

**University of Hawai‘i
Sea Grant College Program
Strategic Plan
2014 - 2017**

The University of Hawai‘i Sea Grant College Program (UH Sea Grant) supports and conducts an innovative program of research, education, and extension services toward the improved understanding and stewardship of coastal and marine resources of the state, region, and nation.

UH Sea Grant is one of 33 Sea Grant programs nationwide that comprise a functional network within our nation’s universities and colleges promoting enhanced understanding, conservation, and use of coastal and marine resources.

As part of the University of Hawai‘i’s prestigious School of Ocean and Earth Science and Technology (SOEST), UH Sea Grant partners with the National Oceanic and Atmospheric Administration (NOAA) to provide links among academia, federal, state and local government, industry, and the local community.

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PREFACE

In early 2012, UH Sea Grant faculty and staff, with assistance from our constituents, stakeholders, and other community members and partners, began work to update our strategic plan. This document is the result of those efforts and establishes our current, four-year work plan for Sea Grant and a reference for the community we serve, the people of Hawai‘i. While this document represents the next iteration of the UH Sea Grant Strategic Plan, it is a living document that will evolve continuously as Hawai‘i’s future unfolds.

INTRODUCTION

America’s invaluable coastal economic, cultural, and environmental assets are at risk. Increased rates of climate-related environmental changes have made coastal communities vulnerable in ways never before imagined. Changing coastal uses and habitat degradation can no longer be ignored. Fisheries, once a major component of America's coastal communities, now comprise only a minor part of our nation’s coastal economy. Heightened concerns about human health and safety are focusing greater attention on port security, coastal infrastructure deterioration, and seafood safety. As hundreds of thousands more Americans move to the coast every year, it is increasingly important that we find adequate ways to ensure that the built environment and the economies it supports operate within the capacity of coastal and island ecosystems. America must use its coastal land, water, energy, and other natural resources in ways that preserve the health and productivity of coastal ecosystems while optimizing benefits to U.S. citizens now and in the future.

According to the U.S. Commission on Ocean Policy report, the U.S. coastal zone contributed \$4.5 trillion to the U.S. economy in 2005. Port and harbor industries, tourism, and the petroleum industry are now by far the largest components of coastal economies in most of America. Also, more than half of the U.S. population now resides within 50 miles of the shoreline with a concomitant concentration of economic activity (Rappaport and Sachs, 2003). The challenges we face on our coasts clearly have significant implications for the nation as a whole, not just for those who live and work in coastal communities. Leaders at all levels—national, state, and local—must work with citizens, private sector businesses, and other organizations to utilize our intelligence, ingenuity, and financial resources to turn a time of potential crisis into a time of opportunity. As individuals and as a nation, we must take immediate steps to educate ourselves about the magnitude of the threats we face and respond to these in bold and creative ways.

The world around us is changing. Globalization of technology, people, finance, products, and decision-making means factors beyond our national borders are affecting the vitality of U.S. coastal communities and economies. Businesses are functioning in an increasingly competitive global economy and many policy decisions are taking place at an international level. The need for collaborative problem solving at the state, regional, national, and international levels has never been greater.

Severe challenges present the greatest opportunities for change and innovation, and Sea Grant is prepared to respond. Among the demonstrated strengths of state Sea Grant programs is the ability to move rapidly to mobilize universities and other partners to address challenges across the country and around the world. Likewise, a significant strength of the Sea Grant network is the ability, through the organization’s coordinated state and regional infrastructures, to implement the national goals of our

parent organization, NOAA at local, state, and regional levels.

At this time of risk and opportunity, the UH Sea Grant will address its goals with innovation and creativity, reflecting the particular needs of the people of Hawai'i's coastal communities.

1.0 NATIONAL PLANNING CONTEXT

The goals and strategies outlined here, while developed for use in Hawai‘i and the central Pacific, incorporate many of NOAA's national priorities: promoting sustainable practices in development and tourism; increasing resiliency to natural hazards; the accessibility and application of quality research to support wise decision-making; and expanding understanding about coastal ecosystems and their close linkages to the economy and built environment.

The urgent need for practical solutions to coastal problems requires coordination, cooperation, partnerships, and effective investment. Sea Grant provides NOAA access to Sea Grant’s university-based capabilities and resources to achieve mutual goals.

The University of Hawai‘i Sea Grant College Program, individually and via the National Sea Grant College Network continues to aggressively integrate our efforts with those of NOAA’s Coastal Services Center, the Office of Ocean and Coastal Resource Management, and the National Centers for Coastal Ocean Science, among others. Collaborative planning among these programs ensures that NOAA’s coastal programs are focused on national as well as local priorities, and that efforts are coordinated, outcome-oriented, and built around our program’s strengths. Additional NOAA programs will be brought into this effort to create a more inclusive coastal enterprise. Two of the focus areas of this plan, sustainable coastal development and hazard resilient coastal communities, lend themselves quite readily in advancing these integration efforts.

National Planning Process and Strategic Approach

The *NOAA National Sea Grant College Program Strategic Plan* establishes direction for the Sea Grant Network to address critical national needs in coastal, ocean, and Great Lakes environments. The plan capitalizes on Sea Grant’s unique capacities and strengths, allows for flexibility and creativity on the part of state Sea Grant programs, and supports many of the priorities in NOAA’s strategic plan.

The National Sea Grant strategic plan provides a guide for the work of the state Sea Grant programs, including the strategic plan of UH Sea Grant. UH Sea Grant remains committed to contributing to the realization of national goals while focusing on the specific needs, challenges and opportunities of Hawai‘i's people and their coastal ecosystems and resources.

2.0 HAWAI‘I PLANNING CONTEXT

Hawai‘i is the southernmost state in the nation. Composed of seven inhabited islands and 129 smaller islands, Hawai‘i possesses one of the longest marine coastlines in the U.S. at approximately 750 miles. The state’s mid-ocean location, 2,500 miles from the nearest continental landmass, offers challenges in communications, access, and commerce. These challenges are particularly severe in light of increasing energy costs and diminishing supply of potable water at home and abroad. Hawai‘i also faces environmental challenges and economic uncertainties that threaten stability today and for generations to come. In Hawai‘i, the nation’s only island state, in which all land and the entire population is coastal; the issues and challenges facing coastal communities across the country are amplified. What we do as a community in facing these challenges and the lessons learned have applicability to our sister coastal and island communities around the U.S.

Of a total state population of nearly 1.4 million (2010 census), approximately 953,000 people or 72 percent live on O‘ahu, within the City and County of Honolulu. In contrast, approximately 185,000 people reside on the Island of Hawai‘i. Together, the islands of Maui, Moloka‘i, and Lana‘i are home to nearly 155,000 people, with just 67,000 on Kaua‘i. Hawai‘i’s coastal communities range from ultra-urban to decidedly rural. Hawai‘i’s economy is based principally on tourism, military spending, and development. Hawai‘i’s visitor population has averaged about 165,000 persons per day with half of these on O‘ahu at any one time.

The challenges to our state are daunting and compounded by its geographical isolation. In an economy driven by tourism, the environment is the economy. Great care is required to ensure that coastal development does not diminish this valuable resource (the environment). Clearly, this is an immense, vital task requiring commitment from users as well as partnerships across academia, government, and communities. The increasing cost of fossil fuels, together with local limitations in water and in phosphate deposits internationally (the latter upon which large-scale agricultural fertilizers depend), argue for a long-view toward a sustainable economy that uses and protects Hawai‘i’s environmental assets (including water and energy), supports our people, and leads to greater energy and food self-sufficiency.

UH Sea Grant has served the people of Hawai‘i for over 40 years through leadership in coastal and marine resource stewardship and research. Congress established a Sea Grant institutional program at the University of Hawai‘i in 1968 and in 1972 designated it as a Sea Grant College Program.

UH Sea Grant resides within the University of Hawai‘i’s School of Ocean and Earth Science and Technology, a premier national marine sciences institution. At present, UH Sea Grant serves the entire University of Hawai‘i system supporting projects and students on the flagship Mānoa campus, at the University of Hawai‘i at Hilo, Maui College, and at its six Community Colleges, as well as American Samoa Community College and the College of the Marshall Islands.

Hawai‘i Planning Process and Strategic Approach

The UH Sea Grant 2014-2017 strategic plan is a living roadmap crafted from the collective needs, opportunities and wisdom of our coastal community constituents and stakeholders. The information included in the plan is derived from many sectors over several years using a variety of engagement models to ensure broad representation. UH Sea Grant extension and research faculty, administration and staff, all participate actively with our stakeholders and constituents to identify both the most pressing challenges as well as opportunities facing our island state. Formal and informal meetings are held regularly to obtain input; written comments and guidance are also solicited on a continuing basis. As an organized research unit of the University of Hawai‘i at Mānoa, UH Sea Grant’s 2014-2017 Strategic Plan was also guided by the *Mānoa Strategic Plan* and the *Mānoa Institutional Proposal*.

Facilitated strategic planning meetings and numerous topically focused small-group and individual discussions are conducted specifically to address each of the four Focus Areas. These meetings are largely organized around UH Sea Grant Centers of Excellence, which are the operational expressions of Focus Areas. We seek and receive guidance at these meetings from a diversity of individuals which include UH Sea Grant Advisory Council members, university faculty, representatives from federal, state, and community government, elected officials, Hawai‘i business leaders, and

representatives of private foundations as well as community members at large. In particular, Advisory Council members are engaged on a routine basis to continually gauge the pulse of our community and provide information and guidance to achieve a continuously relevant and updated strategic plan.

As described above, the National Sea Grant College Program embarked on a concurrent strategic planning exercise for 2014-2017. Parallel planning activities of the National Sea Grant College Program allowed UH Sea Grant to align our efforts with the National Sea Grant Office. Strategic plan focus areas and cross-cutting themes herein are Hawai‘i’s expression of the National Sea Grant Focus Areas.

Importantly, the UH Sea Grant 2014-2017 strategic plan is informed by the Hawai‘i Ocean Resources Management Plan (ORMP). The ORMP is a statewide plan mandated by Chapter 205A of the Hawai‘i Revised Statutes. The scoping and participation conducted in the updating of the ORMP in 2012 involved extensive outreach and input gathering with participation of various stakeholder groups, government agencies, and the public over a period of 18 months. The ORMP is an integrated, place-based approach to management of ocean resources, based on land and sea links, the role of human activities, and improved collaboration in governance.

3.0 OUR VISION AND MISSION FOR 2017

VISION

The National Sea Grant College Program envisions a future where people live along our coasts in harmony with the natural resources that attracted and sustain them. This is a vision of coastal America where we use our natural resources in ways that capture the economic and recreational benefits they offer, while preserving their quality and abundance for future generations.

This vision reinforces the vision articulated in NOAA’s Strategic Plan: “. . . an informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions.”

MISSION

Sea Grant’s mission is to provide integrated research, extension, and education activities that increase citizens’ understanding and responsible use of the Nation’s ocean, coastal, and Great Lakes resources and support the informed personal, policy and management decisions that are integral to realizing this vision.

Sea Grant advances NOAA’s mission “. . . to understand and predict changes in Earth’s environment and conserve and manage coastal and marine resources to meet our Nation’s economic, social, and environmental needs.”

Core Values

UH Sea Grant activity is based on a strong rationale, demonstrated scientific and educational merit, and the production of results clearly useful to citizens with applications in industry,

management, or science. The following are six core values by which UH Sea Grant realizes its mission and vision.

Excellence. Research is funded on a competitive basis held to the highest standard, with scientific merit and student education as major evaluative criteria. Extension activities are research and stakeholder driven and based on annually reviewed extension faculty work plans. Communication efforts utilize the latest information and social networking technology together with various other appropriate methods to achieve maximum output, visibility, and citizen receipt of science-based information generated by researchers and extension faculty.

Relevance. Research, extension, and education activities are aligned with goals and strategic priorities identified in consultation with our program partners and stakeholders in Hawai‘i together with the National Sea Grant College Program priorities.

Participation. High value is placed on the involvement of university faculty, stakeholders, industries, community groups, citizens, and a large number of participating institutions in integrated research, education, and extension activities. Graduate students are actively and meaningfully engaged in funded research and outreach projects.

Accountability. External and internal processes are used to measure program accomplishments. These include identifying the contribution of scientific discoveries to society, measuring how citizens respond to education and outreach programs with increased knowledge or through changes in behavior, and determining the economic impact resulting from Sea Grant supported projects.

Connection with Users. A strong advisory process is used to guide overall program direction, to inform research efforts, to plan extension activities, and to gauge program impacts. It also is used to build public and private support for UH Sea Grant.

Partnerships. Collaboration provides strong potential to leverage existing activities and synergistic outcomes and is a nationally-recognized strength of this program. Partnerships can more effectively address stakeholder needs and demonstrate community acceptance of program activities, which provide a path toward effective and long-lasting impacts that result in behavioral change benefiting the people of Hawai‘i.

4.0 FOCUS AREAS

Over the next four years, UH Sea Grant will concentrate effort in four areas: **Sustainable Coastal Development, Hazard Resilient Coastal Communities, Sustainable Coastal Tourism, and Sustainable Aquaculture and Fisheries.** These four interrelated foci emerged from the national and regional strategic planning process as areas of critical importance to the health and vitality of Hawai‘i’s coastal resources and communities. They respond to issues of major importance to NOAA, are consistent with the work of the NOAA coastal program integration effort, and are topical areas in which Sea Grant has made substantial contributions in the past; position UH Sea Grant to make significant contributions in the future; and are driven by the following overarching principles/realities:

- 1) Except for the direct extraction of fish from the ocean, most of the issues that we face on the water side of the shoreline are caused by what we do on the land;
- 2) The economy and the environment are inseparably linked;
- 3) Coastal uses and their importance to the economy have changed dramatically in the last 40 years (e.g., the economic value of the nation's fisheries now pales to that of tourism);
- 4) Coastal America is facing the end of non-renewable resources including oil and phosphate deposits;
- 5) Successful adaptation to climate change is essential to maintain the health of the environment and the economy; and
- 6) The human resources that our research, education and outreach activities generate are among the most important, long-term assets produced through Sea Grant investment.

In each of the four focus areas, UH Sea Grant has identified goals to pursue and strategies designed to take advantage of our strengths in integrated research, outreach, education, and our established presence in coastal communities. Included in each of the Focus Area sections below are the expected outcomes of our activities and specific measurements that will indicate if we have achieved our goals in the shorter term. Overall performance measures and the targets we hope to reach are also included to ensure we remain on track toward the long view. These are important guidelines but are not intended to constrain our response to emerging, but as yet, unforeseen opportunities and challenges, nor will they suppress the creativity and intellectual capacity to reprogram appropriately as the local context changes.

Understanding relationships and synergies across focus areas is vital to achieving focus area goals. Sea Grant is one of many partners working to address these complex and interrelated issues. Understanding how activities in one area can support and complement other activities, and using partnerships to accomplish shared goals, are strategies inherent to Sea Grant and will be central to achieving the goals outlined in this evolving plan.

4.1 Sustainable Coastal Development

Goal: Communities that make efficient use of land, energy and water resources, and protect and sustain the coastal ecosystems and economies that support our quality of life.

Strategies:

1. Support research activities and extension capacity to help coastal communities reduce their environmental footprints on land and in the ocean.
2. Educate and train the next generation of human resources that will conduct research and outreach leading to sustainable development while building our nation's skilled workforce.

3. Support specific projects and activities toward sustainable building and community design, and land-use practices appropriate for island environments including the promotion of sustainable energy and water practices.
4. Support specific projects and activities that investigate the advantages of coastal-ocean related renewable energy technologies, and the creation of other tools to help communities develop in sustainable ways.
5. Work with federal, state, and local government, non-governmental organizations, and other partners to help island communities evaluate their environmental footprints and develop in ways to minimize these footprints.

Outcomes and Associated Measurable Objectives:

Short/Mid Term Outcome: Communities throughout Hawai‘i’s counties engage in visioning, resource inventories, analysis of development (e.g., building and land-use codes and policies) and education of community leaders and citizens.

Measurable Objective: The UH Sea Grant Center for Smart Building and Community Design will have engaged communities throughout the state of Hawai‘i and assisted them in visioning, resource inventories, analysis of development, or education aimed at promoting sustainable coastal development.

Short/Mid Term Outcome: Communities throughout the state of Hawai‘i use a variety of research results, tools and technologies to improve community design and reduce their environmental footprint.

Measurable Objective: Coastal communities on every main Hawaiian island use a variety of research results, tools and technologies to improve building and community design, and reduce their environmental footprint as a result of Sea Grant activities.

Short/Mid Term Outcome: Growth plans, policies and strategies are developed to protect Hawai‘i’s unique natural and cultural resources to serve future generations.

Measurable Objective: The UH Sea Grant Center for Smart Building and Community Design has provided information, tools or technologies to communities, developers and planning offices enabling the development of growth plans, policies and strategies to protect Hawai‘i’s unique natural and cultural resources to serve future generations.

Long Term Outcome: Alternative energy technologies (e.g., wave, thermal, current, wind, solar) are evaluated for their environmental and economic impacts and adopted where appropriate.

Measurable Objective: The UH Sea Grant Center for Smart Building and Community Design has provided the information, tools or technologies to Hawai‘i’s communities to evaluate their alternative energy opportunities (e.g., wave, thermal, current, wind, solar) for adoption where appropriate.

Long Term Outcome: Coastal community designs that improve energy efficiency and reduce carbon emissions and other pollution.

Measurable Objective: The UH Sea Grant Center for Smart Building and Community Design has developed and/or identified designs appropriate for implementation in insular pacific communities that improve energy efficiency and/or reduce carbon emissions and other pollution.

Long Term Outcome: Hawai‘i is a recognized leader in the production of the human resources that conduct research and outreach leading to sustainable development and help coastal communities to reduce their environmental footprint on land and in the ocean and resources.

Measurable Objective: UH Sea Grant supports the education of scholars, outreach specialists, and practitioners who conduct research and outreach, and who design in a manner leading to buildings and communities that are energy efficient, sustainable and have low impact on their coastal habitats and ecosystems, i.e., help coastal communities reduce their environmental footprints on land and in the ocean.

Goal: Increased awareness by Hawai‘i’s citizens, community leaders, and industries of the complex inter-relationships of social, economic, and environmental values in coastal areas and of the benefits of working together to realize multiple uses and optimize economic, social, and environmental sustainability.

Strategies:

1. Work with NOAA’s Ocean and Coastal Resource Management Program and its Coastal Services Center, the Environmental Protection Agency’s Office of Sustainable Communities, and other federal, state, and local partners to disseminate assessment tools, model plans and ordinances, best management practices, alternative development approaches, and other techniques that will enable the citizens of Hawai‘i to develop their coastal economies in socially and environmentally sound and sustainable ways.
2. Foster cooperation and partnerships among local government officials, community stakeholders, and planning organizations to promote sustainable growth plans and strategies that protect Hawai‘i’s unique natural resources so that they may be available to serve future generations.

Outcomes and Associated Measurable Objectives:

Long Term Outcome: Hawai‘i’s communities are aware of and are actively engaged in low-impact community design to optimize land use concurrent with environmental sustainability, including “green” building practices and “smart growth” community design.

Measurable Objective: The UH Sea Grant Center for Smart Building and Community Design has worked in partnership with the state, local government, community leaders, and developers in sustainable development and “green” building practices state-wide that optimize environmental sustainability.

Goal: Sustainable coastal economies supported by healthy coastal environments which include coastal access for all citizens.

Strategies:

1. Support research that provides communities in Hawai‘i with information and techniques to achieve robust and sustainable coastal economic development without diminishing the long-term health of coastal habitats and ecosystems.
2. Use UH Sea Grant extension and education capabilities to engage coastal communities in planning processes that support the efforts of community leaders to identify and pursue sustainable economic development policies and programs state-wide.

Outcomes and Associated Measurable Objectives:

Short/Mid Term Outcome: State, county, and local decision-makers have the appropriate information, tools and technologies to ensure that state law protecting coastal access to Hawai‘i’s beaches and other coastlines continues to be realized.

Measurable Objective: Public access to Hawai‘i’s beaches and other coastlines is maintained consistent with public safety.

4.2 Hazard Resilient Coastal Communities

Goal: Widespread understanding of the risks associated with living, working, and conducting business along Hawai‘i’s coasts and in island communities.

Strategies:

1. Conduct projects and activities to assess hazard-related risks in the Hawaiian Islands.
2. Increase the availability and usefulness of hazard-related information and forecasting for citizens, industries, and decision-makers.
3. Work with state and local agencies to assess the risks associated with hurricanes, tsunamis, and other coastal hazard events, climate-related changes and other impacts *on critical transportation and supply infrastructure* in the state of Hawai‘i.
4. Work with federal, state, and local agencies and other public and private sector partners to develop comprehensive education/literacy programs on the acute and long-term effects of hazardous events and climate-related changes on human safety and property along the coast, and how to prepare for and survive such events.
5. Develop and publish guides that train and assist public officials and citizens to prepare for coastal hazards.

6. Conduct research and graduate student education/training that improves tsunami run-up and storm surge models and resulting maps, and the human resources to continue such work.

Outcomes and Associated Measurable Objectives:

Short/Mid Term Outcomes: Coastal decision-makers in the state of Hawai‘i are aware of existing and available hazard-related data and resources (i.e., wave gauge, water level/tide gauge, weather station data, etc.). Improved tsunami run-up and storm surge models and resulting maps are provided to state, local, and federal officials. Guides that train and assist public officials and citizens to prepare for coastal hazards are published.

Measurable Objectives: The UH Sea Grant Center for Smart Building and Community Design has provided key coastal decision-makers in each Hawai‘i county with information, tools and/or technologies that improve their awareness of existing and available hazard-related data and resources. Cognizant officials implement tsunami run-up and storm surge models and publish the resulting maps, and use Sea Grant publications to guide policies that enhance resilience to coastal hazards.

Long Term Outcomes: Hawai‘i residents are aware of and understand the physical processes that produce hazards and climate change and the implications of those events for their communities. Hawai‘i becomes an international leader in the modeling and mapping of coastal areas vulnerable to the effects of coastal hazards.

Measurable Objectives: The UH Sea Grant Center for Smart Building and Community Design has provided information and training to coastal residents statewide that educates them about the physical processes that produce hazards and climate change and the implications of those events on their communities. Through UH Sea Grant funding and support, the University of Hawai‘i produces human resources who work in relevant federal, state and local agencies with responsibility over the prediction, safety and resilience to coastal hazards.

Goal: Increased community capacity to prepare for, respond to or minimize hazardous events.

Strategies:

1. Help public and private decision-makers create and adopt policies, plans, and ordinances specific to Hawai‘i’s geographic, cultural and social circumstances to reduce risks, manage catastrophic events and speed recovery.
2. Conduct research and communicate information on how the use of Hawai‘i’s natural features and new technologies can help communities prepare for and mitigate the impacts of hazardous events in the islands.

Outcomes and Associated Measurable Objectives:

Short/Mid Term Outcome: Coastal decision-makers in the state of Hawai‘i have the knowledge and skills to assess local risk vulnerability and respond with appropriate policies and regulations.

Measurable Objective: The UH Sea Grant Center for Smart Building and Community Design will have provided key coastal decision-makers in each Hawai‘i county information and training to gain knowledge and skills to assess local risk vulnerability and respond with appropriate practices, policies, and regulations.

Long Term Outcome: Vulnerable coastal communities in Hawai‘i are provided with information, tools and technology to prepare for, respond to, or minimize coastal hazardous events.

Measurable Objective: The UH Sea Grant Center for Smart Building and Community Design will provide information, tools, and technologies to educate university faculty and students and coastal communities in new cutting-edge research and community projects related to hazard mitigation.

Goal: Effective statewide response to coastal hazards.

Strategies:

1. Work with NOAA’s National Weather Service and National Ocean Service, regional ocean observation systems, and other partners to make hazard-related data and data-derived products available and relevant to support decision-making during hazard mitigation planning and crisis events.
2. Make UH Sea Grant’s local knowledge and contacts available to work with federal, state, regional, and local agencies, non-governmental organizations, and international partners that have hazardous event responsibilities, to facilitate the speed and quality of response to crises worldwide.

Outcomes and Associated Measurable Objectives:

Short/Mid Term Outcome: Coastal decision-makers in the state of Hawai‘i have the capacity to apply data and resources to improve community hazard resiliency

Measurable Objective: The UH Sea Grant Center for Smart Building and Community Design will have provided key coastal decision-makers in each Hawai‘i county information and/or training that improves their capacity to apply data and resources to improve community hazard resiliency.

4.3 Sustainable Coastal Tourism

Goal: Vibrant, attractive, and sustainable coastal tourism operating with the smallest environmental impact.

Strategies:

1. Work with the tourism industry and tourism agencies to identify and implement sustainable practices in tourism management and operations.
2. Assist the tourism industry, tourism agencies and organizations, and communities in the development of research and management innovations related to the condition, use, and conservation of the natural resources they depend upon.
3. Undertake research and demonstration projects to explore what is possible in the areas of reducing resource consumption and impacts on Hawai‘i’s coastal environment.
4. Educate and train human resources to understand that *the environment is the economy* in the tourism industry, and implement sustainable design, practices and operations.

Outcomes and Associated Measurable Objectives:

Short/Mid Term Outcome: Projects are undertaken in Hawai‘i that reveal possibilities for reducing resource consumption and environmental impacts associated with visitors.

Measurable Objective: The UH Sea Grant Center for Sustainable Coastal Tourism will conduct projects showcasing what is possible in the area of reducing visitor resource consumption and environmental impacts.

Long Term Outcomes: Sustainable practices in tourism management and operations are implemented in Hawai‘i. Hotel operators, other tourism businesses, and government agencies see environmental conservation as a central component of Hawai‘i’s tourism business model. Hawai‘i becomes an international leader in the education and training of human resources to understand *the environment is the economy* in the tourism industry, and implement sustainable design, practices, and operations.

Measurable Objectives: The UH Sea Grant Center for Sustainable Coastal Tourism will provide Hawai‘i’s primary tourist industry operators with information enabling the implementation of sustainable practices related to energy, water, and waste management. The tourism industry conducts projects that lead to coastal habitat protection, enhancement or restoration.

Long Term Outcome: Tourism industries, agencies, and organizations, as well as communities are engaged in the development of research, outreach and management innovations related to the condition, use, and conservation of the natural resources they depend upon.

Measurable Objective: Major tourism agencies and organizations, as well as communities, in Hawai‘i will be partnered with the UH Sea Grant Center for Sustainable Coastal Tourism in developing the research and outreach agenda related to the condition, use, and conservation of the natural resources they depend upon.

Goal: A financially competitive and environmentally responsible visitor industry

Strategies:

1. Support research, development, and transfer of new tools, technologies, and information services to keep Hawai‘i’s visitor industry financially competitive and environmentally responsible.
2. Collaborate in efforts to preserve the special cultural and social attributes that distinguish Hawai‘i’s coastal communities and provide their unique sense of place.
3. Contribute to the development of sustainable policies and best management practices and standards to aid the tourism industry in becoming more energy, water, and waste efficient in their operations.

Outcomes and Associated Measurable Objectives:

Short Term Outcome: New tools, technologies and applicable research results are transferred to keep Hawai‘i’s visitor industry financially competitive and environmentally responsible.

Measurable Objective: The UH Sea Grant Center for Sustainable Coastal Tourism will have functional multi-media portals for tourist industry operators to access tourism data for the state, as well as information on relevant operational technologies and university research results.

Long Term Outcome: The special historical, cultural, and social attributes that distinguish Hawai‘i from the rest of the world, and provide its special sense of place are valued and incorporated in planning.

Measurable Objective: Major historical and cultural organizations within the State of Hawai‘i will be included in planning decisions related to sustainable coastal tourism.

Goal: Work with the visitor industry to develop sustainable new products and innovative marketing approaches for these products to increase long-term industry viability and profitability.

Strategies:

1. Work with the national, state, and local tourism industry and agencies to develop sustainable coastal tourism educational programs that can be delivered directly to visitors.
2. Develop opportunities within the university for faculty and graduate students to become involved in research and community projects directed at Pacific Rim tourism issues.

Outcomes and Associated Measurable Objectives:

Short/Mid Term Outcome: Visitors are educated on the concept of sustainable coastal tourism through programs and other direct information services.

Measurable Objective: Significant contact points (e.g., kiosks, information desk, etc.) for dissemination of fact-based information on sustainable coastal tourism and healthy coastal ecosystems will be in operation and reaching at least one-third of tourists visiting O‘ahu.

Long Term Outcome: Opportunities are in place within the university for faculty and graduate students to become involved in research and outreach projects directed at tourism issues.

Measurable Objective: The UH Sea Grant Center for Sustainable Coastal Tourism will sponsor and involve 10 faculty and students in new cutting-edge research and community projects related to sustainable coastal tourism.

4.4 Sustainable Aquaculture and Fisheries

Goal: A sustainable supply of safe seafood to meet public demand.

Strategies:

1. Conduct integrated research, education, and outreach activities to support a viable aquaculture industry in Hawai‘i with acceptable environmental impacts, consistent with national objectives and building on the leadership role Sea Grant plays in this area.
2. Educate and train the next generation of human resources that will conduct research and outreach leading to the development of efficient and economically and environmentally sustainable aquaculture.

Outcomes and Associated Measurable Objectives:

Short/Mid Term Outcome: A viable aquaculture industry with acceptable environmental impacts is supported in the state of Hawai‘i.

Measurable Objective: The UH Sea Grant Center for Sustainable Aquaculture and Fisheries has provided information, tools, and/or technologies to aquaculture stakeholders that enable them to engage in practices in support of a viable aquaculture industry with acceptable environmental impacts.

Short/Mid Term Outcome: Seafood availability and profitability is sustained in the state of Hawai‘i.

Measurable Objective: The UH Sea Grant Center for Sustainable Aquaculture and Fisheries has provided information, tools, and/or technologies to aquaculture stakeholders that enable them to employ practices to increase seafood quality and availability as well as profitability of the Hawai‘i aquaculture industry.

Long Term Outcome: Seafood supply from the Hawai‘i-based aquaculture industry is sustainable and safe.

Measurable Objective: The UH Sea Grant Center for Sustainable Aquaculture and Fisheries has provided information, tools, and technologies to aquaculture stakeholders that enable them to employ practices to produce seafood safely and sustainably.

Long Term Outcome: Hawai‘i is a recognized leader in the production of researchers, outreach specialists and policy makers working toward the development of sustainable aquaculture and fisheries practices.

Measurable Objective: The UH Sea Grant Center for Sustainable Aquaculture and Fisheries produces researchers, outreach specialists, policy makers, and practitioners who work in academia, government, and industry to conduct sustainable aquaculture and fisheries.

Goal: A healthy Hawai‘i seafood industry that harvests, produces, processes, and markets seafood responsibly and efficiently.

Strategies:

1. Support research, development, and transfer of new technologies to enhance the seafood industry’s use of practices that are environmentally, socially, and economically sustainable.
2. Work with the seafood industry to develop new products and innovative marketing approaches to increase seafood availability and profitability.

Outcomes and Associated Measurable Objectives:

Long Term Outcome: The Hawai‘i-based aquaculture industry produces seafood responsibly and efficiently.

Measurable Objective: UH Sea Grant has provided information, tools and technologies to aquaculture stakeholders that enable them to produce seafood responsibly and efficiently.

5.0 CROSS-CUTTING THEMES

Managing Hawai‘i’s natural resources in ways that benefit both human needs and environmental health requires progress in three fundamental areas:

1. Better information about how Hawai‘i’s human-dominated coastal ecosystems function and how human activities affect these ecosystems,

2. Citizens who understand the complexities of coastal environments and economies and how they can interact to mutual benefit; and
3. Management and decision-making processes based on sound information, that engage and involve a broad citizenry and which include mechanisms to evaluate and optimize human/environmental interactions.

To facilitate progress in these three areas and assist the people of Hawai‘i in understanding, managing, and using our coastal, ocean, and marine resources wisely and sustainably, we have embraced three National Sea Grant College Program crosscutting goals and three additional themes that compliment and support the Focus Areas described above. Crosscutting goals are central to all that Sea Grant does and reflect the value of Sea Grant’s integrated approach to research, extension, and education. They provide the foundation of Sea Grant’s work nationwide and are integral to the success of this four-year plan for Hawai‘i. Crosscutting goals and strategies are described below. Outcomes, measurable objectives, performance measures and targets are not independently identified for crosscutting goals as they are embedded within Focus Area metrics.

5.1 Sound Scientific Information

Goal: Sound scientific information to advance understanding of the nature and value of our coastal, ocean, and marine resources; to identify new ways to conserve and use these resources; and to support evaluation of the environmental impacts and socio-economic trade-offs involved in coastal decision-making.

Strategies:

1. Support research to generate the scientific, technical, and legal information needed to increase understanding of coastal, ocean, and marine processes; support the development of new businesses, products, tools, and technologies; and answer the most pressing questions related to coastal and ocean resource conservation, use, and management at the state and regional levels.
2. Play a leadership role within and outside the Sea Grant network to increase the amount of socio-economic research available to help decision-makers evaluate socio-economic trade-offs and assess risks to the future health and productivity of coastal, ocean and marine resources.
3. Integrate, translate, and disseminate research findings and technological discoveries to the citizens, industries, and leaders who need them to capitalize on opportunities and make wise management decisions.

5.2 An Informed Public

Goal: An informed public that understands the value and vulnerability of coastal, ocean, and marine resources and demands informed science-based decisions about the conservation, use, and management of these resources, and a well-trained workforce that will make this (these decisions?) a reality.

Strategies:

1. Advance ocean and coastal literacy through formal and informal learning opportunities in our schools, museums, aquaria, and other educational forums, such as the on-line, digital collections of the National Sea Grant Library.
2. Utilize UH Sea Grant's strong university and community partnerships to create new research and education opportunities in marine and aquatic science for undergraduate and graduate students and to develop information products and training opportunities that will help build workforce capacity for coastal-related jobs and professions.
3. Collaborate within NOAA and with other partners to build public awareness about critical ocean and coastal issues using the integrated research, extension, education, and communication capacities of the entire Sea Grant network.

5.3 Open and Informed Decision-making

Goal: Decision-making processes that involve the full-range of coastal interests, that integrate efforts of public and private partners at the federal, regional, state, and local levels and provide mechanisms for establishing common understandings and generating outcomes that balance multiple interests.

Strategies:

1. Utilize UH Sea Grant's research, extension, and education capabilities to encourage and support the creation of public decision-making processes that minimize overlap, maximize effectiveness, and provide an integrated response to coastal problems and opportunities.
2. Build consensus on complex issues such as coastal land use, energy development, public access, invasive species control, and climate change impacts by supporting cutting edge research, building broader understanding among various constituency groups, and convening diverse groups of stakeholders to work together to find common solutions.
3. Strengthen partnerships to promote national, regional, and issue-related collaboration among federal and state programs and other partners in order to support more effective and integrated coastal decision-making.

5.4 Healthy Coastal Ecosystems

Goal: Ecosystem-based approaches to managing land, water and living resources leading to habitat that is protected, enhanced or restored in Hawai'i's coastal environment.

Strategies:

1. Support research on ecosystem processes, the relationships between coastal stressors, such as water quality degradation and altered biogeochemistry; contaminants; coastal processes and shoreline erosion; invasive species; and long-term human and ecosystem health (e.g., primary productivity, coral reefs and fish pond biogeochemistry).

2. Support the development of Pacific coastal observation systems and other collaborative efforts that advance our capability to predict the effects of human activities and environmental changes on coastal resources in order to take steps to mitigate their effects in insular environments.
3. Provide life-long learning programs for people of all ages that enhance understanding of tropical, ocean, and coastal environments and promote stewardship of healthy coastal and island ecosystems.
4. Invest in the development and dissemination of new information, policies, and methods to communicate information to public and private planners, decision-makers, and managers to improve the effectiveness of ecosystem protection, restoration, and enhancement and identify related promising new approaches and technologies appropriate for island communities.

5.5 Climate Change Adaptation

Goal: A robust program of research, education, and outreach that supports effective decision-making and public behavior change that prepares citizens to effectively respond to climate change and motivates local, county, and state government to incorporate climate change adaptation into decisions and policies.

Strategies:

1. Partner with state and federal agencies to support coastal mapping, sea level monitoring and modeling at spatial and temporal scales relevant for planning decisions, and which considers environmental, social, and economic attributes.
2. Engage scientists and resource managers in prioritizing the additional research, education, and outreach activities needed to address linkages among human actions, ecosystems, and climate-related changes.
3. Develop education and outreach programs to improve knowledge about climate change across generations and cultures, and facilitate the transfer of knowledge from scientists to extension agents, resource managers, planners, and decision-makers.
4. Engage communities in the development of policies and actions to adapt to climate change using science-based information and outreach to support improved understanding and responsible allocation of resources.

5.6 Capacity Building and Workforce Development

Goal: The UH Sea Grant will support the education and research of undergraduate, graduate and postdoctoral students to become leaders in academia, industry, and government with the capacity to lead Hawai'i and the nation to a sustainable future in which habitats, ecosystems and other natural resources are passed from one generation to the next, undiminished.

Strategies:

1. Conduct a graduate training program that supports the education, research and outreach of graduate students who work toward achieving Sea Grant's mission.
2. Utilize fellowships, internships and professional mentoring to provide enhanced training to students in areas that advance Sea Grant's mission.
3. Partner with faculty, departments, and colleges within the University of Hawai'i to increase Sea Grant's capacity to address our State's needs, challenges and opportunities for building a sustainable coastal future.
4. Undertake programs and activities that link secondary and community college curricula in science, technology, engineering and mathematics to those of the University of Hawai'i at Mānoa as a means for retaining students in these disciplines and attracting students of all ages to careers that advance Sea Grant's mission.

6.0 IMPLEMENTATION

6.1 The Center of Excellence Model

Toward Implementation-a refined paradigm highlighting collaboration

The UH Sea Grant continues to develop a refined paradigm to implement strategic priorities and goals through its Center of Excellence Model. These Centers of Excellence (Centers) include researchers, extension professionals, state and local government representatives, industry and community members as well as “non-traditional” Sea Grant partners such as the U.S. Environmental Protection Agency and the American Institute of Architects, among others. Centers build bridges among academics and those who can benefit from their scholarship. Connecting researchers and users allows researchers to hear firsthand from their community what questions need to be answered. Centers also provide for inter-college, -school, and -department collaboration, something not facilitated by the traditional academic structure. The Center model has been embraced by the University of Hawai'i administration, which recognizes its value to the university at-large and has increased support for UH Sea Grant, including university administration salary support for UH Sea Grant Center Directors.

Centers of Excellence also provide a mechanism for regional collaboration within the Sea Grant Network. The success of such collaboration is evident by The Center for Smart Building and Community Design, which has provided a dynamic and successful platform for collaborative activities among UH Sea Grant and Oregon Sea Grant, Texas Sea Grant, Maine Sea Grant, Rhode Island Sea Grant, Mississippi/Alabama Sea Grant, Louisiana Sea Grant and other network programs. The Centers also play a critical role in UH Sea Grant's ongoing strategic planning activities.

Centers of Excellence encompass the UH Sea Grant mission while providing the critical service of focusing program resources to optimize effectiveness. The UH Sea Grant Centers of Excellence include:

•**Center for Smart Building and Community Design**--creating and supporting economically viable, attractive communities that enhance their environment, economy, and culture; Key partner: University of Hawai‘i School of Architecture

•**Center for Sustainable Coastal Tourism**--conducting research and providing services to assist the state and the community in ameliorating visitor impact and diversifying targets for sustainable tourism growth; Key partners: University of Hawai‘i College of Social Sciences, Department of Economics and University of Hawai‘i School of Travel Industry Management

•**Center for Marine Science Education**--providing leadership and support to formal and informal educational institutions and organizations to educate scientists, professionals, teachers and the public about the benefits of wise and sustainable stewardship of our region’s coastal and ocean resources that incorporates cultural values; Key partner: University of Hawai‘i College of Education

•**Center for Sustainable Aquaculture and Fisheries**--providing science-based information and supporting efforts toward sustainable aquaculture development, supporting workforce development for the aquaculture industry, and stimulating demand for local aquaculture products; Key partner: University of Hawai‘i at Hilo Pacific Aquaculture and Coastal Resources Center

6.2 The Sustainability Strategic Hires

The University of Hawai‘i at Mānoa has recognized the excellence of UH Sea Grant and its longstanding commitment to coastal sustainability by awarding the program seven new general-funded faculty positions in a competition with 17 other departmental proposals. Over the next 30 years, this will represent an approximately \$50 million investment in UH Sea Grant’s outreach and research program. We believe that this is likely an unprecedented commitment on the part of a university to a state Sea Grant program and our NOAA parent organization. This initiative greatly increases our ability to address diverse challenges, needs, and opportunities in a multifaceted fashion for decades to come.

The central goal of this strategic hire of multiple faculty is to focus and integrate their research, education, and outreach efforts toward developing and implementing energy and water technology and design aimed at building a sustainable and economically and socially inclusive future for Hawai‘i’s people. This is sought to meet an urgent need for research that develops new energy-saving technologies and a comprehensive understanding of their relative environmental, social, and economic impacts. The use of cold seawater in air conditioning systems, for example, can simultaneously reduce energy costs and dependence on fossil fuels and creates significant savings of potable water through removal of fresh water cooling towers. Other areas where new UH Sea Grant faculty members will make significant contributions include the analysis of transportation, community design and infrastructure on energy and water-use efficiencies, the engineering and cost-benefit analysis of water-production technologies (i.e., reverse osmosis, atmospheric condensation, wastewater reuse and recycling, efficient capture of storm water, etc.) and analysis of the practicality of converting wastewater treatment systems to seawater to conserve potable freshwater resources. Effective implementation of new technologies requires that Hawai‘i’s citizens make informed decisions based on an understanding of their environmental, social, engineering, and economic impacts, and their strengths and limitations compared with business-as-usual. These seven new faculty, each with dual research

and outreach appointments, will provide the above services in the context of the Sea Grant mission.

This cluster of seven new faculty builds on the established partnerships of UH Sea Grant's Centers of Excellence by integrating science and design into decisions on sustainable development and public policy in coastal communities with particular focus on developing, engaging and implementing wise and sustainable use of energy and water resources. These hires, recruited under a rubric of multidisciplinary collaboration, strategically add faculty capability to existing, strong partnerships facilitated and supported through the UH Sea Grant Centers of Excellence and partner schools/colleges. Collaborating schools and colleges within UH include the School of Ocean and Earth Science and Technology, the College of Social Sciences, the College of Engineering, the School of Architecture, the Hawai'i inuiākea School of Hawaiian Knowledge, and the College of Tropical Agriculture and Human Resources.

6.3 Research Proposal Process

The research component of UH Sea Grant represents a critical element of implementation as it generates the foundation of a significant core of extension activities in addition to its research value and focus on graduate education. The UH Sea Grant 2014-2017 strategic plan will encompass two, two-year research funding cycles. The 2014-2016 research components were initiated by a request for proposals (RFP) announced on September 28, 2012. The request was sent to UH departments at the Mānoa and Hilo campuses, the University of Guam, Brigham Young University of Hawai'i, Chaminade University, and Hawai'i Pacific University as well as to community colleges in the insular pacific. The RFP was also placed as a public notice in the Honolulu Star Advertiser, in the University of Hawai'i campus bulletin and sent to an extensive email list serve to achieve broad distribution.

Pre-proposal screening is undertaken by a science panel composed of University of Hawai'i and local ocean and coastal agency scientists who evaluate the scientific merits of the preliminary proposals. The panel is constituted with special care to ensure that members do not have conflicts of interest. In addition, the UH Sea Grant Advisory Council meets to advise the program on the relevance of the proposed work to our constituents and the community (please see Appendix A. for a roster of Advisory Council members). From these meetings, approximately one-third to one-half of submitted pre-proposals is recommended for development as full proposals. Full proposals are subsequently vetted by ad hoc peer review and an External Science Panel.

Based on the content of the proposals received, the External Science Panel is formed to undertake final review and proposal selection for funding. All External Science Panel members receive copies of all full proposals submitted. Each panel member is asked to review and lead the panel in a discussion as a primary reviewer for several proposals and to act as secondary reviewer and tertiary reviewer for several additional. All panel members are asked to have a working knowledge of all full proposals submitted. Thus, each proposal is initially considered in a dialogue among the three assigned reviewers. Other panel members are invited to add to the discussion of each proposal once the assigned panel members have presented. The number of proposals assigned to each member of the panel varies depending on the number of proposals falling within their areas of expertise. The panel members are provided with the ad hoc peer reviews noted above prior to the External Science Panel meeting, i.e., prior to their arrival in Hawai'i. This peer review and referee process conforms to

the rigorous methods of the U.S. National Science Foundation and is overseen by the UH Sea Grant's Program Officer assigned by the National Sea Grant College Program. Due to limits on available funding, many meritorious research proposals are not funded during any given funding cycle.

6.4 Program Development

Program development grants are extramural to the process described above and impart agility to the program to respond to proposals of high quality and merit and opportunities and challenges that emerge outside of the realm addressed by the formal biennial research program. Program development funds are disbursed at the discretion of the UH Sea Grant director when projects or actions are identified that will assist the program in serving its constituents and increasing its capacity. For example, program development grants may be awarded to attract new investigator participation in the program. Emphasis is placed on fostering proof of concept work or method validation with a relatively small amount of "seed" money that improves the project's competitiveness in subsequent Sea Grant funding cycles. Program development grants may also be awarded to build specifically needed capacity within the university through training and other experiential opportunities.

7.0 APPENDICES

7.1 Appendix A. University of Hawai‘i Sea Grant College Program Advisory Council.

Dr. Bruce Anderson
President and CEO
Hawai‘i Health Systems Foundation

Mr. Geoffrey Anderson
President and CEO
Smart Growth America

Mr. Alan Arakawa
Mayor
County of Maui

Mr. George Atta
Executive Vice President
Group 70 International

The Honorable Denny Coffman
House of Representatives
Hawai State Legislature

Mr. Eric Crispin
Vice President
Ohana Real Estate Investors, LLC

Mr. H. Mitchell D’Olier
President and CEO
Kane‘ohe Ranch Management Limited

Mr. Rick Egged
President
Waikīkī Improvement Association

Mr. Alan Everson
Fishery Biologist
NMFS Pacific Islands Regional Habitat Conservation Division

Mr. Joseph Ferraro
Principal
Ferraro Choi and Associates, Ltd.

Mr. Jay Fidell
President
ThinkTech Hawai‘i, Inc.

Mr. Tim Guard
Chairman
Pacific Marine Life Foundation

Mr. Neil Hannahs
Director
Kamehameha Schools Land Assets Division

Ms. Rebecca Hommon
Region Environmental Counsel
Navy Region Hawai'i

Ms. Hi'ilei Kawelo
Executive Director
Paepae o He'eia

Mr. Maurice Kaya
Project Director
Hawai'i Renewable Energy Development

Mr. Jeff LaDouce
Director
National Weather Service

Mr. Samuel Lemmo
Chief Planner
Office of Conservation and Coastal Lands
State of Hawai'i Department of Land Natural Resources

Dr. Kem Lowry
Professor Emeritus
University of Hawai'i Department of Urban and Regional Planning

Mr. Jeffrey Mikulina
Executive Director
Blue Planet Foundation

Ms. Hermina Morita
Chair
Public Utilities Commission

Mr. Ernest Nishizaki
Executive Vice President and Chief Operation Officer
Kyo-Ya

Mr. Robert Parsons
Executive Assistant
Office of the Mayor, Maui County

Mrs. Marilyn Pauley
Board of Trustees
Pomona College

Dr. Samuel Pooley
Director
NOAA, Pacific Islands Fisheries Science Center

Mr. Brian Schatz
Lieutenant Governor
State of Hawai'i

Dr. Francis Schuler
Retired Executive Director
National Sea Grant College Program

Ms. Eileen Shea
Chief
NOAA National Climate Data Center

Mr. Jesse Souki
Director
State of Hawai'i Office of Planning

Mr. William Tam
Deputy Director
State of Hawai'i Commission on Water Resource Management

Mr. Edward Teixeira
Former Vice Director
State Civil Defense

The Honorable Cynthia Thielen
Assistant Minority Floor Leader
Hawai'i State Legislature

Ms. Laura Thielen
Former Chair
Department of Land and Natural Resources

Mr. David Waller
Vice President (retired)
Hawaiian Electric Company

Mr. Ronald Weidenbach
President
Hawai'i Aquaculture Association