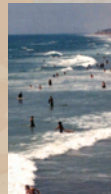


**Sea Grant**  
University of Southern California



UNIVERSITY OF SOUTHERN CALIFORNIA SEA GRANT PROGRAM



STRATEGIC PLAN 2003 - 2008



**Sea Grant**  
University of Southern California



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The National Sea Grant Program is a network of 30 university-based programs in coastal and Great Lakes states involving more than 300 institutions nationwide in research, education and the transfer of technology regarding coastal, marine and Great Lakes issues. Sea Grant is supported by the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), in partnership with the states and private industry.

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PAGE 1

But look! Here come more crowds, pacing straight for the water, and seemingly bound for a dive. Strange! Nothing will content them but the extremist limit of land . . . No, they must get just as nigh the water as they possibly can without falling in. And there they stand — miles of them — leagues! Inlanders all, they come from lanes and alleys, streets and avenues — north, east, south, and west. Yet here they all unite! Tell me, does the magnetic virtue of the needles of the compasses of all these ships attract them thither?

Herman Melville, *Moby Dick*

This program plan is dedicated to Robert L. Friedheim (1935-2001). As Director of USC Sea Grant from 1980 to 1989, he recognized the important role that Sea Grant could play in addressing the problems of Southern California's "Urban Ocean." Dr. Friedheim served as an invaluable advisor to the program after his tenure as Director; his wisdom and his compass will be sorely missed.



## EXECUTIVE SUMMARY

As the largest coastal urban center on the west coast, and the second largest in the nation, the city of Los Angeles has been designated a “mega-city” by the United Nations. This designation carries with it the burden of managing large and growing populations in a geographic region adjacent to valuable and fragile coastal and ocean resources. For over 30 years the Sea Grant Program at the University of Southern California has worked with stakeholders, citizens, government and academia to help navigate this ever-changing landscape.

In this, the fourth decade of existence for the National Oceanic and Atmospheric Administration and the National Sea Grant College Program, every aspect of their missions – from protecting and managing coastal and ocean resources, enhancing environmental literacy and marine research, and predicting changes in the earth’s environment – face a new urgency given ever-increasing national concerns related to the economy, the environment and public safety.

Sustaining and conserving the nation’s coastal and marine environments creates an array of challenges that require both technological innovation and active collaboration among scientists, policymakers, resource managers and a variety of coastal constituents. The University of Southern California Sea Grant Program embarked upon this strategic plan in an effort to allow it to chart a course that meets these challenges and anticipates the future. It draws input from broad regional constituents as well as state and federal priorities. Four strategic thematic areas emerged from this process:

- Water quality and coastal ecosystems
- Society and commerce
- Coastal hazards and public safety
- Education

We will continue to review and refine our goals and objectives to assess our progress as we follow the course we have set to serve the people of Southern California.



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*This photograph of Southern California taken from the space shuttle shows the extent of urbanization*



## INTRODUCTION

In the dawn of the 21<sup>st</sup> century, coastal cities are facing unprecedented growth. As the Earth moves from 6 billion to 9 billion inhabitants over the next 50-100 years, most of this increase will occur in coastal areas. These urban sites will double or triple in size around the world and, as they grow, they will present an increasing challenge to the marine ecosystems on their seaward boundary. The impacts of cities on human and ecosystem health in the coastal zone have already become national and international issues. The dependence of urban areas on these natural coastal resources is just beginning to be understood.

In geographic terms, the 1,100-mile California coastline is approximately the same length as the U.S. East Coast from Norfolk, Virginia to the northern border of Maine, and the character of coastal terrain varies greatly from north to south. Northern California, with the exception of the San Francisco Bay area, has a more rural character. The region known as the Southern California Bight, which stretches from Point Concepción in the north to south of Tijuana, Mexico, is highly developed – an urban coast char-

acterized by nearly uninterrupted commercial and residential development.



The State of California is home to approximately 39 million residents, over 14 million of whom live in three coastal counties and the two adjacent inland counties

### LOS ANGELES IS AT THE HEART OF THIS DEBATE ABOUT THE EFFECTS OF URBANIZATION ON OUR COASTLINES

that comprise the Southern California urban watershed – the region served by the University of Southern California



(USC) Sea Grant program. Ten million Southern Californians live within 30 miles of the coast. In Los Angeles County, the population has increased over 3000 percent since 1940 and is predicted to grow another 30 percent by 2010.

As the largest coastal urban center on the west coast, and the second largest in the nation the city of Los Angeles is at the heart of this debate about the effects of urbanization on our coastlines, especially in the Southern California culture of “endless summer” that places such a unique value on its beaches and coastal ocean. The University of Southern California’s location in the middle of Los Angeles has made the Sea Grant Program at USC an important regional resource, concentrating on issues arising out of the

**AS THE “URBAN OCEAN” PROGRAM, USC IS THE ONLY PROGRAM IN THE SEA GRANT NETWORK TO OFFER SUCH A CLEARLY DEFINED IDENTITY.**

necessity of managing people and resources in an intensely developed coastline. For this reason, in the 1980s the USC Sea Grant program adopted as



*The pressure of this intensely urbanized region on fragile marine and coastal space and resources is immense.*

its programmatic theme the “Urban Ocean.”

The problems found in the “Urban Ocean” environment of Southern California are not unique to the region. In addressing the range of issues found here, we hope to provide information and develop models that will serve other urban coastal regions in the U.S. and around the world. We consider Los Angeles the city of the future and treat it as an urban ocean laboratory. To this end, USC Sea Grant is home to the “Urban Coasts and Harbors” thematic area for the national Sea Grant Network.

In the future, the United States — and the world — will see the effects of escalating urbanization on coastal resources and



adjacent lands. The public we serve will continue to grow and we expect to expand our capabilities to match that growth. We shall seek to expand the USC Sea Grant program from its current status as an Institutional Program to full Sea Grant College status as we endeavor to serve as a model for the nation’s Urban Ocean.

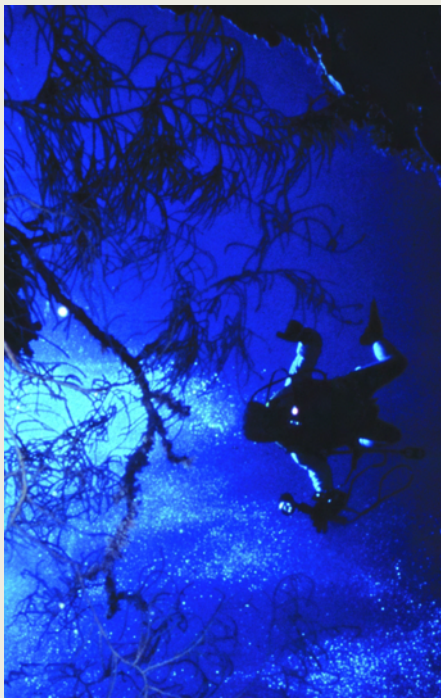


*Watershed map of Santa Monica Bay, from the L.A. Virtual Ocean*

Our dedication to the Urban Ocean theme is reflected in our calls for proposals, in our planning documents, in our project evaluation process, and in our philosophies of science program management. We remain the only program in the Sea Grant network to offer such a clearly defined identity. The University of Southern California Sea Grant program funds research on the critical issues associated with the influence of massive cities on the sea, promotes connections between scientists



and the policy-makers who must craft solutions, and broadly distributes information to the electorate through public education outreach efforts. This work has gained in importance over the past few decades and, as the program has matured, the value of this unique focus has strengthened.



## UNIVERSITY OF SOUTHERN CALIFORNIA SEA GRANT PROGRAM

The University of Southern California (USC) Sea Grant Program is part of the National Sea Grant College Program (NSGCP), a national network of 30 Sea Grant programs, which represent a partnership of federal, state, and private entities in every coastal and Great Lakes state. The NSGCP resides within the National Oceanic and Atmospheric Administration (NOAA), which is in the US Department of Commerce. The USC Sea Grant Program is one of only a few Sea Grant programs seated at private universities. The program therefore leverages its federal and state grants with private funds provided in generous share by USC.

The University of Southern California, one of the largest private universities in the United States, has participated in the NSGCP for over 30 years and has a history of marine science research in Southern California dating back more than one hundred years. USC's facilities, research and curricula make it the principal university in the Los Angeles region for ocean studies, and it has demonstrated excellence in marine research and edu-



**USC SEA GRANT IS ENRICHED BY ITS TIES TO PROGRAMS THAT SHARE ITS CONCERN FOR RATIONAL MANAGEMENT OF COASTAL AND MARINE RESOURCES.**

cation from the beginning of the 20th Century. USC's recognition as a center of environmental studies, as demonstrated both by its selection as the administrator (since 1973) of the \$200,000 Tyler Prize for Environmental Achievement (the nation's premier award in the field) and the establishment of the Wrigley Institute for Environmental Studies (WIES) in 1995 to connect to USC's environmental science community, makes it an optimum site for a Sea Grant program. WIES operates on the USC campus and at the Wrigley Marine Science Center on Catalina Island and is growing rapidly.

The USC Sea Grant Program continues to be enriched through its ties to developing and established programs that share its concern for rational management of coastal and marine resources. Regionally, this enrichment comes from such programs as the Southern California



Marine Institute (SCMI), a consortium of the seven California State Universities located in Southern California, Occidental College, and USC. A close relationship with researchers at WIES ensures that USC Sea Grant coordinates with ongoing research in the marine sciences, and has an interdisciplinary approach to marine-related research. Several new marine science faculty members at USC have come through WIES, and USC anticipates hiring more new faculty members with expertise in marine environmental science specialties. Numerous USC faculty members have been honored for their work in the marine sciences.

The majority of the significant research grants to USC marine science faculty come from prestigious and highly competitive sources including the National Science Foundation (NSF), Office of Naval Research, National Aeronautics and Space Administration, Environmental Protection Agency and NOAA. USC is among the top dozen institutions receiving funding for marine environmental biology from NSF. Overall, USC ranks in



*Five professional staff currently comprise the core of the USC Sea Grant program, with two support staff.*

the top 25 of all public and private universities in the nation receiving federal research funds.

USC Sea Grant's primary responsibility is to contribute to solving the problems of the Urban Ocean, while recognizing the opportunities for coastal commerce, recreation and improving the quality of life in coastal regions such as Southern California. This document has not specifically identified distinctions in the research and outreach programs; this is intentional. Given the size of the program and staff, these functions are integrated to the extent possible. Therefore, profes-



sional staff take substantial responsibility for thematic components, and serve as liaison between the science and policy communities, creating outreach programming to serve identified constituencies. Marine Advisory Service (MAS) staff serve as members of pertinent technical and advisory committees, and work with the Sea Grant Advisory Council to develop research priorities. Results of research are disseminated back to the user community, along with programs for public education.

Outreach staff assess the research and informational needs for addressing local, regional and national problems related to the Urban Ocean. Through the MAS and Communications program, we convey research results and information and help to transfer the technology necessary to help managers deal with present and emerging problems. Additionally, we develop programs that help educate the youth and citizenry of Southern California. USC Sea Grant works to build strategic alliances with coastal and marine industries and other interested groups to advance our collective under-

standing of the opportunities and problems facing our urban coasts.



*USC Sea Grant report on the first review of Huntington Beach closure investigations.*

The USC Sea Grant program continually sharpens and reassesses its goals and priorities in order to stay at the leading edge of problem solving efforts for regional and local issues and sees its growth with critical alliances as its future strength. Using a network of scientists, government agency personnel and advisors, USC Sea Grant is able to anticipate research needs in a relatively short time frame.

Our work on beach closures at Huntington State Beach over the last three years is an excellent example of our





ability to marshal resources and scientific expertise in order to address problems as they emerge. It shows the important linkages among outreach, research and public policy.

**OUR ROLE IS TO ASSESS THE RESEARCH AND INFORMATIONAL NEEDS FOR ADDRESSING LOCAL, REGIONAL AND NATIONAL PROBLEMS RELATED TO THE URBAN OCEAN AND TO DEVELOP RESEARCH PROGRAMS EXAMINING THOSE PROBLEMS.**

In response to chronic beach contamination, the USC Sea Grant program was asked to conduct a review of Orange County's scientific studies. The aim of the review was to improve management and response strategies in order to better prepare for, manage or prevent future closures. The review recommendations helped to develop research priorities for the county. These in turn informed our research solicitation process. USC faculty and research staff strive to anticipate problems and fashion their research toward preventing further degradation of the coast. (Appendix B)

**USC SEA GRANT IMPROVES THE CONNECTIONS BETWEEN RESEARCH RESULTS AND MANAGEMENT DECISIONS. SEA GRANT RESEARCH SUCCESSFULLY DEVELOPED TECHNIQUES IDENTIFYING PATHOGENIC VIRUSES IN SEAWATER AND SHOWED THAT HUMAN ILLNESS WAS A REAL CONSEQUENCE OF SWIMMING NEAR STORM-DRAINS. SEA GRANT BROUGHT SCIENTISTS, DECISION MAKERS, BUSINESS-LEADERS AND ENVIRONMENTALISTS TOGETHER IN A WAY THAT PROMPTED NEW REGULATIONS AND ADVISORY PROCESSES TO MITIGATE THE RISK OF ILLNESS**



## DEVELOPMENT AND ORGANIZATION OF STRATEGIC PLAN

Urbanization in the proximity of dynamic coastal environments imposes a suite of risks on both natural and human systems while at the same time offering valuable access to the coast. We must understand these complex marine systems so that the interactive and cumulative effects of multiple stressors on these environments can be accounted for, and so that we can develop strategies for mitigating harmful impacts. In the complex environment of the Urban Ocean, coastal managers need to be able to establish cause and effect relationships among coastal ecosystem impacts and the wide array of uses. An inability to do so prevents resource managers from reliably predicting the outcome of their actions to prevent ecosystem damage and hazards to public health and safety. Solutions require basic marine science research that is used to inform practical action.

As we update the strategic plan for the USC Sea Grant program, it is apparent that much is still to be learned about the issues and problems of the Urban Ocean. USC Sea Grant will continue to be a leader in the creation of innovative science and solutions in the Urban Ocean arena, with the ability to demand that the

science truly help resolve some of the issues of greatest social importance. We will be the catalyst for public understanding of the science so that it motivates better decisions, and will increase its role in bringing decision-makers and scientists together to inform each of the ways that their roles complement and strengthen the other's. USC Sea Grant will continue to find and implement new and innovative curricular programs that reach our children, so that the next generation of citizens is able to handle a more sophisticated science agenda than any before. Some of this leadership comes from the direct funding of projects. Some of this leadership comes from the larger role of facilitating the connections between the broader array of players that already exist. Some of this leadership emerges as the University of Southern California continues the unprecedented increase in its capabilities in the marine arena.

The USC Sea Grant 2003-2008 Strategic Plan is written to be broad in scope and vision, but with a recognition of the boundaries attendant upon limited resources. We therefore prioritize the elements of this plan in order to focus on the





most pressing concerns of the greater Southern California region. USC Sea Grant looked to both national and state perspectives for assistance in determining these priorities.

#### **NATIONAL PERSPECTIVES – NOAA AND NATIONAL SEA GRANT STRATEGIC PLANS**

The legislatively mandated goal of the National Sea Grant College Program is to “increase the understanding, assessment, development, utilization and conservation of the nation’s ocean and coastal resources by providing assistance to promote a strong education base, responsive research and training activities and broad and prompt dissemination of knowledge and techniques.” Sea Grant’s Network Plan echoes two of the major mission goals and two of the cross-cutting national priorities outlined in the NOAA Strategic Plan. The two mission goals are: to protect, restore and manage use of ocean, coastal and great lakes resources which includes understanding climate variability and change to enhance society’s ability to plan and respond in the context of coastal hazards; and to support the nation’s commerce with information for safe, efficient and environmentally sound transportation. The two cross-cut-

ting priorities are: enhance environmental literacy, outreach and education; and sound, state-of-the-art research.

Both the NOAA and Sea Grant Network Plans provide the primary context for USC Sea Grant’s plan. In the context of

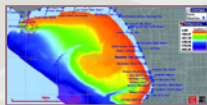
**USC SEA GRANT WILL CONTINUE TO BE A LEADER IN THE CREATION OF INNOVATIVE SCIENCE AND SOLUTIONS IN THE URBAN OCEAN ARENA, WITH THE ABILITY TO DEMAND THAT THE SCIENCE TRULY HELP RESOLVE SOME OF THE ISSUES OF GREATEST SOCIAL IMPORTANCE.**

the challenges presented in the Southern California coastal region, the USC Sea Grant plan refocuses the priorities listed above, with major emphasis on water quality and coastal ecosystem health, and a robust education effort. We have reestablished an emphasis on marine transportation issues. Finally, fostering and protecting sustainable recreational opportunities for residents and tourists recognizes the California coastal region as an engine of economic growth in the state.



#### **STATE AND REGIONAL PERSPECTIVES**

In its 2000 Statement of California Research Needs, the Resources Agency Sea Grant Advisory Panel, which is the primary contact between the State agencies and Sea Grant programs, has developed priorities for funding research and outreach efforts. There are five major areas of focus: water quality, shoreline processes and seismic activities, education, marine resources and habitats, and fisheries and aquaculture. All these areas, with the exception of aquaculture, coincide with USC Sea Grant’s thematic interests.



*Bathymetry map of Santa Monica Bay, from the L.A. Virtual Ocean.*

Among state priorities for research are: analysis of beneficial uses of marine waters, including quantitative analysis of the impacts of storm water runoff and sediment contamination, examination of pathogens and bacterial indicators of water quality, and the development of

tools for efficiently identifying human viruses. The agenda in shoreline processes focuses on determining the physical, biological and economic effects of coastal and near-shore erosion and analysis of the roles of natural and artificial shoreline structures, beach nourishment, and impacts from El Niño and severe storms. The state recognizes the importance of marine education in its call for the development of unique and cost-effective programs to educate people of all ages about the ocean and its needs.

Sea Grant staff members serve on a number of regional panels and committees — the problems and priorities identified by these entities also help us to determine research and outreach priorities beneficial to Southern California. In turn, we provide information about the interests and capabilities of the marine research community. USC Sea Grant’s Marine Advisory Services Leader has been a member of the Technical Advisory Committee of the Santa Monica Bay Restoration Project (SMBRP) for over a decade. This committee develops recommendations for research relevant to Santa Monica Bay, and provides technical input



on research and management proposals. The Bay Restoration Plan is now in an implementation phase, which identifies specific research needs to preserve and improve the quality of the local marine environment. USC Sea Grant responds to these research needs where our agendas coincide. Sea Grant also participates on the Orange County Coastal Coalition Marine Life Refuge Committee, whose goal is to promote responsible use of the rocky intertidal shoreline and to identify research needs for marine life refuges in the area. Recommendations from committees and advisory bodies such as these inform USC Sea Grant's research priorities and outreach efforts related to public access and recreation. Regional and local regulatory and management authorities are in turn the highest priority outreach audience and the first level recipients of research results.

#### **STRATEGIC THEMATIC AREAS**

We have identified four major thematic areas of projected effort – water quality and coastal ecosystems, society and commerce, coastal hazards and public safety, and education – to comprise the focus of our work in the next five years. Research, outreach, communications and

education functions are integrated, as we develop programs and report results in a timely and useful manner. As with the previous long-range plan (Appendix C), we recognize that our current financial and human resources do not allow implementation of research and outreach priorities in all four areas to proceed at the same rate. We do, however, plan to enhance resources and staff, when feasible, to better serve the needs of a rapidly expanding Urban Ocean population. In a continuing effort to address urgent public needs we work to leverage available resources through collaborations and partnerships and to seek new sources of support to pursue program goals. We endeavor to do so at local, state, and federal levels of government and with private enterprises.

Our agenda in Water Quality and Coastal Ecosystems remains our highest priority, given their importance to the region. This is reflected in the number of research projects funded in this area. Education is our second-highest priority, followed by Society and Commerce, and Coastal Hazards and Public Safety, to which we give equal weight. The goals and objectives of the latter two thematic areas are

currently addressed largely through Program Development and Outreach programs rather than through research projects. In the next five years we will work to foster more in-depth research in these areas by developing collaborations and partnerships, and aggressively seeking new sources of funding.

#### **STRATEGIC PLANNING PROCESS**

The initial USC Sea Grant Strategic Plan was drafted by USC Sea Grant professional staff, and reviewed by Sea Grant's Advisory Council. The plan was developed with input from a broad array of sources – including the National Sea Grant and NOAA Strategic Plans, the California Resources Agency Statement of Research Needs (January 2000) and Ocean Management Plan, and the problems identified and recommendations made at the October 2002 conference, "California and the World Ocean." In addition, the Santa Monica Bay Restoration Project provided an outline of their priorities, and Sea Grant staff garnered additional information from attending regional and local meetings on water quality, public health, coastal hazards, and environmental education. The Sea Grant Advisory Council (Appendix D) and

Academic Coordinating Committee (Appendix E) and the California Resources Agency Sea Grant Advisory Panel (Appendix F) continue to provide input both formally and informally, on program direction. USC Sea Grant also consulted researchers in the Southern California marine community and around the nation, state and federal agency officials, stakeholders and users of the marine environment.

For each of the four strategic areas: Water Quality and Coastal Ecosystems, Education, Society and Commerce, and Coastal Hazards and Public Safety, we solicited formal input. A planning consultant, with Sea Grant experience and expertise, helped us refine the strategic thematic area visions and objectives. The final stage of the input process began in October 2002. Four day-long external focus group meetings were held at the Faculty Center on the USC Campus, each meeting concentrating on one of the four strategic thematic areas. The focus groups consisted of active participants in USC Sea Grant research and outreach programs, representatives of client groups, representatives from state and federal agencies, and members of the





USC Sea Grant Advisory Board. At least one member of Sea Grant's management team, along with professional staff, participated in each session. Appendix G provides a list of focus group meeting participants.

USC's planning consultant presented each focus group background on their specific strategic thematic area and a list of questions to promote discussion (Appendix H). During the first half of the meeting, participants freely discussed the opportunities and obstacles facing their particular thematic area. They were then asked to come up with solid, prioritized goals and objectives for their thematic area. From the information gathered during these sessions, vision and goals/objectives statements were drafted for each thematic area. Finally, meeting participants were asked to review the resulting drafts for each strategic thematic area to assure that they accurately reflected the meeting discussions.

The USC Sea Grant strategic plan fits well with the University of Southern California's strategic plan, which calls for bringing the wealth of faculty and professional staff expertise to bear on the prob-

lems and opportunities presented by the Los Angeles metropolitan urban environment. That environment is, in effect, a "laboratory" for examining the issues pertinent to urban regions worldwide.





## USC SEA GRANT STRATEGIC THEMATIC AREAS

### WATER QUALITY AND COASTAL ECOSYSTEMS

#### **Vision**

A healthier urban ocean environment, reflected in cleaner coastal waters that afford better opportunities for recreation and commerce and the protection of human and ecosystem health.

#### **Background**

Intense urban development and the recreational activities of millions of Californians living in the coastal region have seriously altered and impacted the near-shore and off-shore ecosystems of the Southern California coastal zone. Wetlands have been filled in, and rivers and streams turned to concrete, resulting in rapid delivery of massive amounts of urban contaminants to recreational beaches and marine habitats. Channelized rivers and streams serve as direct conduits for runoff into the ocean, even during dry weather. Recurrent cycles of fires and floods cause high sediment and nutrient loads which flow into the coastal ocean. These non-point sources of pollutants are difficult to manage and present a wide range of unknown problems for both ecosystems and public health.



*Researchers from California State University Long Beach deploy nets at Seal Beach to capture and tag stingrays.*

Potential hazards to public and ecosystem health from these inputs result in frequent water quality warnings or beach postings throughout Southern California. State and federal laws mandate testing waters to determine if the contamination standards have been exceeded. Standard bacterial monitoring tests for the presence of fecal coliforms, total coliform and enterococcus, but does not indicate the actual presence of pathogens potentially harmful



to human health. While bacterial indicators are currently considered the best indicators of public health risk, it would be preferable to managers and scientists to find the pathogens most likely to cause illness and to have testing methodologies that provide authorities with the information on those pathogens in sufficient time to warn the public.

The Southern California region has one of the largest sewage effluent systems in the country: more than 1 billion gallons per day reach the ocean from the White's Point (Los Angeles County), Hyperion (Los Angeles City) and Orange County sewage treatment plants, and Point Loma (San Diego County) sewage treatment plant contributes another 300 million gallons more per day. Pollution problems

**THESE NON-POINT SOURCES OF POLLUTANTS ARE DIFFICULT TO MANAGE AND PRESENT A WIDE RANGE OF UNKNOWN PROBLEMS FOR BOTH ECOSYSTEM AND PUBLIC HEALTH.**

in this region can be severe. For example, before it was outlawed in the 1960s, over 200 metric tons of DDT was

deposited in the sediments of the Palos Verdes Shelf, creating significant impacts on the coastal marine ecosystem, which persist to the present time.

This is important because it is not only the public's health that is at risk but also the health of marine ecosystems. People can protect themselves by avoiding the water when it has been contaminated, but the organisms that live in the marine environment do not have this choice. The only way to fully protect the fragile marine ecosystem is to prevent the influx of pollution. Achieving such protection continues to challenge scientists working to accurately identify and eliminate the influx of non-point source pollution. Baseline data for present-day Southern California marine ecosystems and working models of the structure and dynamics of these ecosystems are needed to assess both natural and human induced changes. Furthermore, studies must advance beyond single species management and invest in long term ecosystem-level research to better understand the complex interacting factors critical to healthy ecosystems and restoration of degraded habitats.



### Protecting Public Health

#### **Goal**

1. Protect public users from potential health risks associated with swimming in coastal waters, consuming seafood, and other recreational users.

#### **Objectives**

Develop better rapid water quality indicators and source tracking tools.

Develop methodologies to decrease risk of human illness through consumption of contaminated fish and shellfish.

Identify and determine effects of contaminants and biological agents of concern to human health and the health of marine organisms.

Create mechanisms, e.g. geographic information systems (GIS) for simplifying the distribution of water quality information for policymakers and the public.

Develop unique tools for informing the public about health risks related to coastal recreation (i.e., swimming and consuming seafood) in areas of poor water quality.

Make better information on water quality and coastal ecosystem health and dynamics more readily available to local governments to improve policies and management decision making.

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THE ONLY WAY TO FULLY PROTECT THE  
FRAGILE MARINE ECOSYSTEM IS TO  
PREVENT THE INFLUX OF POLLUTION.

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### Understanding Pollution

#### **Goal**

2. Improve understanding of the content, fate, and effect of point and non-point source discharges in urban watersheds.



#### **Objectives**

Identify and evaluate the sources and processes controlling behavior, fate and impact of pollutants in aquatic systems.

Investigate groundwater, including septic system, contributions to near-shore pollution.

Understand the role of wetlands in mitigating storm water flow and clarify the importance of wetlands water quality to the wetland ecosystem.

Assess the presence of contaminants in aquatic ecosystems; assess effects and potential mitigation measures.

Develop methods to accurately determine the assimilative capacity of receiving waters.

Help develop architectural design principles for runoff mitigation planning and inform the public about sustainable development design.

### Assessing Impacts on Marine Life

#### **Goal**

3. Develop new methods and approaches for assessing the conditions (health, changing distributions and abundances) of coastal marine life.

#### **Objectives**

Assess the impacts of urban storm-water pollution on the near-shore marine environment.

Determine responses of marine organisms to contaminants and pathogens. Develop effective bio-indicators of contamination.

Understand marine life-habitat interactions at the local level and improve understanding of population ecology for habitats important to Southern California.



Determine the patterns, causes, and implications of changes in coastal population of marine species and marine biodiversity in response to ocean regime shifts and naturally occurring events such as El Niño Southern Oscillation (ENSO).

#### **Understanding and Protecting Ecosystems**

##### **Goal**

4. Improve understanding of the dynamics of coastal ecosystems in urban watersheds, as they respond to ocean climate change and other natural events as well as to anthropogenic activities.

##### **Objectives**

Investigate and assess the contribution and impacts of aerial deposition and impacts of contaminants to aquatic systems.

Support observations and studies of long-term trends and effects of oceanic events such as sea surface warming, sea level rise and anthropogenic activities such as introduction of exotic species.

Determine the reach and/or range of urban impacts on coastal ecosystems.

Accurately determine source contributions and effective methods to reduce loadings, to contribute to the identification of Total Maximum Daily Loads (TMDLs) for municipal and state authorities.

Improve understanding of the impacts of invasive species, harmful algal blooms and artificial reefs.

Determine the effects and effectiveness of Marine Protected Areas (MPA) including socioeconomic effects, and develop methods and approaches for MPA evaluation.



#### **SOCIETY AND COMMERCE**

##### **Vision**

Balance the robust economic opportunities of the ocean with safeguards to ensure the continued sustainability of marine resources.

##### **Background**

The coastline has become host to a wide range of uses: huge seaports, millions of beachgoers on more than 100 miles of sandy beaches, commercial and recreational fishing docks and fish markets, sewage-disposal plants and electric generating stations, residential use, and military facilities, all present coastal planners and managers with an almost insurmountable array of conflicts and issues. Since World War II the area has become the major West Coast seaport yet it has also supported an increasing population of residents and visitors. Accompanying economic growth of the area has been competition for uses of the coastline for housing, recreation and commerce.

California's ports and harbors are a central component of the coastal economy of the region. Ninety-five percent of international trade arrives by sea into United



States ports, and Southern California is home to the two largest commercial ports in the country. In all, California's six major ports (Oakland-San Francisco, Los Angeles-Long Beach, Port Hueneme and San Diego) process about 70% of all ocean freight handled on the West Coast (by tonnage). The Ports of Los Angeles and Long Beach have the third largest volume of imports and exports in the world; moreover, cargo loads are anticipated to triple by the year 2020. The impact of this growth will affect air quality, water quality, the land transportation system and the area's population. Port managers and environmental regulators



struggle to find methods of limiting the impacts of huge port operations on the environment.

**THE IMPACT OF A TRIPLING OF PORT-RELATED COMMERCE WILL AFFECT AIR QUALITY, WATER QUALITY, THE LAND TRANSPORTATION SYSTEM AND THE AREA'S POPULATION.**

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Approximately 50% of the vast volume of goods passing through Southern California's seaports has destinations outside of California. As a result, much of the cargo entering the ports also leaves the region either on trucks – for destinations closer than 500 miles – or on trains for more distant locations. The impact of those truck and train trips has a profound effect on the transportation network of the region: creating congestion, aggravating existing air pollution problems, deteriorating roadway surfaces, and causing collisions. University researchers are uniquely qualified to examine and recommend remedies for these modal-interface problems that often fall between the jurisdictions of mode-specific transportation planning agencies.

In addition to the more traditional seaport management issues, all U.S. seaports now experience concerns over heightened security. Responding to the need for additional security, the entire cargo handling and documentation system is currently undergoing redesign on an international basis. University researchers can also assist this vital industry in the redesign of its systems to meet the enhanced security needs of the US and its worldwide trading partners.

Seaport management includes consideration of the multiple uses of port facilities. One of those important uses is the commercial fishing fleet and the commercial fish market.

The commercial fishing industry has long been an important component of California's coastal economy. In 2001, more than 200 million pounds of commercial seafood was landed in the Los Angeles area, most of it through the commercial fish markets in the Port of Los Angeles.

Equally complex are the ecological and environmental dimensions of sustainable coastal development. This is especially



important with respect to recreation and tourism in California, yet have been little studied. The state's beaches contributed over \$27 billion to California's economy. According to one report, beach related spending (and multiplier effects) represented almost 3% of total California economic activity in 1995 and created over 500,000 jobs. But the true valuation of coastal tourism is not known. In the face of increasingly heavy tourism, maintaining attractive coastal destinations has become problematic. What are the impacts on California's valuable tourism industry from coastal development? How do we assess the value of coastal recreation and the non-consumable values associated with beach tourism – do the public's perceptions of environmental quality reflect the actual safety of bathing waters and beaches? What is the relationship between the continual crowding of coastal areas and their value to users? These are important questions for the citizens and public policy makers in California, as well as in the rest of the nation.

**Ports and Harbors**

**Goals**

1. Develop an environmental and eco-

nomics research agenda for environmentally sustainable ports.

2. Contribute to efforts to enhance security at ports.
3. Provide leadership in understanding and addressing ports and harbor issues.



**Objectives**

Investigate issues of traffic prediction, rail capacity, storage capacity, hinterland transport, and cargo routing.

Support research that leads to a better understanding of air quality impacts of transporting goods via seaborne, rail or





truck transportation and evaluate the most efficient intervention points for reducing emissions.

Provide assistance to planners as ports prepare to expand capacity, including research on "green" port technologies.

Provide outreach to support and disseminate information on new methods and protocols for enhancing public safety and the security of cargo at ports and harbors.

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Partner with the ports to better educate the public (e.g., K-12 schools, local community and government) about port operations and their vital importance to the nation.

Expand existing programs and develop new educational materials for shippers on ballast water issues and remediation efforts.

Support research on the impacts of dredging and the deposition of contaminated sediments from upstream and port-based sources.

Support research aimed at developing cost effective beneficial uses for dredged materials.

Examine issues of wetland restoration and watersheds related to port growth and mitigation costs.

Partner with the ports to design and implement a graduate student internship program to support multi-disciplinary studies of port operations.

#### **Marine Related Business / Sustainable Development**

##### **Goals**

4. Assist Southern California regional authorities in enhancing environmentally and economically sustainable coastal tourism and recreational opportunities.

5. Provide accurate and bias-free, science-based information for reducing conflicts over existing and proposed uses of coastal space and resources.

6. Assist the Southern California commercial fishing industry to adapt to new environmental, regulatory and economic conditions that affect its viability.

##### **Objectives**

Educate the public about environmentally responsible tourism.



*Researchers from California State University Fullerton study the effects of trampling in a marine protected area in Orange County.*

Support research that examines ways to reduce recreation-induced damage to coastal ecosystems – tide pools, trampling, etc.

Study methods for determining the utility of "no-take" zones or other methods of reducing human impact.

Determine the importance of the ocean environment to ocean commerce (What are the economic impacts of a degraded ocean environment?).

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Support development of information on the economic value of Southern California coastal areas, and contribute to the development of valuation methods nationally.

Educate the public about major coastal environmental issues and assist decision makers to resolve debates on these issues among the public, regulatory agencies, businesses, multiple users and environmental groups.

Using the information that is obtained in ecosystem and coastal hazard research, help to create planning and development scenarios that fit within the limitations of urban coastal regions.

Hire an extension fisheries specialist to meet the needs of the commercial fishing industry.

Coordinate fishery issues with campus researchers and develop research to meet the needs of the industry and inform policies to facilitate its long-term viability.

Facilitate the flow of information between cognizant regulatory agencies and the Southern California commercial fishing industry.



## COASTAL HAZARDS AND PUBLIC SAFETY

### Vision

Provide a safer coastal environment, through better understanding of coastal processes, the impacts of urbanization on the coastline and their interactions with

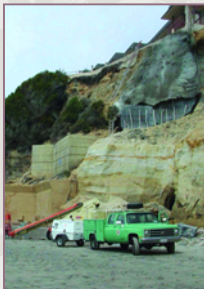
SOCIETAL COSTS FROM NATURAL DISASTERS ARE CLIMBING, BOTH NATIONWIDE AND WORLDWIDE, AS EXPANDING COASTAL SETTLEMENTS PLACE MORE PEOPLE AND PROPERTY AT RISK.

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coastal processes, and mitigating those impacts to protect life, property and ecosystems.

### Background

The world is more connected than ever and hazards that once were local are becoming regional and even global. Also, hazards are not always individual events, but often occur as interrelated events. Many coastal locations are exposed to long-term hazards such as chronic coastal erosion and rising sea-level. Superimposed on these hazards are shorter term flooding from El Niños or



seasonal storms, episodic erosion and bluff collapse, and rapid inundation, uplift or subsidence from infrequent tsunami and seismic events. Natural disasters are becoming a regular occurrence. The costs of these events to society are climbing, both nationwide and worldwide, as expanding coastal settlements place more people and property at risk.

As much as 85% of California's coast is eroding. In many areas, this is an immediate threat to coastal infrastructure and



development. Erosion itself can be a coastal hazard; for example, cliff erosion results in property loss from rock and mudslides. And an eroded coast is more vulnerable to flooding, tsunamis and other hazards.

Erosion is exacerbated by the declining sand supply to the coastline. Sand mining from coastal rivers, dunes, and beaches has provided much-needed construction material but has robbed coastal beaches of new sand. Dams and flood control structures block inland sand from reaching the coast. Once sand is at the coast, jetties, breakwaters and harbors change transport and deposition patterns. Additionally, sea-level rise is estimated to be 2.5-3.0 mm/year, and this may increase the damage to low-lying coastal lands during storms. This in turn accelerates erosion and associated habitat loss. Impacts of rising sea level include erosion, flooding, inundation, and saline intrusion into coastal aquifers.

It is important for Sea Grant to assist in the study and examination of ways to decrease the threats to public safety from these coastal hazards and to improve the health of our coastal beaches and water-

ways. Ways to address these issues are to enhance local communities' knowledge and skills to deal with coastal hazards, educate people to be good stewards of California's beaches and conduct research that adds to our basic knowledge of coastal hazards and their impacts.



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### Beaches

#### Goals

1. Provide leadership in understanding and addressing issues of safe access,



beach sustainability and restoration, beach ecosystem health and the economics of coastal tourism and beaches valuation.

#### **Objectives**

Solicit research and initiate outreach and education programs that ensure personal safety, reduce property and ecosystem damage and loss, and protect and enhance the strength of the sector of the California economy dependent on coastal recreation.

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Support research focused on understanding and accurately assessing the economics of coastal tourism.

Sponsor a workshop that will address questions surrounding sediment compatibility and forge a focused joint research program to establish appropriate standards.

Develop cost effective means of screening sand for potential contaminants (i.e., munitions)

#### **Mitigating Coastal Hazards**

##### **Goal**

2. Provide local and regional govern-



ments with information and tools to better understand and anticipate natural coastal hazards.

#### **Objectives**

Provide and update accurate information on climatic patterns such as El Niño and La Niña, and prepare property owners for severe winter storms.

Publish information on wave transformation coefficients for Southern California as a tool for engineers to more accurately predict coastline wave heights.



Understand the mechanism(s) responsible for bluff failure and assist in the development of Best Management Practices for bluff management.

Inventory and disseminate information on multi-hazard concerns (e.g., sea-level rise, tsunamis, earthquake, slides, erosion) and hazard responses.

Identify and disseminate information on tsunami inundation zones in California.

Develop risk indices tied to geographic regions and at-risk groups.

Better inform the public about watershed management and the impacts of water diversions on shoreline nourishment.

Work with academic engineering programs to foster recruitment and training of coastal engineers.

#### **Protect Local Communities**

##### **Goal**

3. Develop programs to assess and improve the effectiveness of current community hazard programs to address individual and cumulative hazards.



#### **Objectives**

Increase public education and awareness of impacts of coastal development to promote better land management and usage.

Create and maintain an index of coastal protection measures that can be used to inform the public and local governments about potential coastal hazards.

Educate communities and current owners of high-risk property about their risks, the consequences of natural hazards, and inform them of the various government programs that can provide some protection or hazard mitigation.

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## EDUCATION

### **Vision**

Improve marine science literacy in California and the nation by making marine science content accessible to diverse audiences.

### **Background**

Many Los Angeles students and their families have little knowledge or familiarity with the ocean, yet live in one of the largest coastal cities in the world. Reaching students early in their learning lives is vital to their long-term success as students and citizens. Through K-12 educational programs USC Sea Grant has the opportunity to guide these constituents to a better understanding of their connections with the coastal environment, to increase their knowledge and interest in science, to teach them stewardship concepts, and to help them become aware of professional opportunities in the fields of marine science, coastal management and ocean policy. In the urban environment, reaching large numbers of underserved students and adults from diverse socioeconomic and ethnic backgrounds is not only the primary challenge but also a premier opportunity.



In partnership with the University of California at Los Angeles and 5 informal science partners, USC Sea Grant has received a \$2.5 million National Science Foundation grant to create "COSEE-West" a regional Center for Ocean Science Excellence in Education (COSEE). The Center, one of 7 regional centers nationwide, will facilitate catalytic multi-dimensional partnerships between ocean science researchers and educators and network marine science education throughout the Southern California region and beyond.

Teachers are a vital component in the learning process. Providing teachers, especially new teachers, with appropriate resources can help overcome shortcomings in science content knowledge in primary and secondary teacher education. The lack of availability of educational programs, teaching methods, and curriculum materials in marine science that can be used in science courses and are clearly related to the current science standards is problematic. Yardsticks for measuring success in science education differ widely across regions, the country, and within the various interrelated disciplines of marine science.



**IN THE URBAN ENVIRONMENT, REACHING LARGE NUMBERS OF UNDERSERVED STUDENTS AND ADULTS FROM DIVERSE SOCIOECONOMIC AND ETHNIC BACKGROUNDS IS NOT ONLY THE PRIMARY CHALLENGE BUT ALSO A PREMIER OPPORTUNITY.**

At both the regional and national levels ethnic minorities and women are under represented as science majors at the university level and in marine science careers. USC Sea Grant strives to narrow these gaps in minority and gender repre-



sentation in scientific research and employment. USC Sea Grant is providing mentoring programs, internships, research opportunities and programs to increase awareness of marine career opportunities.

Sea Grant helps expose undergraduates and graduate students to science addressing pressing local, regional and national issues. The Sea Grant Trainee Program offers graduate students opportunities to participate on funded research projects, most often connected with thesis or dissertation research, and to present their own research findings in a variety of venues. Graduate fellowship opportunities in Washington D.C., on Capitol Hill or with NOAA and other agencies, provide real-world exposure to the nexus of science and policy. The Dean John A. Knauss Marine Policy Fellowship, for example, allows students to gain a unique understanding of the policy decision process by providing an unparalleled experience of directly participating in the policy decisions affecting coastal and ocean resources.

Sea Grant education focuses on the next generation — through enhancing K-12 science education, improving teachers' knowledge and science teaching skills, and supporting opportunities in post-secondary years both through university based programs and free-choice learning.



#### K-12 Level

##### **Goal**

1. Bring marine science education and learning opportunities to underserved students and adults from diverse socioeconomic and ethnic backgrounds with a special focus on inner city and underserved populations.

##### **Objectives**

Through COSEE, serve as a center of compilation and dissemination of marine science information and educational opportunities for teachers, students, underrepresented and intergenerational audiences and the general public.

Establish ongoing programs for "young women-in-marine-science."

Develop and disseminate additional marine science career information and activities, including those that are culturally appropriate, to school counselors (e.g., secondary education counselors) and others.

Develop collaborations with museums and aquariums to create and disseminate age, site, and culturally appropriate science educational materials that

allow children of all ages to gain knowledge.



Cooperate with appropriate school districts and county or state offices of education in reaching students and teachers.

Address issues of gender/minority gaps in the science community via innovation and expansion of curriculum projects.

##### Teacher Education and Support

##### **Goals**

2. Support increased marine science literacy and accessibility for teachers.

3. Support teachers in using scientific data as an educational tool.

4. Enable teachers to create and implement standards-based lessons through marine science.



### Objectives

Create appropriate workshops to help teachers bring marine science into the classroom; design some workshops specifically for new teachers.

Provide online workshops that not only help teachers with science content but also enhance technological skills by targeting access and use of data in the classroom.

Help teachers to understand the environmental impact on the marine environment of the urban area.

Assess the effectiveness of educational programs, teaching methods, and curriculum materials in marine science.

Provide up-to-date, easily accessible (and standard correlated) marine science data, information and recent research to teachers (via online site, email newsletters, CDs etc) and offer support in accessing and using this information.

Assist teachers in meeting required science standards (and other standards where appropriate, e.g., math, literacy, geography) by teaching their required curriculum through the marine science lens.

Collaborate on a national level (via COSEE and other Sea Grant programs and agencies) to develop a set of standards and benchmarks for marine science knowledge.

### Intergenerational Learning

#### Goals

5. Increase understanding of marine and environmental science and the links with policies in students of all ages and improve connections among parents, students and teachers.

6. Enhance parent involvement in their child's learning experience.

#### Objectives

Develop sustainable school/community-based programs that foster parent-student cooperative learning.

Continue to involve adult learners, parents especially, in field trip programs.

Incorporate culturally appropriate science and environmental content in order to reach a diverse population.



### UNDERGRADUATE EDUCATION

#### Goal

7. Provide undergraduate students with opportunities for involvement in marine science and the community.

#### Objectives

Involve undergraduate students as liaisons to K-12 classrooms.

Provide opportunities for students to gain practical experience in the science and policy arenas through internships with public and private-sector organizations and businesses and informal science centers.

Engage undergraduate women as mentors/counselors for "young women-in-science" summer field programs.

Inform undergraduate science majors of opportunities for careers in marine science, management and policy.

### Graduate Education

#### Goal

8. Enhance graduate students' opportunities to pursue research and career goals in marine science and policy.

### Objectives

Expand Sea Grant Trainee program to offer increasing numbers of research opportunities in marine science and policy.

Foster connections among graduate students and the research community to maximize opportunities for participation in research and management.

Increase participation in the John Knauss Marine Policy Fellowship program, and in other federal and state fellowship and internship opportunities.

Foster graduate student connections to K-12 education and free choice education as marine science mentors and guest speakers in K-12 schools, informal education venues and outreach programs.



Visitor Dock at Two Harbors, Catalina Island

## S U M M A R Y

The USC Sea Grant program has a vital role in promoting the understanding, sustainable development and conservation of the coastal environment of Southern California in the face of burgeoning urban growth. The Strategic Plan provides an overall vision for the future and will guide our efforts over the next five years. The Plan is intended to provide a framework on which to build our programming and research agenda as we advance the program's size and reach.

As a program linking academic institutions with policy makers, stakeholders, and the public, Sea Grant is both a leader and integrator, facilitating forward looking research that both provides and responds to early warnings about environmental challenges. By catalyzing scientists to anticipate future needs, and providing policy makers with the best information available, Sea Grant supports advanced science applied to the wise use and protection of coastal resources, and fosters educational endeavors to ensure the support of a science literate and environmentally aware public.

As integrator, Sea Grant can bring researchers, managers and users together



to address important emerging issues. As an honest broker Sea Grant can provide an open forum for the exchange of ideas, the development of new problem solving techniques, and the organization of scientific inquiry to resolve emerging conflicts over scarce and valuable resources.

As we implement this strategic plan, we will continue to work with outside partners to bolster our ability to address the range of problems associated with the Urban Ocean. We will work with institutions that we serve and seek new partners in government and private enterprise to help direct new resources to important areas, and to foster a dynamic and creative approach to advance marine research and create constructive solutions to difficult and divisive resource problems.





## APPENDIX A: USC Sea Grant Research Review Process

### Sea Grant Advisory Council

Provides input on USC Sea Grant research priorities for the biennial Call for Proposals.

### Call for Preliminary Proposals

Issued early in the year (January/February) biennially. Includes information on Sea Grant research priorities relevant to the "Urban Ocean" theme, and the State of California Resources Agency Sea Grant Advisory Panel (RASGAP) Statement of Research Needs.

### RASGAP Review of Preliminary Proposals

Proposals are scored on the basis of relevance to State needs in March/April. A score of 1 indicates top priority for funding from the state, 2 is acceptable for state funding, 3 indicates the project is unacceptable for receiving funding from the state. USC Sea Grant's policy is not to fund projects that have received a RASGAP rank of 3.

### Sea Grant Academic Coordinating Committee Review of Preliminary Proposals

This panel considers the quality of the science proposed and its relevance for the USC Sea Grant program theme; along with the scores from the RASGAP Review and the participation of a RASGAP member. Ranking of preliminary proposals for determining requests for full proposals.

### Request for Full Proposals

The Sea Grant Director and Associate Director consider rankings provided by the Academic Coordinating Committee and RASGAP. Potential principal investigators are invited to submit full

proposals and provided the full set of proposal requirements and forms.

### Peer Review

Upon receipt of full proposals, requests for peer reviews are sent to reviewers, followed by phone calls to confirm that reviews will be conducted.

### Technical Review

USC Sea Grant assembles a panel of Technical Reviewers, most of whom are from outside of California, or have specific expertise in areas represented in full proposals. The panel assesses the proposals, along with the set of peer reviews and ranks them in terms of scientific quality, capabilities of potential principal investigators, and relevance to USC Sea Grant priorities and issues of importance to Southern California and the nation.

### RASGAP Review

Full proposals are again reviewed by the State RASGAP committee, which again ranks them with respect to State research priorities.

### Funding Decisions

Funding decisions are made after consideration of all reviews and rankings, determination of funding resources and assembly of collaborative relationships and matching funds. Principal investigators are informed of decisions.

## APPENDIX B: HUNTINGTON BEACH: Recommendations

Our first review of Huntington Beach contamination studies provides an excellent example of one of the ways we build our research agenda.

Beach closures due to high levels of indicator bacteria in the summer of 1999 were the subject of a USC Sea Grant-initiated technical review in February 2000. As part of that review, the expert panel developed recommendations for long- and short-term research to better understand and thus prevent similar occurrences. The panel based their recommendations on questions such as: How can we prevent similar closures in the future? Were the right studies conducted and the data properly interpreted? What future studies should be conducted to forestall large contamination events from recurring? Lessons learned here can inform other urban coastal cities facing similar problems.

### Examples of Near-Term Studies

Nearshore hydrodynamic processes — mechanisms that transport water-borne contamination along shore. Include dye releases, nearshore transport measurements and modeling.

Marsh dynamics; role of marsh as source of bacteria.

Plume model for Orange County Sanitation District offshore discharge.

### Examples of Longer-Term Studies

Better source characterization methodologies.

Develop rapid detection techniques to improve speed and accuracy of monitoring programs.

Understand the relationship between indicators and pathogens.

Better nearshore transport models.

Create better characterization of urban runoff sources.

Understand the role of marshes in bacterial dynamics.

Study the adherence of bacteria to particles and surface films.

### Lessons Learned for Huntington Beach and Beyond

Contingency planning: identify roles and responsibilities; decision tree/database/ organization structures.

Comprehensive monitoring program including upstream watersheds.

Routine maintenance of infrastructure — sewage pipelines and equipment, beach based amenities, etc.

Professional analyses by experts.



## APPENDIX C: Implementation of the 1994-99 Long Range Plan

27 SC Sea Grant's previous Long Range Plan (1994-99) covered four thematic areas, in addition to outreach and education. With relative limitations in terms of staff and resources, we adopted an "evolutionary" approach to program development, in which specific thematic issues took priority in funding efforts while secondary attention was paid to other areas. The four basic topical areas, in order of priority, were:

- Environmental Quality
- Public Health and Safety/Coastal Hazards
- Public Access and Recreation
- Coastal Commerce and Economic Development

Among these, environmental quality and public health were the most pressing regional problems. Non-point source pollution from urban storm drains and river discharges from urban watersheds were the focus of research efforts. Oceanographers developed new methods for tracking non-point source plumes in a multi-agency funded study that examined the impacts of storm-water on Santa Monica Bay. New technologies for revealing the presence of viruses from human sources have yielded more efficient tools for assessing hazards to public health for swimmers and surfers.

Other studies on the impacts of storm water were directed at an examination of heavy metals and other toxins in colonies of endangered least terns in Orange County's Bolsa Chica wetlands, and at groundwater inputs into the coastal ocean. USC Sea Grant work on storm-water and urban runoff continues with studies of contamination at Huntington Beach and in Santa Monica Bay.

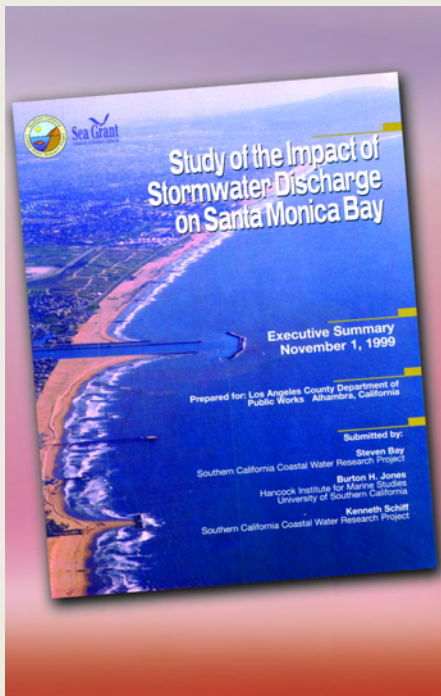
A study of DDT off the Palos Verdes shelf revealed the continuing re-suspension of DDT's and PCB's in the water column, one of the studies that led to the designation of the region offshore of Palos Verdes as an Environmental Protection Agency "SUPERFUND" site. Further studies have examined the presence of these contaminants in San Diego Bay.

In the area of coastal hazards, studies of sea level rise in California and Maine analyzed the potential hazards to low-lying coastal communities using possible inundation maps coupled with demographic information. Researchers conducted focus studies with stakeholder groups and developed protocols to assist planners, developers and other municipal authorities in predicting the level of possible inundation due to storms and tides in a variety of sea level rise scenarios. A handbook for planning is currently underway.

During the severe El Niño period in 1997-98 Sea Grant provided information for coastal landowners and coastal businesses on the potential impacts of storms on coastal properties. In cooperation with the California Coastal Commission, web pages offered specific guidelines for preparing for winter storms. Sea Grant also conducted an online workshop for educators on El Niño, in order to provide accurate, science-based information during a time when a great deal of media attention was focused on the potential impacts from El Niño storms.

A suite of studies on the human impacts of beach visitation in marine refuges yielded important results about the lack of effectiveness of the refuge and marine reserve system in California. These have been widely cited and were used in the development of new state and federal legislation for designing and managing marine protected areas. Studies of trampling by visitors led to the development of an educational video aimed at school groups planning tidepool visits and other recreational visitors.

A study on the cultural attitudes toward marine wildlife was conducted, as a means to help museums and aquariums, as well as naturalist programs at state and county parks, to develop educational materials for diverse audiences. Other work on marine recreation and tourism through our outreach programs included a course in "panic prevention" for operators of marinas, and advisories on our web-based "Guides to Beaches" on swimming and beach safety.





#### APPENDIX D: USC Sea Grant Advisory Council

**Gary Bane**  
Nauticos/Ocellus Productions Division  
Santa Barbara, CA

**Melinda Bartlett**  
Environmental Affairs Department  
City of Los Angeles, CA

**Norman Bartoo**  
National Marine Fisheries Service  
La Jolla, CA

**John Dorsey**  
Loyola Marymount University  
Los Angeles, CA (formerly Storm Water  
Management Division, City of Los Angeles)

**Dennis Eschen**  
Department of Parks, Recreation & Marine  
City of Long Beach, CA

**Leslie Ewing**  
California Coastal Commission  
San Francisco, CA

**Mark Gold**  
Heal the Bay  
Santa Monica, CA

**James Hastings**  
Consultant, Marine Education  
Los Angeles, CA

**Robert Kleist**  
Evergreen International (USA) Corp.  
San Pedro, CA

**Geraldine Knatz**  
Port of Long Beach  
Long Beach, CA

**Charles D. Kopczak**  
California Science Center  
Los Angeles, CA

**Michael Lyons**  
Regional Water Quality Control Board  
Los Angeles, CA

**Alan Mearns**  
NOAA HAZMAT Response Division  
Seattle, WA

**William McComas**  
Rossier School of Education  
University of Southern California  
Los Angeles, CA

**Craig A. Moyer**  
Manatt, Phelps & Phillips, LLP  
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**Karl F. Nordstrom**  
Institute for Marine & Coastal Studies  
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New Brunswick, NJ

**Victor Omelczenko**  
Public Relations, United States Department of  
the Treasury, Internal Revenue Service  
Los Angeles, CA

**Fred Piltz**  
Minerals Management Service  
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Camarillo, CA

**Dorothy Soule**  
Hancock Institute for Marine Studies  
University of Southern California  
Los Angeles, CA

**Gaang-yu-Wang**  
Santa Monica Bay Restoration Project  
Los Angeles, CA

**Stephen Weisberg**  
Southern California Coastal Water Research  
Project  
Westminster, CA



#### APPENDIX E: USC Sea Grant Academic Coordinating Committee

**Anthony F. Michaels**  
Director, Wigley Institute for Environmental  
Studies, University of Southern California  
Los Angeles, CA

**Bernard Bauer**  
Chair, Department of Geography, University of  
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**Suzanne Edmands**  
Assistant Professor, Department of Biological  
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**Kenneth Nealson**  
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Department of Earth Sciences  
University of Southern California  
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**Joseph Deviny**  
Former Dean of Academic Affairs and Professor  
Civil/Environmental Engineering  
University of Southern California  
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**Judith Kildow**  
Senior Research Professor  
Wigley Institute for Environmental Studies  
University of Southern California  
and Research Faculty, Gund Institute for  
Ecological Economics, University of Vermont,  
Vermont

**Rick Pieper**  
Director, Southern California Marine Institute  
Terminal Island, CA



## APPENDIX F: California Resources Agency Sea Grant Advisory Panel



### PANEL MEMBERS

**Brian Baird**  
Resources Agency of California  
Sacramento, CA

**Hon. Harold Wayne**  
California State Assembly  
Sacramento, CA

**Hon. Bruce McPherson**  
California State Senate  
Sacramento, CA

**Gary Bane**  
Nauticos Ocellus Productions Division  
Santa Barbara, CA

**Reinhard Flick**  
California Department of Boating & Waterways  
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**Peter Douglas**  
California Coastal Commission  
San Francisco, CA

**Eric H. Knapp**  
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Marine Resources Division  
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**Timothy J. Mulligan**  
Department of Fisheries  
Humboldt State University  
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**Francis Palmer**  
State Water Resources Control Board  
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**Darryl Young**  
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**Justin Malan**  
California Aquaculture Association  
Carmichael, CA

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**Margy Cassell**  
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**Susan Williams**  
Rodgers Bay Marine Laboratory  
University of California  
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### ALTERNATES

**Ellin Miller**  
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**Susan Hanch**  
California Coastal Commission  
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**Robert Brodberg**  
Office of Environmental Health Hazard  
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**Steven Saiz**  
State Water Resources Control Board  
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**Jacqueline E. Schaler**  
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Sacramento, CA

**Kim Sterrett**  
California Department of Boating and Waterways  
Sacramento, CA

**Theodore Smith**  
California Department of Conservation, Mines  
and Geology  
Sacramento, CA



## APPENDIX G: Focus Group Meeting Participants

### WATER QUALITY AND COASTAL ECOSYSTEMS

**Ralph Appy**  
Director of Environmental Management  
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## APPENDIX H: Questions Provided to Focus Group Members

### QUESTIONS TO ASK WHEN CRITICALLY EVALUATING POTENTIAL FOR USC SEA GRANT FOCUS AREA

Below is a list of questions that were developed to assist in advancing the discussion regarding the scope of the focus area for use in the USC Strategic Planning process. The questions are divided into three general categories of assessment: the focus area; opportunities and partnerships; and goals and objectives. The purpose of the discussion was to frame the focus area, identify the opportunities presented by the focus area and possible partners, determine appropriate goals, to evaluate and prioritize those goals, and state achievable objectives.

#### ASSESSMENT OF THE FOCUS AREA

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Does the pursuit of this focus area add to the knowledge on the issue? Does it address areas of critical concern to the "Urban Ocean"?

Is the focus area important to the region and to USC Sea Grant's clientele?

Will Sea Grant support meaningfully contribute toward addressing the focus area? Will the focus area be unaddressed without Sea Grant involvement?

Is there a reasonable probability that meaningful progress can be made toward addressing the focus area within the typical funding limitations of Sea Grant?

Is there a reasonable probability that meaningful progress can be made toward addressing the focus area within the time frame of most Sea Grant projects (two to three years)?

#### ASSESSMENT OF OPPORTUNITIES AND PARTNERSHIPS

What is the potential size of the impact, in terms of the number of people and geographic reach?

Relative to the scale of the focus area, how much is already being invested by other entities?

Are the talent, expertise, and interest available in LA County and/or in the California region to address the focus area (both in academic institutions and agencies)?

Can opportunities for matching funds and/or partnerships be identified?

Is there an opportunity to diversify funding, increase the scope of work or communication of results on this focus area through strategic partnerships? If yes, what are they?

Might Sea Grant support for work in this focus area directly or indirectly enhance the talent base in marine and coastal issues in the state or the region?

#### Assessment of Goals and Objectives

Are the stated goals and objectives appropriate for making a meaningful contribution to this focus area?

Does pursuit of stated focus area goals provide a good opportunity for meaningful Sea Grant involvement in a new and important issue area?

Do the stated goals lead toward development of new concepts and tools to deal with the problems faced in this focus area?

Are there societal benefits or other products/results that flow from stated focus area goals and objectives?

Are the beneficial outcomes measurable in the three to five-year timeframe? If yes, how?

How should the stated goals and objectives in this focus area be prioritized?

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pp 5 (column 1), 13 - Los Angeles Virtual Ocean, Dale Kiefer, Simeon Ogil, USC

p 18 - Christopher Lowe Lab, California State University, Long Beach

p 27 - Steve Murray Lab, California State University, Fullerton

pp 28-31 Lesley Ewing, California Coastal Commission