine science research and managed established marine laboratories in Southern California for over one hundred years. USC's marine facilities, research programs, marine faculty, and marine and environmental curricula make it one of the major research universities in the Los Angeles region for ocean studies.

Despite a relatively small budget and staff compared to other Sea Grant programs, USC Sea Grant serves one of the largest (nearly 19 million) and most diverse populations in four coastal counties of Southern California (Orange, Los Angeles, Santa Barbara, and Ventura) and two adjacent inland counties (San Bernardino and Riverside).

Southern California is the most populous and diverse metropolitan region in the United States,

with more than 10 million residents speaking over 140 languages, making this a prime region to study the effects of urbanization on our coastlines and the impact of the ocean on the diverse, urbanized environment. This is especially true in the Southern California culture of “endless summer,” which places such a unique value on its beaches and coastal ocean. As of 2018 (the most recent data available), the City of Los Angeles recorded over 50 million tourists to the region annually, drawing a record-high $36.6 billion in total economic impact. Beaches are among the most popular destinations among the numerous amenities attracting tourists to the region. Los Angeles County is home to the busiest port complex in the United States; close to 45% of all oceanic freight entering the country comes ashore through the twin ports at Los Angeles and Long Beach. Together, these ports contribute more than one million jobs to a vibrant economy.

Over the years, USC Sea Grant has established a network of scientists, government agency personnel, private and public sector advisors, and science education leaders. Employing extensive outreach to partners, collaborators, resource managers, and the public, USC Sea Grant can anticipate research needs and develop responses in a timely and responsive manner, leveraging its collaborations for broader impacts. Further, USC Sea Grant has worked closely with its networks to ensure that its research, communication tools, and education services reach broadly into the diverse Southern California community that it serves, with particular attention to underserved and underrepresented, priority communities.

50 Years of Progress

The USC Sea Grant Program has grown throughout the years to provide expert guidance, funding, coordination, facilitation, training, education, neutral brokerage, and mediation - all under the common goal of elevating the best available science to support better decisions. For the last 50 years, our research investments, education programs, and extension efforts have supported achievements in several key areas of importance including climate change, water quality, harmful algal blooms, toxicology, aquatic invasive species, marine wildlife and ecosystems, ports, marine transportation, coastal management, coastal community resilience, sea level rise, and advances in “Pre K to Gray” environmental education. As we look towards the future, we are excited for the opportunity to practice leadership in an array of emmerging issues and research opportunities, and in the development of new partners who will help us build sustained, long-term, inclusive progress for our urban ocean and its residents.

The problems found in Southern California are not unique to the region, which is evident by the growing use of the term “urban” in titles for marine and 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 California, such as the San Francisco Bay and San Diego regions, and other urban coastal environments in the United States and around the world. The continuing impacts of climate change not only threaten our treasured beaches but also critical infrastructure and ports, and planning for the impacts of climate change and building climate resilience in communities is a priority for our bustling and economically thriving urban region. We consider Los Angeles a city of the future and treat it as an urban ocean laboratory. USC Sea Grant can pioneer solutions for the challenging issues associated with a culturally diverse range of perspectives including: access and transportation,

language and communications, and economic disparities that characterize urban coasts. These factors are of increasing importance along the steadily developing coastlines of the United States and the world.

Sea Grant at USC

USC Sea Grant is administered within the USC Wrigley Institute for Environmental Studies (WIES). WIES is an "organized research unit" and a leader in USC's drive to foster sustainability and environmental responsibility and awareness in the region; it is the home of both Sea Grant and the Environmental Studies Program. WIES also administers the Wrigley Marine Science Center on Catalina Island, a world-class marine laboratory and conference facility. The laboratory hosts research and education programs in fisheries and aquaculture, aquaponics, geobiology, and climate change research as well as innovative programs for undergraduate and graduate programs in the marine sciences and "Pre K to Gray" marine science education. The laboratory and conference center serve not only USC but also are used by the broader marine and ocean science community. Sea Grant serves as a major research component of WIES; Sea Grant-funded research is sometimes conducted at the Catalina facility. A graduate fellowship program is open to all applicants who have a need to conduct their research on Catalina Island, and the fellows participate in many of WIES' educational and research programs.

WIES is housed in the 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 the Sea Grant Director; to the Director of WIES; to the Dean of the Dornsife College; to the Provost and Senior Vice President for Academic Affairs; to the USC President.

This position 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 eligible to apply for USC Sea Grant support. Second, the close affiliation with WIES provides a symbiotic relationship, providing a solid focus for integrated research, marine science, policy, and education and outreach programs. The close relationship also promotes collaborative efforts with WIES, such as position sharing and joint research and education efforts. USC Sea Grant, Wrigley, and the Environmental Studies program are co-located, allowing for enhanced opportunities for collaboration and student participation.

The USC Sea Grant Program has a clear advantage in having its Director also play an important role in WIES leadership. USC Sea Grant is a major research center for WIES, and the Director helps to ensure that results from USC Sea Grant-funded research and outreach are well represented in WIES reports to USC leadership and its Advisory Board and supporters. Since its formation in 1996, the Wrigley Institute actively works to recruit new faculty in various sub-disciplines of marine sciences and policy, particularly related to marine environmental biology, geobiology, environmental studies, and earth sciences. In addition, the Wrigley Institute supports new fellowships for graduate students, runs a National Science Foundation

supported Research Experiences for Undergraduates program (a 10-week residential program that uses both the Wrigley Institute of Marine Science on Catalina Island and University Park Campus resources in Los Angeles), and supports outreach and education programs. The Wrigley Institute's strong commitment to marine science research and education and formal affiliations to accomplished natural and social science faculty provide important opportunities for strong interdisciplinary partnerships with USC Sea Grant in the pursuit of solutions to local and regional urban ocean challenges.

Sea Grant's small staff size allows close cohesion of the range of program elements and an invaluable cross-fertilization of ideas, plans, resources, 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.

As part of a large research university, we recognize the need for information security related to research. Our cyber and information technology security protection measures are in line with NOAA's Information Technology Security program. USC Sea Grant's information technology infrastructure is protected by an extensive range of cyber and information security protocols, and training is required for all USC faculty and students.

Strategic Plan Development

USC Sea Grant's strategic plan goals for 2024-2027 reflect the United States' most urgent coastal and ocean needs, NOAA's national priorities, and the National Sea Grant Program's goals, while still addressing the specific needs and priorities of the state and the region. Under the larger umbrella of the urban ocean theme, our program's focus areas are congruent with the National Sea Grant College Program Strategic Plan for 2024-2027 (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**. Focus areas provide a structure to the wide range of Sea Grant's topical interests. In practice, we recognize that focus areas are interrelated and that a single activity may advance the goals of multiple focus areas. This Strategic Plan is designed to be adaptive; that is, with attention to competing and shifting priorities in an environment that can change rapidly due to climate change and societal needs.

USC Sea Grant developed this Strategic Plan in 2022, relying on input from a wide range of interests at the national, regional, state, and local levels. We surveyed members of our Advisory Council, Academic Coordinators, and the California Natural Resources Agency Sea Grant Advisory Panel (RASGAP) and Ocean Protection Council, as well as influential and diverse community members in the region, including individuals from local and state governments, marine transportation and ports, K-12 and higher education professionals, coastal businesses, university researchers, Indigenous peoples, fisheries and aquaculture, nonprofit environmental organizations, coastal residents, and communications professionals. In addition, USC Sea Grant held focus groups for each major area of work, receiving direct input from interested parties on priority and emerging issues. Survey responses and focus groups confirmed that USC Sea Grant's strategic focus areas, program areas, and research priorities are on point and

valuable to the region. There was enthusiasm for expanding work on improving equitable coastal access for all communities, including those inland, as well as enhancing our emphasis on climate change, local and traditional ecological knowledge, alternative energy, microplastics, marine debris, and contaminants of emerging concern.

Survey responses also confirmed the benefits of interlinking USC Sea Grant's research programs and outreach efforts across the region. 100% of respondents stated that they had increased knowledge or awareness of ocean and coastal issues as a result of Sea Grant outreach and education programs. A majority of respondents also stated that they gained useful contacts or new partnerships through working with USC Sea Grant, and had increased access to technical assistance, educational resources, and new scientific or management information and tools.

National Perspectives

The 2024-2027 National Sea Grant Strategic Plan serves as a framework to guide the direction of Sea Grant at a higher level. The National Plan provides the primary context for USC Sea Grant's plan. For the suite of challenges presented in the Southern California urban coastal region, the USC Sea Grant plan refocuses those priorities, continuing major emphases on water quality, coastal ecosystem health, coastal community resilience, and a robust education program.

Each focus area has "goals," "actions," and "desired outcomes," The goals describe the desired long-term direction for each focus area. The actions are tactics or means used to achieve desired outcomes. The outcomes are benchmarks from which USC Sea Grant can track progress toward achieving each goal. Further, as we implement these strategies, we develop and apply performance measures (see Appendix 4) as quantitative ways of tracking success and measuring outcomes.

State and Local Perspectives

Several advisory bodies to Sea Grant are regularly consulted for guidance and input on strategic direction. 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 and engaged Advisory Council (**Appendix I**). Membership of the Council is composed 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. The diverse composition of the Advisory Council is analogous to the diversity of the region USC Sea Grant serves. Purposefully, this positions USC Sea Grant's advisors to aid in balancing the focus of our work on issues that require the most immediate attention and those that require long-term commitment. Advisors represent the California Water Resources Control Board, the California Ocean Protection Council, the Santa Monica Bay Restoration Commission (part of the Environmental Protection Agency National

Estuary Program), the Marine Exchange of Southern California, the Southern California Coastal Water Research Project (SCCWRP), Channel Island National Marine Sanctuary, public universities, private industry, and others. Sea Grant staff maintain an ongoing dialogue with the Advisory Council throughout the year.

USC Sea Grant's Academic Coordinating Committee members (**Appendix II**) come from several academic departments at USC, and includes a representative from the leadership of the California State University System (Vice President for Academic Affairs Emeritus), helping to ensure that a range of scientific disciplines is represented on this committee. The Academic Coordinating Committee contributes to the development of Sea Grant's Strategic Plan and research solicitations, reviews preliminary proposals, and provides input on external research opportunities and other programs.

A third advisory group, RASGAP, is a state panel composed of representatives from the departments and agencies in the California Natural Resources Agency, the state agency that provides state matching funds for the two Sea Grant programs in California (**Appendix III**). 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 reviews, to help rank projects in the context of agency information needs. The open dialogue and collaboration between key state partners and USC Sea Grant helps to calibrate research focus areas.

The California Ocean Protection Council (OPC) was created in 2004 to ensure that California maintains healthy, resilient, and productive ocean and coastal ecosystems for the benefit of current and future generations. This Governor-appointed council is charged with providing leadership and coordinating the activities of ocean-related state agencies to better manage ocean resources. OPC leadership oversees the administration of RASGAP, reinforcing active collaboration between USC Sea Grant and high-level State representatives.

The OPC guides California's ocean policy initiatives and provides input for Sea Grant's solicitation of research proposals as well as occasional funding for Sea Grant projects. The four primary goals in OPC's FY 2020-2025 Strategic Plan overlap considerably with USC Sea Grant's focus areas, allowing for significant concordance between the state's priorities and our activities. For example, OPC's goals to safeguard coastal and marine ecosystems in the face of climate change and to enhance coastal and marine biodiversity match closely with our goal of advancing healthy coastal ecosystems in the face of advancing climate change and OPC's goals to advance equity and foster a sustainable blue economy adhere closely with our goals in coastal community resilience. This concordance makes OPC and Sea Grant natural partners in advancing strong, science based policy.

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 provides scientific guidance and support for a number of California state agencies, including the OPC. USC Sea Grant has partnered with OST on projects in the past and will continue to collaborate to ensure research priorities are being met in the state.

Cross-Cutting Principles

USC Sea Grant aligns its cross-cutting principles with those of the National Sea Grant College Program. These concepts provide a common foundation for all of the following Focus Areas and the work Sea Grant conducts. Recognizing these Cross-Cutting Principles enhances Sea Grant's capabilities in order to meet future national needs. In the course of implementing the 2024-2027 National Strategic Plan, the National Sea Grant College Program will strive to address three specific areas to enhance the Program's capabilities in order to meet national needs:

- **Partnerships**: Cultivate and sustain partnerships by integrating the expertise and capabilities of partners from the international, federal, tribal, and state communities as well as from academia, nongovernmental organizations, local, traditional ecological knowledge, and industry.

- **Climate Change**: In all of our focus areas, the changing climate is a lens through which we view the health of coastal ecosystems, the sustainability and resilience of coastal communities and those who work and reside in them, and the production of food resources, both by aquaculture and fishing. In science education, understanding the impacts of a changing climate is already an important dimension affecting all study areas in ocean science.

- **DEIJA**: It has long been our goal to enhance diversity, equity, inclusion, justice and accessibility by seeking and integrating diverse perspectives that advance cultural understanding and enable us to pursue our vision and mission with, and for, all audiences. We actively create mechanisms to allow all people to participate in Sea Grant activities. Bringing a range of perspectives, values and tools together to find innovative, creative, inclusive and responsive solutions helps us to successfully tackle problems facing our urban ocean environment.

Focus Area 1: Healthy Coastal Ecosystems

The challenge of balancing ecological conservation and protection with intensive human uses of a public resource has always been central to USC Sea Grant's funded research, extension, and education programs along the urban ocean coast. Ensuring that coastal waters are safe for people and marine life has always been a priority for the state and particularly for Southern California. Accordingly, USC Sea Grant has consistently maintained a focus on coastal water quality. Over the decades, the nature of this research has shifted from a focus on sewage and associated bacteria to a focus on stormwater runoff and viruses; the focus will continue to shift as climate change has become a major driver of emerging issues of drought, water conservation and low impact development. Legacy pollutants, chemicals of emerging concern and harmful algal blooms increasingly affect coastal waters in our region.

Coastal habitats at the land-sea interface—estuaries, wetlands, sandy beaches, rocky intertidal— are particularly vulnerable to the impacts of climate change and it is through this lens that we will continue to examine impacts from urbanization, development, sea level rise, and other shoreline changes. These habitats are not only important for the organisms which depend on them, but they also provide ecosystem services to humans such as water filtration, physical barriers from storms and flooding, groundwater recharge, and nursery grounds for seabirds and fisheries of economic importance. With added threats from rising sea levels, coastal habitats will likely face additional impingement in the future. Understanding how these habitats might change in the future will enable planners to make informed choices for their restoration, management, and sustainable development.

Globally, wildlife and humans are exposed to increasing quantities and types of persistent industrial and pharmaceutical chemical contaminants (e.g., PFAS) and the effects of such exposure is poorly understood. Mitigation or remediation of these pollutant sources as well as effective risk management of potential impacts are also significant challenges. In the Southern California Bight, legacy contamination of coastal and offshore sediments with DDT (and associated chemicals) is gathering renewed attention to the potential impacts of deep ocean disposal of DDT on existing and potential future uses of this highly productive region.

Closely linked with pollution and coastal water quality is the issue of harmful algal blooms. Scientists still do not know all of the conditions that can trigger a toxic algal species to bloom and produce toxin, but USC Sea Grant has and will continue to invest in projects investigating the biology and ecology of these species and the cascading effects of hypoxia, fish kills, and health threats to marine mammals and seafood resources. USC Sea Grant has a long history working on aquatic invasive species (AIS), and will continue to support investigations about AIS – including how incidences may increase with a changing climate and with additional vectors like floating plastic debris.

The ubiquity of plastic in today's culture has contributed to it being one of the most serious ocean pollution issues of the 21st century. USC Sea Grant is perfectly poised to explore issues of ocean plastic pollution, including pathways, prevention strategies, effects on habitats and wildlife, and ecotoxicology. Further, significant challenges of detecting microplastics, assessing their toxicity, and scalable approaches to mitigating their impacts remain.

Since their implementation in Southern California in 2012, marine protected areas (MPAs) are considered to be an essential part of ecosystem-based management regimes, and may play a major role in managing responses to climate change effects on habitat and species resilience. In addition to playing a significant role in their implementation based on the best available science, USC Sea Grant now co-leads the Los Angeles regional MPA Collaborative, one of a statewide network charged with fostering the state's implementation of education and enforcement programs and developing new outreach strategies for the MPA network. USC Sea Grant continues to work diligently with local, regional, state, and federal partners to ensure that the aims of Southern California's MPAs are well understood and supported by the public through partnering closely with diverse parties from both coastal and inland communities, including Indigenous peoples. USC Sea Grant works closely with the National Marine Sanctuary Program and other federal entities with jurisdiction over marine protected areas.

California's coast has a history of oil and natural gas production, dating back to the 19th century, and currently has 27 offshore oil and gas platforms in central and Southern California. This industry presents challenges to offshore ecosystems, including oil spills, the potential decommissioning of oil and gas platforms, and onshore infrastructure. We will continue to support scientific research that helps inform management decisions and plans moving forward that protect the health of Southern California's ecosystems.

Healthy Coastal Ecosystems Goals and Outcomes (HCE)

HCE GOAL 1: Coastal and watershed habitats, ecosystems, and the services they provide are protected, enhanced, and/or restored.

- **Action 1:** Co-develop, improve, and share knowledge, decision-support tools, technologies, and approaches to protect, enhance, and restore ecosystems.
    - **DESIRED OUTCOMES:**
        - Communities have greater awareness and understanding of ecosystem functions and the services they provide.
        - Coastal and watershed ecosystem science and conservation needs are identified and prioritized through diverse community participation.
        - Evidence-based science, traditional and local knowledge and innovative solutions inform and improve the management and conservation of coastal habitats.
        - Coastal and watershed biodiversity, habitats and ecosystem functions and services are restored and sustained.
        - Collaborative and inclusive planning and decision-making leads to enhanced stewardship and community benefits, especially for the most vulnerable.

HCE GOAL 2: Land, water, and living resources are managed by applying science, tools, and services to sustain resilient coastal and watershed ecosystems.

- **Action 1:** Support a science- and management-driven framework that integrates research, observations, monitoring, and modeling and that includes community engagement and traditional and local knowledge to provide a scientific basis for informed decision-making.
    - **DESIRED OUTCOMES:**
        - Inclusive collaborations with diverse community members and partners support planning, research and innovative solutions to address coastal and watershed resource management needs, especially for vulnerable communities.
        - Community supported science initiatives are utilized and contribute to improving our knowledge with respect to stewardship of ecosystems and their contributions to coastal and watershed communities and economies.
        - Coastal and watershed communities and resource managers have access to and use science, data, tools and training to be effective in planning and decision-making processes.
        - Resource managers understand the risks, options, tradeoffs and impacts of their decisions.
- **Action 2:** Identify and advance successful strategies that enhance resilient ecosystems and watersheds in the context of changing conditions, including environmental variability, and climate change, and other anthropogenic impacts (e.g., urbanization, pollutant impacts).
    - **DESIRED OUTCOMES:**
        - Communities share, access, understand and use information regarding projected changes and related impacts within ecosystems.
        - Communities can apply knowledge from case studies, training and tools to improve their ability to plan, prepare, and adapt to environmental variability and climate change, and anthropogenic impacts.

Focus Area 2: Resilient Communities and Economies

Amid the growing complexities of supporting a balance between a vibrant coastal economy and protecting the sustainability and biodiversity of marine resources, continuing population growth and associated development pressures of California's coastal cities, and the increasing impacts of a changing climate, places demands on ecosystems and vital infrastructure. Sea level rise and shoreline change threaten coastal infrastructure, beaches, wetlands, and wildlife; prolonged drought impacts water quality and availability; and increased storm intensity will lead to damaging floods and mudslides. Therefore, climate change is a lens through which scientists, managers, and policymakers must view the future; likewise, it is a lens through which USC Sea Grant considers and implements future research and engagement.

We continue to advance scientific understanding and lead community efforts on addressing changing ocean conditions and potential impacts on coastal infrastructure and populations. USC Sea Grant not only funds research and develops outreach products and educational tools to help understand the impacts of changing coastlines, but also works closely with local, regional and state governments to help coastal practitioners understand and evaluate adaptation strategies to prepare for impending impacts.

Developed and implemented in 2010, USC Sea Grant's AdaptLA Program continues as a robust outreach, capacity building, and technical assistance program for coastal communities across Southern California. Our goal is to ensure that the best available science-based information, scientific modeling, and planning tools for sea level rise and coastal change is available for local and regional jurisdictions, in order to assess vulnerabilities and develop adaptation plans, and have trained scores of coastal professionals on a variety of adaptation-related topics. We conduct statewide longitudinal surveys to assess the state of climate adaptation in California, enabling us to gauge the needs of coastal managers and practitioners and to calibrate our outreach appropriately.

Further, we play a significant role in helping communities — including decision-makers, teachers, and students —understand current climate science and effectively integrate science into planning efforts, reducing risks and increasing resilience to natural and human-induced hazards. Often, the communities most at risk when faced with severe weather and climate extremes are those who are traditionally underrepresented in the sciences. We engage all communities in policy and management discussions of social vulnerability and community resilience, and ensure all are engaged in informing scientific research needs and have an opportunity to contribute through community-based participatory science opportunities.

We continue to support the needs of the adaptation community of practice in California and expand to new areas of inquiry. This work includes supporting research aimed at evaluating the impacts of a changing climate on coastal habitats; evaluating the effectiveness and economic feasibility of potential adaptation strategies with an emphasis on natural and nature-based solutions; providing guidance for monitoring approaches to shoreline resilience; creating and evaluating strategies for improving water quality and availability along the coast and within urban watersheds; capturing and reducing marine debris targeting upstream pathways; and developing existing and new technologies for reducing microplastics in municipal practices.

For populations affected by potential changes to coastlines, including threats to infrastructure posed by changing shorelines and aging facilities, we will assist emergency managers and planners in integrating changing climate considerations into disaster and land use planning, and consider the issues of human mobility raised by the necessity of adapting to a changing coast. For coastal and inland communities alike, we support research evaluating the implications of changing shorelines and infrastructure threats on equitable coastal access, including MPA and beach access.

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 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, and international trade brings considerable economic benefits to the region as well as the nation. However, there are notable environmental impacts on the coast and residents in the region, such as poor air quality, diminished water quality, the introduction of AIS, and significant transportation congestion.

Looking ahead to 2030, we estimate there will be increases in maritime commerce that will impact the two Southern California ports, as well as the potential for emerging cyber risks to maritime transportation systems. Alterations in shipping patterns due to changes in international trading relationships, as well as evolution in vessel size, and the potential for climate change to affect polar shipping routes, are issues of importance to commerce in Southern California, affecting port infrastructure and potentially the entire U.S. economy. We anticipate opportunities to convene multidisciplinary discussions on issues associated with the marine transportation community.

Developments in energy resources, specifically wind-generated electricity both offshore and nearshore, are issues of growing interest to the west coast. Similarly, discussions of water availability and drought in Southern California are escalating. Sea Grant has a history of facilitating discussions on planning the use of ocean areas, and we anticipate continuing our role in marine spatial planning as interest in offshore wind energy, desalination, and other coastal dependent uses continues to develop. With changing demands on coastal and ocean space, competition over prioritization of uses is accelerating. We continue to track these emerging issues and are prepared to facilitate public discourse.

USC Sea Grant's long-standing relationships with coastal communities and industries uniquely position us to participate in discussions on emerging issues in environmental management and the formation of new platforms for engaging interested community members. USC Sea Grant has amplified research on the operational efficiency of seaports and the use of alternative maritime fuels, and was an early supporter in the development of AltaSea, a multi-use facility, marine laboratory, and blue economy outreach center on the waterfront in the Port of Los Angeles.

In coastal communities, new paradigms for sustaining resilient communities are emerging, using information from economics, planning, landscape architecture, and the building industry. As some coastal communities transform from fishing communities to combined residential, business, and recreation centers with innovative technologies including aquaculture, questions

arise about spatial planning and new models for working waterfronts. USC Sea Grant contributes to the development of tools for including multiple and diverse voices, including Indigenous stewards, in the development of coastal and marine spatial planning.

Resilient Communities and Economies Goals and Outcomes (RCE)

RCE GOAL 1: Coastal and watershed communities have the capability and resources to prepare for and adapt to extreme and chronic weather and coastal hazards, climate change, economic disruptions, and other threats to community health and well-being.

- **Action 1:** Improve and expand exchanges of knowledge to better identify the diverse needs of communities and to increase the public's understanding of changing conditions and related impacts.
    - **DESIRED OUTCOMES**:
        - Scientific understanding, including traditional and local knowledge, provides foundational information, and all community members understand the impacts of changing conditions and coastal hazards and have the capability to prepare, respond and adapt.
        - Community leaders improve their understanding of changing conditions and coastal hazards and their capability to implement mitigation and adaptive strategies.
- **Action 2:** Work with communities to advance collaborative, comprehensive planning, actionable science, and adaptive management strategies.
    - **DESIRED OUTCOME**:
        - Inclusive collaborations with diverse community members and partners support mitigation and adaptation efforts built on knowledge from and responsive to the needs of all, especially the most vulnerable.
- **Action 3:** Work with communities to explore and support diversification, strengthening, sustainability and social equity within coastal economic sectors and the blue economy.
    - **DESIRED OUTCOMES**:
        - Coastal and watershed communities have access to and share knowledge, tools, services, and technologies to adapt and grow resilient economies.
        - Leaders in coastal and watershed economic sectors understand how they can become more resilient through diversification, including expanded renewable, regenerative, and clean practices.

RCE GOAL 2: Water resources are enhanced, sustained, and protected to meet existing and emerging needs of the communities and economies, and biodiverse ecosystems that depend on them.

- **Action 1:** Use engagement and information exchange to advance the understanding of how actions impact water quality, quantity, and availability.

- **DESIRED OUTCOMES**:
  - Community members understand watershed function and coastal functions and the ecosystem services they provide, understand how their actions will impact water resources, and are able to make informed decisions.
  - Community members understand the importance of water resources to biodiversity within coastal ecosystems and the importance of that biodiversity to ecosystem resilience.

- **Action 2:** Collaborate with diverse partners and community members, especially the most vulnerable, to advance plans and management practices for protecting and managing water resources.
  - **DESIRED OUTCOMES**:
    - Communities work with knowledge networks to share and access science, data, tools, and services to anticipate changes in water resources, to protect and sustain water resources, and to make informed decisions.
    - Communities have diverse, sustainable economies and industries that support existing and emerging water resource needs.

Focus Area 3: Sustainable Fisheries and Aquaculture

It is USC Sea Grant's vision to have a safe, sustainable, and accessible domestic seafood supply and a public that understands how to make healthy and sustainable seafood choices. Like much of the world's oceans, Southern California has witnessed a decline in fisheries over the last half-century due to threats from poor water quality; endocrine disruption from chemicals of emerging concern; coastal development and habitat alteration. Shifts in the ranges of seafood resources due to changes in temperature and impacts on habitats are a growing problem. Added threats from ocean acidification will significantly impact fish stocks, particularly those with carbonate shells such as shellfish.

Coastal development has always threatened the viability of marine resources. Research reveals that many fisheries species, including important game fish, use coastal wetlands and lagoons for breeding and nursery grounds. Man-made habitats – including oil and gas platforms and other artificial reef structures – may appear to improve fish recruitment and production in Southern California, but more work is needed to understand how restoration of existing habitats and thoughtful deployment of man-made structures may benefit fisheries.

Recreational and subsistence fishing is of great importance in Southern California, especially in the context of equitable access to seafood. USC Sea Grant will continue to fund projects focused on recreational and subsistence fisheries in Southern California, and to foster understanding of California regulations meant to enhance sustainable and robust recreational opportunities as well as subsistence fishing access.

Sustainable aquaculture is an emerging 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, will not be able to sustain fisheries markets. According to NOAA's Office of Aquaculture, 70-85 percent of seafood consumed in the U.S. is imported (and half of that is from aquaculture), leading to a seafood deficit of over $17 billion per year. Increasing domestic aquaculture could help the U.S. avoid larger foreign imports of seafood, which is not produced with the environmental and health standards attributable to U.S. practices. Importantly, aquaculture also supports commercial and recreational fisheries through wild hatchery and restorative aquaculture programs. Recent policy developments at the federal and state level demonstrate a growing regulatory commitment to actualizing sustainable aquaculture at scale. Southern California was recently selected by NOAA as a national "Aquaculture Opportunity Area," a geographic region with high potential for commercial development, and an Aquaculture Action Plan for California is currently being developed by the state.

USC Sea Grant will continue to leverage funded research and outreach programs to ensure that coastal and open ocean shellfish and seaweed aquaculture successfully achieves the triple bottom line for sustainability (i.e., environmental, social, economic). Developing safe, environmentally sustainable, and socially responsible aquaculture products requires development of appropriate technologies and practices, an educated diverse workforce that can support this burgeoning industry, and informed public support for industry expansion.

USC Sea Grant continues to explore new directions supporting sustainable seaweed and shellfish farming, and forms of restorative aquaculture. Seaweed aquaculture holds promise as a sustainable source of a large variety of food and natural products while providing multiple ecosystem services. Growing seaweed together with shellfish in integrated multi-trophic aquaculture systems offers promise as a sustainable way to grow protein while improving water quality and expanding the blue economy and workforce. We will support the efforts of local aquaculture and seafood industry groups who are exploring feasible economic models for a regional seafood supply chain that increases equitable access to seafood for low-income, food-insecure communities in Southern California.

In order to support growing aquaculture and aquaponics industries, a trained, diverse workforce must be exposed to the subject in the classroom as well as in the field. Middle and high school students, and continuing education students, for example, can learn first-hand about fish biology and husbandry. National, regional, and local coordinated collaboration, research, outreach, and education in this area will be vital to raise the next generation as informed consumers and a trained, diverse workforce.

Surveys show that overall public understanding of aquaculture is limited or negative. Greater public education and outreach are needed to inform the public about different types of aquaculture, best practices, and the value of eating safe, sustainable seafood. USC Sea Grant continues to work at the intersection of science, communication, and education, partnering with formal and nonformal education centers to better inform and educate the public.

Education about seafood safety—produced through aquaculture or wild caught— will continue to be a priority for USC Sea Grant. Enlightened consumers make wiser choices about buying sustainable domestic products and make healthy choices not only about the food they eat, and the manner in which it is produced, harvested, and processed, but also about its potential risk of contamination, for example, from legacy DDT contamination off the Southern California coast. 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. Partnerships are critical in making sure that our educational resources can be understood within the context of these rich and diverse cultures populating the Los Angeles region, including those traditionally underserved and underrepresented in the sciences and science communication.

Sustainable Fisheries and Aquaculture Goals and Outcomes (SFA)

SFA GOAL 1: Domestic fisheries, aquaculture, and other coastal and freshwater living resources supply food, jobs, and economic and cultural benefits.

- **Action 1**: Promote and support harvesting, culturing, processing, and post-processing (e.g., marketing, accessibility) techniques that lead to safe, sustainable, high-quality food as well as economic, social, and ecosystem benefits.
    - **DESIRED OUTCOMES:**
        - Coastal residents and U.S. Seafood consumers understand the benefits of

domestically-produced seafood, both wild and farmed, for individual and environmental health.

- Coastal resource industries employ technologies and reinforce strategies to ensure equitable access to safe and sustainable seafood and products.
- Coastal resource industries employ strategies that balance economic, community, cultural, and conservation goals.

- **Action 2:** Support development of a trained and diverse workforce and enhance technology transfer in a manner that recognizes a variety of methodologies and approaches, including those based on traditional and local knowledge.
  - **DESIRED OUTCOMES:**
    - Increased understanding and technological solutions aid management and production.
    - Engagement with interested parties and partnerships enable the industry to acquire innovative technologies and adapt to changing conditions.

SFA GOAL 2: Natural resources are sustainably managed to support coastal communities and working waterfronts, including commercial, recreational, subsistence fisheries, and aquaculture.

- **Action 1:** Ensure the best available science, services, and tools are available to and trusted by resource managers, the fishing and aquaculture communities, and consumers.
  - **DESIRED OUTCOMES:**
    - Commercial and recreational fishers and aquaculturists are knowledgeable about efficient, sustainable, and responsible tools, techniques, and uses of coastal and freshwater resources.
    - Resource managers and fishing and aquaculture communities have access to and share diverse knowledge and tools to increase their capability to adapt to changing resource management needs, including those driven by climate change.
    - Consumers understand the health and sustainability benefits of domestically produced seafood and use that knowledge to inform their seafood purchasing decisions.

Focus Area 4: Environmental Literacy and Workforce Development

Environmental literacy provides an essential foundation for developing resilient communities, sustainable fisheries and aquaculture, and healthy coastal ecosystems. Southern California faces tremendous challenges—cemented rivers, urban sprawl, and diminishing access to watersheds and the coast—which disconnect communities from each other and from nature. USC Sea Grant recognizes the importance of understanding the watershed and of connecting urban communities with the coast. In our endeavors, we strive to be inclusive in reaching diverse, underserved, and under-represented groups, youth, educators, and families. This effort is enhanced by providing access to current science, experiential learning at all ages, and cultural, local, and traditional knowledge.

USC Sea Grant has been a leader in the national effort to develop principles for ocean literacy and expanding accessible pathways to ocean literacy for Southern California's diverse constituencies. USC Sea Grant educators foster environmental literacy by focusing efforts beginning at early ages and continuing through lifelong learning, in partnership with organizations and agencies representing Southern California's diverse population. Strategies include providing access to current scientific research, developing and implementing instructional resources and programs, leading hands-on experiences for people of all ages, hosting professional development opportunities for educators, and integrating and sharing local and traditional knowledge in educational and curriculum resources.
Through community-supported science, education, and public outreach on marine protected areas, climate change, sea level rise, living shorelines, aquatic invasive species, marine debris, plastic pollution, and aquaculture, individuals and communities develop knowledge and skills that enable a better understanding of their environment. They also are able to make informed decisions about how to select healthy, sustainable seafood to eat or the roles community members can play in protecting watersheds, coasts, and oceans of this very complex environment.

USC Sea Grant's Pre-K-16 primary audience for education programming consists of Black, Indigenous, Latinx, and other students and families of color, along with marginalized students who have limited access and opportunities to engage in marine, coastal, and watershed education. Through both nonformal and formal education, USC Sea Grant provides opportunities for families, especially young adults who are not well represented in these fields, to consider a wide range of careers. Education strategies focus on providing career training opportunities through partnerships with scientists, managers, and policymakers at local and regional nongovernmental organizations and business organizations who are similar to students both culturally and experientially, a critical element in helping students see themselves in these roles. This effort includes programs like Storytime with a Scientist, career shadowing, internships for high school students with researchers or experts in the field, and longer-term, paid internships. Further, USC Sea Grant provides an avenue for increasing knowledge and skills through the California Naturalist Training, conducted in partnership with University of California Extension, providing certification that allows participants to leverage their new skills in pursuing careers in interpretation, restoration, or stewardship.

Formal partnerships with schools and organizations increase our reach and allow programming to be customized in order to address local issues while building science literacy. This includes core curriculum instruction with Los Angeles Unified School District-District Central, the social justice partnership with EmpowHer Institute's E-STEAM (Science, Technology, Engineering, Arts, & Math) program, developing aquaculture curriculum with San Pedro schools' Pre-K-continuing education, and undergraduate internships.

USC Sea Grant serves an equally important role in nonformal education, providing professional development opportunities for educators and education programs for community members of all ages. In recent years, this approach has bolstered Sea Grant's network and capacity-building successes locally and regionally with the development of the Los Angeles STEM Collective, geographical expansion of LiMPETS (Long-term Monitoring Program and Experiential Training for Students), and transition for coastal marine science providers to hybrid learning platforms through the Coastal Education Collaborative. Strong partnerships with nonformal science, technology, engineering, and math centers such as aquaria, museums, libraries, and afterschool programs help achieve this goal.

It is important to recognize and value the diverse cultural connections to the ocean among the many unique voices, knowledge (including Native peoples, especially the Chumash, Tongva (Gabrielino), Kizh and Acjachemen tribes), and Black, Latinx, Asian, and other priority communities throughout the greater Los Angeles region. These voices are essential in broadening our understanding of the connections to the ocean, and everyone benefits from shared traditional knowledge and approaches to learning. USC Sea Grant engages Indigenous partners and actively seeks guidance and collaboration with Tribal Nations in various efforts including through California Naturalist trainings, the MPA Collaborative, the Intertribal Education Collaborative, Sea Grant's Traditional and Local Knowledge community of practice, and as Co-Chair of the National Marine Educators Association's committee on Traditional Ecological Knowledge USC Sea Grant's Executive Director and Education Manager serve on the Wishtoyo Chumash Education Advisory Board to help tailor education principles for Tribal communities.

Coastal, ocean, climate, and sustainability science education is an investment in the future of society, by fostering healthy coastal ecosystems and resilient communities and economies. Undergraduate teaching, graduate research investment, and fellowship opportunities help students prepare for careers in science, technology, engineering, mathematics, and other disciplines critical to local, regional, and national needs. Fellowships (especially the John A. Knauss Marine Policy Fellowship) place the very best graduates in positions that prepare students to lead the nation in sustainable and forward-thinking environmental management. USC Sea Grant, in coordination with its partners, continues to help identify and alleviate barriers to participation in Sea Grant fellowship and grant programs to ensure that students from diverse backgrounds, especially those in underserved and underrepresented communities, get access to Sea Grant's research, extension and education programs.

Environmental Literacy and Workforce Development Goals and Outcomes (ELWD)

ELWD GOAL 1: A diverse, environmentally literate public participates in lifelong formal, nonformal learning opportunities.

- **ACTION 1**: Create and implement educational resources and opportunities that are diverse, equitable, inclusive, just, and accessible for formal, nonformal learners to explore multiple ways of learning and knowing and to develop their curiosity and learning abilities throughout their lives.
    - **DESIRED OUTCOME**:
        - Individuals will apply environmentally literate skills by utilizing knowledge to support, build, and restore healthy natural and human communities.
- **ACTION 2**: Develop, provide and assess research, curricula, tools, pedagogy, and other resources for educators, students, and lifelong learners to support personal choice, participatory decision-making, and community planning processes.
    - **DESIRED OUTCOMES**:
        - Educators, students and lifelong learners have current information and innovative tools that meet or exceed relevant standards and practices.
        - People know and can act on issues that impact their lives, communities, and environments.
        - Community members use their knowledge to remove barriers and act for personal and social resilience and adaptation to changing economic, environmental, and social conditions.
- **ACTION 3**: Strengthen the ability of individuals, organizations, and communities so that they have the knowledge, dispositions, skills and abilities to make informed and responsible decisions regarding coastal issues.
    - **DESIRED OUTCOMES**:
        - Individuals, organizations and communities create innovative opportunities, businesses, and communities that respect diverse ways of knowing and learning, address systemic problems in equitable and just ways, and integrate traditional and novel cultures.
        - Coastal and watershed communities are sustainable, healthy, diverse centers of tradition, innovation, and prosperity.

ELWD GOAL 2: A diverse, skilled, and environmentally literate workforce that is engaged and able to build prosperous lives and livelihoods in a changing world through traditional and innovative careers.

- **ACTION 1**: Identify and remove barriers to accessing training and learning opportunities so that the nation's diverse population is connected to and prepared for the range of career paths that support the needs of coastal and watershed communities.

    - **DESIRED OUTCOME:**
        - All members of a community are enabled to explore and pursue the variety of occupations that are essential to sustain coastal and watershed communities, economies, and ecosystems.
- **ACTION 2**: Increase opportunities for students at all levels (P-12, community college, undergraduate, graduate, post-graduate, and technical and vocational) to gain knowledge and experience addressing issues that are important to our ocean, coasts and their respective watersheds.
    - **DESIRED OUTCOMES**:
        - Sea Grant student opportunities provide increased literacy, experience, and preparedness in critical disciplines, skills, and issues.
        - Students from all backgrounds and with diverse needs are thoughtfully and intentionally supported in and have access to formal, nonformal, and experiential learning, training, and research experiences.
- **ACTION 3**: Develop and carry out programs that help people discover, create and grow within careers that support the current and future needs of coastal and watershed communities and ecosystems and to adapt and thrive in changing conditions.
    - **DESIRED OUTCOME:**
        - Employment in coastal and watershed communities expands and diversifies.
        - The existing and future workforce is able to adapt and thrive in changing environmental, social, and economic conditions.

Appendix I: USC Sea Grant Advisory Council

Name	Affiliation
Marissa Caringella	Chief Administrative Director, Santa Monica Bay Restoration Commission
Dr. Mariela de la Paz Carpio-Obeso	Ocean Unit Chief, Division of Water Quality,, State Water Resources Control Board
Candice Dickens-Russell	President and CEO, Friends of the Los Angeles River
Dr. Mas Dojiri	Assistant General Manager, City of Los Angeles Sanitation & Environment
Dr. John Dorsey	Professor of Civil Engineering & Environmental Science, Loyola Marymount University
Dr. Lesley Ewing	Senior Coastal Engineer, California Coastal Commission (retired; consultant)
Russell Galipeau	Superintendent (retired), Channel Islands National Park; Lecturer, California State University Channel Islands
Dr. Mark Gold	Former Executive Director, Ocean Protection Council
Jenny Krusoe	Executive Director, AltaSea at the Port of Los Angeles
CAPT J. Kipling Louttit	Executive Director, Marine Exchange of Southern California
Chris Mobley	Superintendent, Channel Islands National Marine Sanctuary
Craig Moyer	Partner, Manatt, Phelps & Phillips, LLP
Lisa Gilbane	Environmental Analysis Section Chief, Bureau of Ocean Energy Management
Rebecca Smyth	West Coast Director, NOAA Office for Coastal Management
Dr. Guangyu Wang	Chief Administrative Director (retired), Santa Monica Bay Restoration Commission
Dr. Stephen Weisberg	Executive Director, Southern California Coastal Water Research Project Authority (SCCWRP)

Appendix II: USC Sea Grant Academic Coordinators

Name	Affiliation
Dr. Carly Kenkel	Gabilan Assistant Professor, USC Department of Biological Sciences
Dr. Kenneth Nealson	Professor Emeritus, USC Department of Earth Sciences; Wrigley Chair in Environmental Studies
Dr. Steven Murray	Interim Provost and Vice President for Academic Affairs and Professor of Biology Emeritus (retired), CSU Fullerton
Dr. Patrick Lynett	Professor of Civil and Environmental Engineering, USC Viterbi School of Engineering
Dr. William Leach	Professor (Teaching), USC Sol Price School of Public Policy

Appendix III: Resources Agency Sea Grant Advisory Panel (RASGAP)

Name	Affiliation
Michael Anderson	State of California Office of Spill Prevention and Response
Deborah Aseltine-Neilson	Senior Marine Biologist Specialist, California Department of Fish and Wildlife
Dr. Doug Capone	Professor of Biological Sciences, University of Southern California
Marina Cazorla	Coastal Programs Manager, California Department of Parks and Recreation
Jenn Eckerle	Deputy Secretary for Oceans and Coastal Policy, California Natural Resources Agency
Michael Esgro	Senior Biodiversity Programs Manager & Tribal Liason, California Ocean Protection Council
Dr. Lauren Garske	Senior Biodiversity Program Manager & Tribal Liaison, California Coastal Commission
Dr. Brian Gaylord	Professor, College of Biological Sciences, Coastal and Marine Sciences Institute, University of California, Davis
Jennifer Mattox	Science Policy Advisor & Tribal Liaison, California State Lands Commission
Dr. Steven Murray	Professor Biology (emeritus), California State University, Fullerton
Dirk Rosen	Marine Applied Research & Exploration (Private Industry)
Dr. Wesley Smith	Staff Toxicologist, Office of Environmental Health Hazard Assessment / CalEPA
Peter Struffenegger	North America at Urchinomics (Aquaculture Private

	Industry)
Katherine Walsh	Senior Environmental Scientist Supervisor, California State Water Resources Control Board

Appendix IV: USC Sea Grant Staff

Director, Karla Heidelberg, Ph.D.
Dr. Heidelberg he brings over 24 years of experience as a scientist, educator, and leader in ocean research, education, and policy. She has been on the Biology and Environmental Studies faculty of USC since 2006 and has held multiple leadership and administrative positions including serving as the Director of the USC Program in Environmental Studies and as a leader in a long-running NSF-funded Research Experience for Undergraduates. She has received several USC University teaching awards. From 2019-2023 she was on detail to the NSF as a Program Officer in the Office of Polar Programs, where she oversaw the Antarctic Organisms and Ecosystems Research Portfolio. For this work, she received an NSF Director's Award for Superior Accomplishment in 2021. Before coming to USC, she was an American Association for the Advancement of Science Diplomacy Fellow in the Office of Oceans Affairs at the U.S. Department of State. This experience was followed by a role as the Global Program Science Coordinator, where she coordinated an around-the-world expedition to evaluate marine biodiversity at the J. Craig Venter Institute. Dr. Heidelberg earned her Ph.D. from the University of Maryland in 1999 in Marine-Estuarine and Environmental Science.

Executive Director, Phyllis Grifman, M.A.
As Executive Director, Ms. Grifman serves as the primary Research Coordinator and oversees extension, outreach and education programs. She is an active partner in numerous state and national activities, linking Sea Grant with research and information networks in such areas as national marine sanctuaries, state marine protected areas, ecosystem science, land use planning in both the public and non-profit sectors, and other local, regional and national endeavors. Ms. Grifman maintains close contact with current and former Sea Grant scientists, and develops Sea Grant's new research capabilities. She served as Chair of the Advisory Council of the Channel Islands National Marine Sanctuary for several years, chairs that body's Research Activities Panel, and has served on the Council for over a decade. She is Vice President for Southern California of the California Shore and Beach Preservation Association, and a member of the Santa Monica Bay Restoration Commission Technical Advisory Committee.

Science, Research, and Policy Specialist, Amalia Almada, Ph.D.
Dr. Almada serves an integral role as an extension specialist focused on interpreting and disseminating information and research results, including those from Sea Grant researchers, on topics such as water quality, sustainable aquaculture, and ecosystem health with managers, planners and community members in Southern California. Dr. Almada applies her social science training to several USCSG projects, including a community-driven California DDT research needs assessment and a Seafood Equity Hub in South Central Los Angeles. Dr. Almada also supports USC Sea Grant's research coordination and management of research

proposals. She received a BSc in Biology from Georgetown University, a PhD in Biological Oceanography from the Joint Program at the Woods Hole Oceanographic Institution and Massachusetts Institute of Technology, and completed a Provost Postdoctoral Fellowship at the University of Southern California.

Urban Ocean and Port Specialist, Director of Extension – To be filled

Science, Research, and Policy Specialist, Karina Alvarez, M.S.
Ms. Alvarez serves an integral role in coordinating, interpreting, and disseminating Sea Grant research findings on coastal hazards and climate change with coastal managers, city planners, and community members in Southern California. Ms. Alvarez applies her training in coastal and ocean systems, GIS, and science communication to support municipalities in building coastal resilience. Before joining USC Sea Grant, Ms. Alvarez applied GIS as a tool to address environmental concerns such as urban heat islands and estuary health at The Bay Foundation and the NASA DEVELOP National Program. Ms. Alvarez received a B.S. in Environmental Science from Loyola Marymount University and a M.S. in Global Change Ecology from the University of Bayreuth.

Education Programs Manager, Linda Chilton, M.A.

Ms. Chilton is responsible for developing, implementing, and coordinating a broad range of educational programs for students, teachers and families in partnership with many organizations and institutions. Through numerous collaborations with science educators throughout California and the nation, she brings together scientists and educators to develop curriculum and field programs on current marine and coastal science topics. She works with local, regional, and national partners in aquaculture education, aquatic invasive species, and developing a diverse workforce. Ms. Chilton dedicates much of her time engaging lifelong learners in community supported science, connecting nonformal science experiences with current research and ocean issues, and creating partnerships to support underrepresented audiences in marine science education and career development. She is co-chair of the LA MPA Collaborative and co-leads the LA County California Naturalist certification training that primarily serves participants reflective of those underrepresented in naturalist and interpretive fields. In 2022, she received the prestigious James Centorino Award from the National Marine Educators Association, recognizing more than 35 years of leadership in marine science education.

Education Program Specialist, Maria Madrigal, M.S.
Ms. Madrigal works alongside the Education Programs Manager, Linda Chilton, to help identify needs and resources to support coastal based education programs. Her role includes connecting with students, teachers, and families in formal education systems and after-school programming, and facilitating the collaboration of diverse network partners in order to identify common programmatic needs and adaptation strategies, all while ensuring equity and access for all students and educators. Previously, she served as the Program Manager for the USC Viterbi School of Engineering K-12 STEM Center. Prior to joining USC, she spent almost 20 years at the SEA Lab in Redondo Beach, leading and managing education programs. As the SEA Lab was a program of the Los Angeles Conservation Corps, her priority was preparing young adults to enter the workforce by providing education and job-training skills in the marine

and environmental fields. In 2012, she was fortunate to participate in NOAA's Teacher at Sea program in American Samoa. Recently, she authored the marine biology book for a series highlighting different fields within the STEM field.

Communications Manager, Leah Shore, M.S.
Leading the team's communications, Ms. Shore's work is centered around conveying the program's marine science research, education, and outreach efforts across a broad range of audiences. Her work enhances the usability of the program's initiatives and science findings through building resiliency, raising awareness, and increasing capacity of the research and issues surrounding our coastal communities. She manages the communication strategies and materials across projects and digital platforms, as well as serves as the primary science writer. Ms. Shore specializes in science communication, especially aimed at bridging the gap between science and application. She holds a B.S. in Meteorology from the University of Oklahoma and an M.S. in Climate and Society from North Carolina State University. Previously, she worked as the Climate Assessment Specialist for the Southern Climate Impacts Planning Program, a NOAA-funded program, leading communication efforts of assessing stakeholder vulnerability to extreme weather and climate events and aiding in adaptation efforts across the South Central United States.

Contracts and Grant Coordinator, Ruth Dudas
Ms. Dudas has more than 25 years of administrative experience, working in the fields of printing and logistics as Executive Assistant and Office Manager before her tenure at USC Sea Grant. Since 2002, Ms. Dudas serves as USC Sea Grant's fiscal officer and budget coordinator, and manages all contracts and grants logistics, in addition to providing administrative support for Sea Grant staff. Ms. Dudas has completed numerous fiscal training programs with NOAA as well as USC. She ensures the efficient execution of daily office procedures and serves as liaison with USC contracts and grants operations and sponsored project administration.

Science Writer, Charlotte Stevenson, M.S.
Ms. Stevenson is a science writer with a graduate-level foundation in research science and a strong background in environmental policy and politics. She has served as a science writer for USC Sea Grant for 12 years. She has a broad portfolio in writing, ranging from highly technical research papers; programmatic writing such as strategic planning and grant reporting; as well as creative forms such as articles, blogs, op-eds, essays, and documentary scripts. Ms. Stevenson has an M.S. and B.S. in Biology from Stanford University where she spent many years at Hopkins Marine Station in Monterey, CA. She was a 2006 John A. Knauss legislative marine policy fellow and subsequently a staffer in the House of Representatives, Natural Resources Committee. Over the last decade, she has also written blog posts and technical reports for Scripps Institution of Oceanography, the CA Ocean Science Trust and published freelance pieces in publication such as *Undark*, *Age of Awareness*, *ECO Magazine*, and the *New York Times Online.*

Appendix V: Performance Measures & Metrics

The Performance Measures and Metrics below are primarily developed by the National Sea Grant College Program, along with discrete elements added by USC Sea Grant (marked with *).

Focus Area 1: Healthy Coastal Ecosystems (HCE)

- Number of acres of coastal habitat protected, enhanced, or restored as a result of Sea Grant activities.
- Number of resource managers who use ecosystem-based approaches in the management of land, water, and living resources as a result of Sea Grant activities.
- Number of people who support advancing evidence-based decision-making on legacy or emerging contaminants as a result of Sea Grant activities.*

Focus Area 2: Sustainable Fisheries and Aquaculture (SFA)

- Number of fishermen, seafood processing, or aquaculture industry personnel who modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Sea Grant activities
- Number of seafood consumers who plan to modify their purchases using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood as a result of Sea Grant activities*

Focus Area 3: Resilient Communities and Economies (RCE)

- Number of communities that adopt/implement sustainable economic and environmental development practices and policies as a result of Sea Grant activities
- Number of communities that adopt/implement hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events
- Number of congressional districts who are informed about or have adopted/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.*

Focus Area 4: Environmental Literacy and Workforce Development (ELWD)

- Number of Sea Grant-supported graduates who become employed in a job related to their degree within two years of graduation
- Number of Sea Grant products that are used to advance environmental literacy and workforce development.
- Number of people engaged in Sea Grant-supported nonformal education programs
- Number of Sea Grant facilitated curricula adopted by formal and nonformal educators.*

Cross Cutting Performance Measures:

- Number of Sea Grant tools, technologies, and information services that are used by our partners/customers to improve ecosystem-based management
- Economic and societal impacts derived from Sea Grant activities (market and non-market; jobs and businesses created or sustained)
- The number of zip codes that participated in Sea Grant activities*
- The number of underrepresented and underserved communities that participated in Sea Grant activities*
- Number of Sea Grant tools, technologies, programs, and information services that specifically reach underrepresented and underserved communities*

Cross Cutting Performance Metrics Outputs:

- Core funding proposals
- Number of peer-reviewed publications
- Sea Grant staffing
- Number of Sea Grant supported undergraduate students and associated awarded degrees
- Number of Sea Grant supported MS/MA graduate students and associated awarded degrees
- Number of Sea Grant supported PhD graduate students and associated awarded degrees
- Other Sea Grant supported professional degree graduate students and associated awarded degrees
- Number of P-12 students reached through Sea Grant-trained educators or directly through Sea Grant education programs
- Number of P-12 Educators who participated in Sea Grant education programs
- Volunteer hours
- Sea Grant-sponsored/organized events
- Attendees at Sea Grant-sponsored/organized events
- Public or professional presentations
- Attendees at public or professional presentations

The Urban Ocean Program

University of Southern California Sea Grant

Strategic Plan 2024 – 2027