Hazard Resilient Coastal Communities 2013 Focus Team Report

BACKGROUND

Under the 2009-2013 National Strategic Plan (Strategic Plan), Sea Grant supports the following Hazard Resilient Coastal Communities (HRCC) national goals: 1) widespread understanding of the risks associated with living, working, and doing business along the nation's coasts; 2) community capacity to prepare for and respond to hazardous events; and 3) effective response to coastal catastrophes.

Annually, each Sea Grant (SG) Program submits short "impact statements" (impacts) via the National Sea Grant Office reporting process (PIER). Impacts describe significant and verifiable economic, societal and/or environmental benefits of SG work and how efforts have made a difference in the lives of coastal residents, communities, and environments. The impact reporting process has become an increasingly important means of enhancing visibility, demonstrating accountability, generating support and building a reputation as a focused, productive and successful program.

This 2013 Focus Team Report examined HRCC impacts that were produced in the 2012 reporting year of February 1, 2012- January 31, 2013. Examination of the impacts allows the Focus team to achieve the following objectives:

1) Assess SG's progress towards its strategic plan focus area goals and outcomes;
2) Identify national impacts that should be highlighted in communication products and reporting;
3) Pinpoint gaps to achieve the focus area goals outlined in the Strategic Plan; and,
4) Identify emerging issues and new opportunities for Sea Grant.

NETWORK PERFORMANCE

Since 2009, the Sea Grant programs have tracked the impacts and accomplishments associated with all four focus areas. These data are reported as a performance measure, as part of the Government Performance and Results Act[1] (GPRA). The data are then aggregated with NOAA OCRM & CSC, and supported by an accountability and reporting system (Coastal Resilience Report Card) to identify NOAA's contributing resilience activities, link contributions to annual progress, and tracks the long-term results of these efforts through progress indicators. In addition, information has been collected as to Sea Grant's successful efforts to assist coastal communities become more sustainable and resilient to natural hazards and disasters. The table below shows the number of communities (both new and recurring) that, between 2009 and 2012, received training or technical assistance in hazards resilience and improved hazard resiliency. The data suggest an increased trend since 2009, meaning that the Sea Grant network's activity has been successfully implemented.

HRCC Network Performance 2009-12		
	Number of Resiliency Training/Tech Assistance provided to community members[2]	*Coastal Communities with improved hazard resiliency*[3]
2009	620	160
2010	605	187
2011	451	145
2012	795	341

ORGANIZATION OF REPORT

SECTION ONE: The first and second objectives are reported and analyzed according to each of the three HRCC Goals. An introductory summary of findings is provided. Then, identified themes for each are goal are listed with the representative impacts statements.

SECTION TWO: The second section identifies previous and emerging gaps in Sea Grant's work. Gaps represent both the 2012 reporting year as well as those identified through the previous years in the Plan.

[1] http://www.whitehouse.gov/omb/mgmt-gpra/index-gpra

[2] This metric tracks Sea Grant's contribution to individuals, businesses, and communities that develop comprehensive emergency preparedness and response plans to increase their resiliency and enable them to respond effectively.

[3] This metric tracks Sea Grant's contribution to communities that develop comprehensive emergency preparedness and response plans to increase their resiliency and enable them to respond effectively.

SECTION THREE: This section reports on emerging themes and areas of opportunity for the Sea Grant network. The identified themes and opportunities represent both work achieved throughout the State programs and the National Sea Grant Office. This section will conclude with general comments from Focus Team members.

FOCUS TEAM MEMBERS

NAME	TITLE	AFFILIATION
Joshua Brown	Chair	National Sea Grant Office
LaDon Swann	Vice-Chair	Mississippi-Alabama Sea Grant Consortium
Mike Liffmann	Alternate Chair	National Sea Grant Office
Hank Hodde	Coordinator	National Sea Grant Office
Adrienne Antoine	Member	NOAA Climate Program Office
Wendy Carey	Member	Delaware Sea Grant
Gene Clark	Member	Wisconsin Sea Grant
Joe Cone	Member	Oregon Sea Grant
Dennis Hwang	Member	Hawaii Sea Grant
Nicole Kurkowski	Member	NOAA Weather Service
Elizabeth LaPorte	Member	Michigan Sea Grant
Darren Lerner	Member	Hawaii Sea Grant
Monique Meyers	Member	California Sea Grant
Frank Niepold	Member	NOAA Climate Program Office
Christa Rabenold	Member	NOAA Coastal Office
Harry Simmons	Member	National Sea Grant Advisory Board

SECTION ONE: Impact Goals and Themes

GOAL 1: Widespread understanding of the risks associated with living, working, and doing business along the nation's coasts.

Understanding coastal risks requires improving the science behind **risk forecasts**, and the Sea Grant network has funded such efforts for a variety of regionally relevant coastal hazards. These hazards include waves, rip currents, coastal erosion and ocean acidification. In addition to monitoring and modeling coastal risks, Sea Grant also advances understanding of longer-term risks posed by **climate change and variability**. Of note, are the collaborations that Sea Grant has fostered to impact larger audiences and implement projects.

Advancing the science of coastal risk forecasting is an essential step, but Sea Grant's mission also involves bringing this science to citizens living and working along the coasts. To do this, Sea Grant places an important focus on **communicating coastal risks** by tailoring relevant risk information to specific audiences. In some instances, Sea Grant programs create and carry out **educational programming and training** for both coastal citizens and professionals. Finally, Sea Grant works at the local and regional level to help communities **understand their vulnerability** to natural hazards and/or climate change.

THEME: Developing and Improving Risk Forecasts and Hazards Modeling

Maine Sea Grant Research Informs Coastal Erosion Management and Preserves Access to a State Park
MAINE SEA GRANT (MESG) funded researchers are studying erosion processes at Carrying Place Bog as part of a statewide study of marshes and sea-level rise. They have established bog accumulation rates of .05 mm/year and salt marsh growth rates of .54 mm/year. Both rates are slower than local tide-gauge measured sea-level changes of 2.2 mm/year. At Carrying Place Bog, erosion rates have been as high as .99 mm/year and average .25-.50 mm/year along the face of the exposed bluff. As a result, Maine Department of Transportation and Maine Geological Survey used Sea Grant research results to make a decision to place rip-rap to slow the ongoing erosion at South Lubec, and to evaluate more permanent solutions.

A Modified FVCOM System Supports Diagnostic Analysis using Hourly Model Output Data
MASSACHUSETTS INSTITUTE OF TECHNOLOGY SEA GRANT (MITSG) developed the A Finite Volume Community Ocean Model (FVCOM) as a publicly accessible, user friendly integrated ecosystem model for the Massachusetts and Cape Cod Bays. The model system provided an essential tool for understanding the complex ecosystem dynamics in this region and a wide variety of environmental prediction and

management applications. **T**he Massachusetts Water Resources Authority (MWRA) uses the model for water quality-monitoring programs, with insights supporting decisions about placement of monitoring sites, which bridges research and real application.

Oregon Sea Grant Develops Reliable, Operational Wave Forecasting for Oregon's Coast to Help Improve Safety for Commercial and Recreational Boaters

An **OREGON SEA GRANT**-funded (ORSG) wave prediction tool is being utilized by coastal ocean users to assess local conditions and help improve safety for commercial and recreational boaters. Predictions have been incorporated into operational global and regional weather forecast models. The model has been nested into the global and Eastern North Pacific (ENP) forecast system used by the National Weather Service. Work is underway to determine whether the forecast information can be used to assess the effects of local waves on coastal vulnerability to climate change and flood hazards.

Washington Sea Grant Research Develops a High-Resolution Modeling System for Forecasting Climate-Driven Changes in Ocean Processes, Coastal Environment, and Seasonal Weather

WASHINGTON SEA GRANT-funded (WASG) researchers combined various global climate models with the finer-grain Regional Ocean Modeling System, to forecast future upwelling, circulation, wind, temperature and ecological conditions in Washington waters. The models were verified by comparing hindcast results to observations. And they adapted NOAA projections to devise what may be the first system for forecasting ocean biochemistry, in detail, on seasonal time scales. The research has also informed the principal investigator's service as Washington State Climatologist, and as mentor to a local tribal member investigating prospective climate impacts on his community.

THEME: Understanding Risks of a Changing and Variable Climate

Minnesota Collaboration Identifies Funding Opportunities for Climate Work

MINNESOTA SEA GRANT (MNSG) staff worked with the NOAA Coastal Services Center to produce an abstract listing of currently available, climate-related funding opportunities (called Climate Funding Opportunities). The list provides a snapshot of available funding opportunities from government, non-profit, philanthropic, and academic organizations throughout the country. The document provides application, funding, and eligibility information on four international funding opportunities, 16 national-scale opportunities, and 12 regionally focused opportunities. This document provides support to organizations that would not otherwise have the ability to expend staff resources to compile information on available funding sources for climate adaptation project work. In collaboration with The Nature Conservancy, the document is available through the Collaboratory for Adaptation to Climate Change website (www.adapt.nd.edu).

Climate Webinar Series Educates Thousands about Global Change Issue

To strategically plan climate outreach for the state and help localize the climate change issue, Ohio State University created the OSU Climate Change Outreach Team in 2008. The team, representing 10 departments within Ohio State including **OHIO SEA GRANT** (OHSG) and Cooperative Extension, works with

16 state and regional partners to coordinate climate education and outreach initiatives within the state and region. Using survey results, the group developed the monthly climate webinar series, Global Change, Local Impacts, to focus on regional climate impacts. The monthly series brings in experts from around the Great Lakes region to discuss issues and impacts to be encountered regionally as our climate changes. LINK

Washington Sea Grant Spurs an Unprecedented State Effort to Address Ocean Acidification, with Potential National Impact

WASHINGTON SEA GRANT (WASG) has awarded more than $1 million for field and laboratory research into acidification's effects on shellfish and on the zooplankton base of the marine food chain. The WSG-organized Symposium on Ocean Acidification in November 2011 provided an impetus for Governor Chris Gregoire to establish the Washington State Blue Ribbon Panel on Ocean Acidification, the first such state response nationwide. Sea Grant staff worked with the governor's office to identify panel members, and coordinated the panel's working groups on science, adaptation and remediation, and education and outreach. Staff oversaw the preparation of the comprehensive science summary and materials for the final report, with spurred substantial executive and legislative initiatives and brought national attention and extensive media coverage to the acidification issue. Also as a result, Gov. Gregoire directed state agencies to implement the panel's recommendations and included $3.3 million for acidification research in the state budget. LINK

THEME: Helping Communities Assess Vulnerability

Maine Towns Incorporate Hazard Resilience into Municipal Training

The State of Maine has incorporated **MAINE SEA GRANT'S** (MESG) resources into the Basic Land Use, Shoreline Zoning, and Floodplain Management trainings for local Code Enforcement Officers. Additionally, 30 professionals have joined the Climate Change Adaptation Providers' Network and the group is identifying a strategy for coordinating services for climate adaptation implementation in a pilot community.

Storm Teams Track Erosion on Southern Maine Beaches

Since 1999, volunteers with the Southern Maine Beach Profiling Program have provided data on changes in beach shape and elevation to participating towns and the Maine Geological Survey. In recent years, **MAINE SEA GRANT** (MESG) helped to coordinate funds and monitoring of the beach profiles in southern Maine. In 2012, the National Weather Service began utilizing program volunteers as "storm teams" to conduct rapid pre- and post-storm profiling in three towns to determine the extent of short-term beach erosion and understand beach resilience dynamics.

New York Sea Grant Advises Towns on Coastal Hazards

The Town of Shelter Island, NY requested **NEW YORK SEA GRANT** (NYSG) assistance in evaluating an erosion problem on a barrier spit protecting an important harbor. NYSG compiled information, including historical aerial photographs, old shoreline maps and dredging records to identify the causes of the problem and management alternatives. Through presentations and a site visit, a NYSG specialist

discussed the findings with representatives of the town, the non-governmental organization, the trust that owned the land, and local residents. The town is using this information to develop a project coordinated with the county to begin strategically placing material dredged from the harbor inlet to restore sand transport to the eroding areas.

THEME: Hazards Education and Risk Communication Coastal Residents and Professionals

Hawai'I Sea Grant Increased Community Capacity to Prepare for Hazardous Events in the State and Sea Grant Network

HAWAII SEA GRANT (HISG) addressed the need to increase coastal resilience by developing the Homeowner's Handbook to Prepare for Natural Hazards in 2007. Now, approximately 45,000 handbooks have been distributed statewide through partners, community outreach events, workshops, invited presentations, and requests made through the Hawaii Sea Grant communications office. Since then, partners took the lead in organizing six statewide community workshops with Hawaii Sea Grant's assistance in 2012. On a national level, with assistance from Hawaii Sea Grant, Mississippi-Alabama, Louisiana, and Delaware Sea Grant Programs published their own versions of the handbook

Educating People About Great Lakes Rip Currents Saves Lives

MINNESOTA SEA GRANT (MNSG) has been partnering to promote rip current awareness and safety to Duluth, Minnesota, residents and tourists since 2004. The partnership worked to install rip current signs, institute a flag warning system, and educate thousands of people through workshops, expos, web pages, and public service messages. In 2011, the MNSG-led Beach Information Communications System (BICS) Project began with $198,000 in funding from the Great Lakes Restoration Initiative. Beginning in 2012, the website ParkPointBeach.org began providing real-time beach reports that include rip current risk, bacteria warnings, and wind/weather conditions for Minnesota's most popular Lake Superior sandbar.

Gearing up for Change: Climate Training for Outreach Professionals

A 2012 needs assessment study revealed that Sea Grant extension educators consider climate change and adaptation important topics, but that many of them do not yet feel equipped to provide their audiences with climate information or adaptation assistance. In response, **MICHIGAN SEA GRANT** (MISG) helped organize a half-day train-the-trainer workshop for participants of both the Great Lakes Sea Grant Network Meeting and the National NEMO (Nonpoint Education for Municipal Officials) Conference in Duluth, October 2012. The workshop was entitled "Gearing up for Change: Climate Training for Outreach Professionals" and was co-facilitated by presenters from Michigan, Minnesota and Illinois-Indiana Sea Grant, along with a guest speaker from the NOAA Coastal Services Center's EBM Tools Training Program. The workshop trained 26 outreach and extension specialists about climate science, climate change and Great Lakes regional impacts, and available tools and resources for adaptation planning.

GOAL 2: Community capacity to prepare for and respond to hazardous events.

Sea Grant extension agents across the network work with homeowners, insurance companies, local officials, coastal managers, and emergency planners to improve community preparedness and resilience. On the smallest scale, Sea Grant programs create and distribute resources, conduct demonstration projects, and work with the private-sector to promote homeowner resilience directly. At the community-wide scale, Sea Grant collects data and develops tools to help communities plan for and assess risk and mitigate coastal hazards. In particular, we find an influx of impacts reflecting Sea Grant's ability to help communities adopt new hazards planning and policy guidance. Numerous coastal communities have approved new Hazards Mitigation Plans and emergency management procedures based on Sea Grant's extension and outreach activities. Finally, Sea Grant also conducts outreach and planning efforts to help communities take the first steps toward adapting to a changing climate.

THEME: Assessing Coastal Risk and Reducing Vulnerability

New Science-Based Prediction Tool Helps the Insurance Industry more Accurately Assess Hurricane Damage Risk and Construction Standards for Residential Structures

An estimated $1.5 trillion in residential homes are vulnerable to hurricane damage in south Florida. Existing insurance loss models are currently judgment-based using estimates of interior content loss derived from anecdotal information. In response, **FLORIDA SEA GRANT** (FLSG) supported a science-based protocol, implemented at Florida International University's Wall of Wind hurricane facility, to update the insurance industry's model for estimating damages and assessing insurance loss. The research resulted in significant enhancements to the Florida Public Hurricane Loss Model, and has also resulted in the establishment of new building codes in Miami to strengthen the exterior components of residential structures.

Louisiana Sea Grant helps develop the Financial Resiliency Decision Support Tool

LOUISIANA SEA GRANT (LASG) faculty and others developed a method for identifying risk-adjusted financial vulnerability to future natural disasters for local governments, since they are likely to have less financial support from the federal government to cover emergency, response and recovery costs. In response, a regional economist and Sea Grant extension specialist applied a procedure for measuring the financial vulnerability to Calcasieu Parish, LA, government from a future Rita-sized tropical natural disaster. After identifying the financial gap, they recommended policy alternatives to the local parish government to make them more financially resilient to future tropical natural disasters.

Baldwin County, AL Adopts Building Codes to Increase the Resilience of the County and its Residents

The City of Orange Beach partnered with **MISSISSIPPI-ALABAMA SEA GRANT CONSORTIUM** (MASGC)**,** Smart Home America and the Gulf Coast Chapter of the International Code Council to bring together the key players in hazard resilient construction, including the International Code Council and the Institute for Business and Home Safety (IBHS). Sea Grant and Habitat for Humanity supported educational activities

for builders and contractors to raise awareness of the benefits and costs associated with following the Coastal Code. Sea Grant also sponsored an expo that benefited coastal decision makers by learning about risk assessment and specific achievable steps that can be taken to reduce risk, reduce the insurance burden on their citizens, and allow their communities to recover from disasters more quickly. The events were instrumental in providing the needed training to allow many Baldwin County, Alabama to adopt the 2012 Edition of the International Code Series, the most recent codes in the nation.

Water Data and Predictions for Estuarine River Systems through CI-Flow

As a key partner, **NORTH CAROLINA SEA GRANT** (NCSG) helped to develop the Coastal and Inland Flooding Observation and Warning (CI-FLOW), a prototype real-time system that predicts total water level. CI-FLOW is now an inter-disciplinary multi-agency consortium focused on the mitigation of coastal hydrologic hazards in the Tar and Neuse river basins of North Carolina The project has brought together researchers, outreach specialists and the customers that will use CI-FLOW products to plan, design and test emerging and more effective methods of information transfer. During this project phase NWS weather forecasters were able, through an interactive methodology, to fine-tune water level information and the most effective display format for use while forecasting. The CI-FLOW project is now being evaluated in the Pearl River watershed of Mississippi and Louisiana.

THEME: Assisting Local Governments with Hazards Planning and Policy Guidance

Vulnerable Coastal Cities includes Sea-Level Rise Risks in Hazard Mitigation Plans

In partnership with AMEC Environmental and **MISSISSIPPI-ALABAMA SEA GRANT CONSORTIUM** (MASGC), Waveland and Biloxi, MS included sea-level rise adaptation strategies in their 2013 updated Hazard Mitigation Plans. Biloxi focused on an outreach and education campaign to their residents while Waveland focused on the creation of maps to visualize future scenarios with increased sea-level rise. Planning for future scenarios can earn these two communities additional points in the National Flood Insurance Program's Community Rating System, which will reduce their risk to future storms and the premiums for their residents.

Orange Beach, AL updates Emergency Operations Plan as a Result of Vulnerability Assessment

MISSISSIPPI-ALABAMA SEA GRANT CONSORTIUM (MASGC) helped conduct a Vulnerability-Consequences Adaptation Planning Scenarios (VCAPS) workshop for the City of Orange Beach, Alabama. During this workshop, members from the City of Orange Beach and neighboring cities within the watershed, developed an action plan for responding to increased heavy precipitation events and greater intensity storm events. These actions were incorporated into an updated Emergency Operations Plan that was adopted by the city.

Sea Grant Helps the City of Boston Plan for Weather Related Hazards and Plan for Climate Change

With **MASSACHUSETTS INSTITUTE OF TECHNOLOGY SEA GRANT** (MITSG) funding, the Social and Environmental Research Institute (SERI) used a mediated modeling process called the Vulnerability and Consequences Adaptation Planning Scenarios (VCAPS). The process led discussions among the

stakeholders and documented the vulnerability of Boston to extreme weather events, exacerbated by future climate change, and identified actions to increase resilience. The City of Boston drafted a new hazard mitigation plan using information derived from the VCAPS process, which includes strategies related to climate change adaptation. LINK

PASG helped the City of Chester to Incorporate Climate Adaptation Planning Objectives into its Vision 2020 Comprehensive Plan

Chester, Pennsylvania, is a coastal community that is particularly vulnerable to future climate and storm hazards. **PENNSYLVANIA SEA GRANT** (PASG) staff provided outreach and technical assistance to Chester City Council and the Planning Department to include in the comprehensive planning process. This assistance proved instrumental for the City in drafting a climate adaptation and other sustainability objective into the Vision 2020 Plan. The 2020 plan was completed in October, 2012 and will help to make the tidal riverfront community more resilient as it serves as model for other local municipalities. LINK

Coastal Resilience Index Promotes Community Resilience to Coastal Storms

TEXAS SEA GRANT (TXSG) introduced the Coastal Resilience Index (CRI) developed by Mississippi-Alabama Sea Grant and implemented the guided self-assessment tool in six coastal communities. The CRI enables community leaders to critically examine their preparedness level for storms and storm recovery, as well as identify weaknesses in their recovery infrastructures needing improvement before future storms. As a result, all communities are addressing their identified vulnerabilities, and one community updated its Hazard Mitigation Plan. LINK

THEME: Helping Communities Adapt To Climate Change Impacts

Rising to the Challenge: Results of the 2011 CA Coastal Adaptation Needs Assessment

With support from **CALIFORNIA SEA GRANT** (CASG)**,** nearly 600 California coastal planners and managers were surveyed on their attitudes and knowledge about climate change, technical needs in meeting state directives, and progress toward implementing "climate adaptation" policies. Responses form the basis for the report "Rising to the Challenge: Results of the 2011 California Coastal Adaptation Needs Assessment," presented to state agencies. Based on the survey responses, the California Ocean Protection Council is directing $2.5 million to help coastal communities update their coastal plans and brace for rising sea levels. NOAA Coastal Services has incorporated some of the report's findings into its "Climate Adaptation for Coastal Communities" 3-day training program. LINK

Sea Grant Led Coastal Community Climate Adaptation Initiative (CCCAI) Project Leads to City Adopting Hazard Mitigation and Climate Adaptation Action Plan

DELAWARE SEA GRANT (DESG) led a CCCAI-funded project which helped the City of Lewes enhance local understanding of climate change and natural hazard impacts, and provided guidance in identification of strategies to build resilience towards these impacts. The project engaged key local stakeholders – City staff, City Board / Commission members, and Regional / State partners – as well as property owners and

residents. Recently, the City of Lewes has adopted a unified Hazard Mitigation and Climate Adaptation Action Plan that aims to improve community sustainability and resilience. LINK

Hawaii Sea Grant Supported the Adoption of the State Of Hawaii's Climate Change Adaptation Planning Priority Guidelines

At the invitation of the State Office of Planning, **HAWAII SEA GRANT** (HISG) has been serving on the Ocean Resources Management Plan's (ORMP) working group. The group is composed of state and county agencies, federal partners, academia, and community groups. One task of the working group has been to provide climate policy guidance to the Hawaii Coastal Zone Management Program. In 2009, the working group produced a report entitled "A Framework for Climate Change Adaptation in Hawaii". In July 2012, the Governor signed into law Act 286, the Climate Change Adaptation Planning Priority Guidelines which encourages collaboration and cooperation among county, state, and federal agencies, policy makers, businesses, and other community partners to plan for the impacts of climate change. LINK

Sea Level Rise Adaptation Planning for the City of Los Angeles

UNIVERSITY OF SOUTHERN CALIFORNIA SEA GRANT (USCSG) developed *AdaptLA*, a science-based and stakeholder-supported sea level rise adaptation planning process and vulnerability study for the City of Los Angeles. This participatory process included multiple planning meetings, engaged city leadership, and included significant regional stakeholder participation. This project has enhanced knowledge and understanding of climate science and vulnerability to sea level rise to assets and communities, building capacity in the City of Los Angeles and surrounding cities and communities. LINK

Sea Grant Project Improves Awareness of Planning for Sea Level Rise in Virginia Coastal Communities

Through **VIRGINIA SEA GRANT**-supported (VASG) work, three Virginia coastal localities have gained insight into the planning tools that may work best to help their communities prepare for sea level rise. The City of Virginia Beach is using the results of its focus group in the development of its sustainability plan. The Accomack-Northampton Planning District Commission is using the results of the workshop to guide the Eastern Shore Climate Adaptation Working Group in its work to prepare the Eastern Shore for sea level rise. The Gloucester County Board of Supervisors and Middle Peninsula Planning District Commission will use the results of its focus group when preparing long-range plans for county infrastructure and land use. LINK

GOAL 3: Effective response to coastal catastrophes.

Three of the 2012 impacts pertained to Goal 3, deriving from post-disaster response efforts. Recognizing that disaster response is dependent on disasters actually occurring, this represents a fraction of Sea Grant's overall work. However, one of Sea Grant's demonstrated strengths is its ability to quickly mobilize universities and other partners to address these types of challenges. Moreover, post-disaster response and recovery provide an opportune medium for Sea Grant researchers and extension specialists to interject their previously compiled vulnerability and risk assessments, planning mechanisms, mitigation techniques, resiliency protocols, and technological advances.

THEME: Integrating Research into Disaster Response

Quick Response by New York Sea Grant Provides Information to Better Manage Hurricane Sandy Impacts

Hurricane Sandy inflicted tremendous damage along the New York and New Jersey coastlines, including a breach in the Fire Island National Seashore. The National Park Service (NPS) served as the responsible management agency and asked **NEW YORK SEA GRANT'S** (NYSG) Coastal Processes Specialist to assist their interagency Breach Assessment Team, composed of 35 federal, state and local officials. The NPS used NYSG information to evaluate the condition of the breach and its impacts, and decided not to close it immediately, which would have cost approximately $6 million. The initial data showed the feature was fairly stable and having minimal impacts on main land tide levels. Recognizing the value of the information, NPS is funding a continuation of the data collection program to monitor the breach and its physical impacts to ensure it did not cause increased flooding on the mainland.

Sea Grant Helps Coastal Communities Examine Climate Change Issues

In 2012, an estimated 500-year storm struck Duluth, MN, and surrounding communities, causing widespread damage and a federal disaster declaration. The flood follows on the heels of 100-year rains in the region during the past decade. **MINNESOTA SEA GRANT** (MNSG) partnered with other Great Lakes SG programs to conduct a needs assessment targeting community and resource managers, and with Oregon SG to conduct an in-depth assessment in one Lake Superior Community through interviews and surveys.

THEME: Improving Disaster Resilience Design Standards

North Carolina Sea Grant Conducts Post-Hurricane Ike Damage Assessments

Hurricane Ike destroyed several thousand homes and small buildings in Texas but left some untouched. **NORTH CAROLINA SEA GRANT** (NCSG) researchers surveyed the buildings — present and destroyed — to determine why some survived and why others didn't. The study resulted in new recommendations for depth/damage curves and an updated failure prediction for waves and erosion. The results suggest that choosing a higher floor elevation is a primary safety factor for new construction in hurricane-resilient communities.

SECTION TWO: Previous and Emerging Gaps

In addition to reviewing the progress toward the national strategic goals, the Focus Team reviewed the impacts to gauge whether they were addressing previously-identified gaps (enumerated in the 2012 Annual Report), to identify additional areas needing attention, and to recognize emerging themes that cross-cut the strategic goals.

Previous Gaps

In the HRCC 2012 Annual Report, the Focus Team identified three gaps from the 2011 Impacts:

- Soft engineering trends for shoreline erosion control;
- Robust evaluation of outreach and education activities;
- Serving as a liaison between coastal communities and FEMA.

This year, the Focus Team discussed whether the 2012 reported impacts better addressed these previously identified gaps.

Soft Engineering Trends for Shoreline Erosion Control

The previous Annual Report suggests that Sea Grant should position itself as a leader in investing in research on new "soft" engineering techniques, analyzing trends in and results of its application, and engaging with communities to help them understand their options. This area for opportunity has been proposed at the national scale as "green/gray infrastructure," meaning applying both soft (natural) and hard (man-made) structures along the coast to lessen vulnerability to natural hazards.

Some of the 2012 impacts addressed this gap through Sea Grant's coastal processes work. We find that programs are continuing to evaluate shoreline substrate as to its effectiveness for mitigation, the effects of sea level rise to coastal communities and environments, and helping to inform coastal zone management and planning decisions. Many 2012 Accomplishments are helping Sea Grant continue this work. Of note, Minnesota Sea Grant assisted with a stakeholders meeting for NOAA Coastal Services Center project that will identify green infrastructure and flooding mitigation projects related to climate change. North Carolina Sea Grant is evaluating the economic benefits and costs of beach erosion management. Also, many programs are working with partner organizations and volunteers to establish living shorelines. The table below represents impacts and accomplishments that help to fulfill this gap.

2012 HRCC Impacts		
Sea Grant Program	**ID #**	**Title**
California	11674	Beach Evolution on Scales from Storms to Years
Maine	17012	Maine Sea Grant research informs coastal erosion management and

		preserves access to a state park.
Maine	17063	Storm Teams track erosion on southern Maine beaches
New York	16963	Advising Towns on Hazards
Woods Hole	17527	Sea Grant Extension continues supporting SE Massachusetts Counties in informing critical management decisions in the coastal zone.

2012 HRCC Accomplishments		
Sea Grant Program	**ID #**	**Title**
Hawaii	16502	Hawaii Sea Grant educated Kauai community stakeholders on coastal erosion issues
Minnesota	16578	Hazard Resiliency in Coastal Communities
New Jersey	18009	Sheltered Shorelines
New York	16964	NYSG Provides expertise on national and regional coastal processes initiatives
North Carolina	17336	Economic Benefits and Costs of Beach Erosion Management
Ohio Sea Grant	18095	Development and validation of a high-resolution nearshore model for Lake Erie
University of Southern California	17752	Beyond Bathtub: Workshop on Modeling and Responding to Sea Level Rise and Shoreline Change
Washington	17232	Washington Sea Grant surveys eroding coastal bluffs to determine safe setbacks for development
Woods Hole	17530	Coastal Processes Presentations

Robust Evaluation of Outreach and Education Activities

As noted in the 2012 Annual Report, several HRCC impacts involve educating communities about coastal risks and strategies to improve resilience. It seems, however, that a recurring concern of the Focus Team is proper evaluation of these activities to gauge impacts without efforts to track changes in behavior resulting from Sea Grant's work. As such, this continues to be a gap for the Focus Area, as a programmatic system has not been instilled to evaluate the hazards-related outreach and educational activities.

The Focus Team proposed a new funding initiative in 2009 for network-wide evaluation, but this idea never gained momentum. The Team suggested that Sea Grant conduct an evaluation of the past and current beach hazards work and programming, since multiple state programs with varying coastal types are implementing similar outreach activities (e.g. Break the Grip of the Rip campaign). One Focus Team member suggested the development of a "Rip Current Matrix" to show the effectiveness of Sea Grant's beach hazards activities. This work can be integrated into FY13 and FY14 NOAA Coastal Storms Programs activities in the Great Lakes.

Serving as a Liaison between Coastal Communities and FEMA

Both the 2011 and 2012 Annual Reports found gaps in working with FEMA to help foster hazards resilience. Sea Grant impacts from those years reflected some FEMA activity, but the Focus Team thought that more interaction was needed and that this subject was still an imperative gap to fill in Sea Grant's work.

After review, the 2012 impacts did not reflect robust activity of acting as a liaison with FEMA in coastal communities. However, after evaluation of the 2012 Accomplishments, we find that Sea Grant programs are working with FEMA in many other ways. This includes the formation and distribution of the Homeowner's Handbooks, strengthening Hazards Mitigation Plans and Emergency Management Operations, helping assess the Community Rating System (CRS), and informing local flood maps and National Flood Insurance Program (NFIP) guidance.

A notable upcoming concern for Sea Grant programs' and their constituents is the effects of the Biggert-Waters Act of 2012[4], which will increase the cost of flood insurance for living on the coast if proper flood mitigation techniques are not utilized. This area of concern provides a new opportunity for outreach and extension activities for Sea Grant. Also notable is work done by the National Sea Grant Office, which has been working closely with FEMA's Recovery Directorate and Community Planning and Capacity Building (CPCB) personnel to develop a Collaborative Partnership Guide[5]. The NSGO's 2013 Knauss Fellow, Hank Hodde, also wrote a white paper[6], titled "Disaster Recovery and Resilience: A Path Forward for the National Sea Grant College Program." The paper proposed 'Disaster Specialists' within the Sea Grant Programs to help foster relationships and work with respective FEMA Regions and local Emergency Managers. The table below represents impacts and accomplishments that help to fulfill this gap.

2012 HRCC Accomplishments		
Sea Grant Program	**ID #**	**Title**
Delaware	17253	Delaware City – Enhancing Community Awareness of Future Flood Risk and Vulnerability
Delaware	17252	Sea Grant Improves Community Awareness of Future Flood Risk through use of Mapping Visualization Tools
Delaware	17105	Delaware Sea Grant works with DNREC and FEMA to coordinate training for communities on the National Flood Insurance Program (NFIP)
Delaware	17115	Homeowners Handbook Helps to Inform and Prepare Residents about Coastal Natural Hazards
Louisiana	16800	Sea Level Rise Outreach to Children
New Hampshire	16816	NHSG Coordinates and Shares Research on Legal Aspects of New 100-Year Floodplain Maps
New Jersey	18119	Coastal Communities Climate Change Adaptation Initiative 2012
New Jersey	18005	Hurricane Sandy Response
South Carolina	17891	Using Participatory Scenario Building to Encourage Climate-Resilient Zoning in the Coastal Carolinas

[4] http://www.fema.gov/flood-insurance-reform-act-2012

[5] http://seagrant.noaa.gov/Portals/0/Documents/what_we_do/focus_areas/hazard_resilient_coastal_communities/resources/NSGO_Collaborative%20Partnership%20NOAA%20Sea%20Grant%20and%20FEMA%20CPCB%20(final%20draft).pdf

[6] http://seagrant.noaa.gov/Portals/0/Documents/what_we_do/focus_areas/hazard_resilient_coastal_communities/resources/Hodde_Sea%20Grant_Resilience%20White%20Paper_Final%20Draft.pdf

Washington	17223	Washington Sea Grant assists coastal communities in preparing for sea-level rise and other hazards
Woods Hole	17530	Coastal Processes Presentations

Emerging Gaps

Disaster Response

Disaster response continues to be a gap for Sea Grant. Sea Grant state programs and personnel are not first responders, therefore, they are often first called upon to help in the aftermath of a disaster. However, Sea Grant professionals live in the communities they serve and experience what their constituents do – the good and the bad. Because of this, programs are getting more involved with agencies and organizations whose missions are directly related to disaster response, like FEMA, State agencies, local emergency management, municipalities, and non-profits.

Also, many programs are realizing that pre- and post-disaster response and recovery activities provide an opportune medium to work and interact with local communities. While not often reported, programs have quickly mobilized resources, rekindled and built new partnerships, informed community decisions, and often engaged in difficult dialogue about best path forwards. As an established boundary organization, Sea Grant State programs are oftentimes at the nexus of pulling together resources and partnerships to raise awareness and implement resiliency programming.

It was suggested that programs get more involved with NOAA's Weather Ready Nation campaign.

Integrated Floodplain Management

Sea Grant conducts considerable research and outreach surrounding coastal erosion, sea level rise, and inundation. However, the Focus Team suggests that these topics be better integrated to help communities manage their floodplain. We have seen impacts related to coastal mitigation, stormwater, erosion and sea level rise rates. Programs are now starting to work more with their local floodplain managers and helping communities engage with FEMA's Community Rating System (CRS). More recently, programs are trying to help homeowners navigate the 2012 Biggert-Waters Act. There seems to be a lack of tying all of these subjects together. Specifically, there is a need to research and monitor the effects of erosion and sea level rise as it relates to flooding, inundation, and FEMA flood maps. The Focus Team sees this as a tremendous opportunity moving forward for Sea Grant.

Restoration of Natural Ecosystems and Resources

Much of Sea Grant's resilience work has a large focus on the built environment. It is where people live and work and, justifiably, receives considerable attention. There is, however, a great deal of attention being given by the research community on uses of the natural environment for hazards' defense mitigation purposes. This ranges from green and gray infrastructure, living shorelines and other bioengineering tools. The Focus Team suggests that the network s focus more attention on natural environments and resiliency. Since natural environments have been altered by humans and will continue to be altered by chronic natural processes and climate change, perhaps we should emphasize preserving and restoring natural defenses to increase mitigation capacities.

SECTION THREE: Emerging Themes and Opportunities

Emerging Themes and Other Highlights

In the HRCC 2012 Annual Report, the Focus Team identified four emerging themes from the 2011 Impacts:

- Regional Ocean and Great Lakes Planning and Risk Management
- Legal Implications for Sea Level Rise
- Stormwater Management for Pollution and Flood Control
- Transfer of Tools and resources among Sea Grant Programs

This year, the Focus Team has recognized new emerging themes from the 2012 impacts. These subjects provide tremendous momentum for increasing Sea Grant's effectiveness in making communities more resilient.

Regional Collaborations

As indicated in last year's report, Sea Grant programs do a good job of sharing tools and resources. The most prevalent resource has been the distribution and development of the Homeowner's Handbook to Prepare for Natural Disasters. Now, programs are starting to collaborate more on the programmatic level. An example is the Great Lakes Restoration Initiative, where Sea Grant programs are working closely with themselves, other parts of NOAA, and the EPA. Another example is through NOAA's Coastal Storms Programs, which has a regional coordinator working out of a designated Sea Grant office. Many of these regional initiatives prove vital to leveraging resources and funding.

Hurricane Sandy

Though not fully reported through impacts, all of the NE Sea Grant programs (Maryland, Delaware, New Jersey, New York, Connecticut, and Rhode Island) conducted important work after Sandy's impact in October, 2012. Programs applied research findings into response and recovery mechanisms, built new partnerships, and deliverable valuable information through outreach and extension activities. They also assisted local, state, and federal agencies and organizations with their duties and responsibilities. To highlight these efforts, the National Sea Grant Office helped coordinate a NOAA-wide Congressional Hill Briefing on Sandy response and recovery in 2013, and New York Sea Grant was able to present their prominent coastal processes work.

Beach Hazards Risk Communication

Sea Grant has notable success rip current outreach and education. The network's efforts have saved lives and education thousands. State programs have gained new partnerships too. Due to this legacy program, Sea Grant is now working to help communicate the risk of all types of beach hazards. This has prompted a new pilot program in partnership with the National Weather Service and the U.S. Life Saving Association to collect observable beach data to enhance daily forecasting abilities. Also, NOAA's Coastal Storms Program is now concentrating it efforts in the Great Lakes to promote improved weather

observations and projections, as well as better communication of this information across Great Lakes communities.

Opportunities

Network wide webinars

Much of the information that is collated by the Focus Team isn't presented to the entire Sea Grant network. Not only does that include this report, but also the wide range of resources and tools produced by the programs. It was suggested that the National Sea Grant Office report out new ideas, products and partnerships to the network.

National stories out of goal themes

An outcome of writing an impact statement is to tell a good story. Also, impacts portray the great work of the Sea Grant network. Oftentimes, individual impacts are made into news articles at the local level. These can then be broadcasted on the state programs, university or National Sea Grant's website. After reviewing impacts within the goals, the Focus Team finds that it would be advantageous to tie multiple impacts into one national story. This would give relevance to regional work, national initiatives, and subject matter themes. And example would be the impacts that help assist local governments with hazards planning and policy guidance, or helping communities adapt to climate change impacts.

Tailoring themes to NOAA's strategic goals

Planning strategically not only ties the National Sea Grant College Program together, but it also helps Sea Grant plan within the goals and priorities of NOAA. The Focus Team suggested that the Annual Report's thematic grouping reflect NOAA's Strategic Plan.

General Focus Team Comments

The HRCC Focus Team's Annual Review conducts a survey of reported impacts to provide critique and help piece together a picture of Sea Grant's efforts toward the area on a national scale.

Just as in years past, the Focus Team debated whether all of the 2012 reported impacts truly reached the level of "impact" instead of "accomplishments," though they acknowledged improvements in this distinction over earlier reporting years. To fix this ongoing issue, the Focus Team suggested that the National Office needs to challenge the feedback loop with letting the network know how impacts are used and reports are distributed. This may address the apparent disconnect between the field agents writing the impacts and the impacts relevance in DC (i.e. NOAA leadership and Congress). Impact-writing guidance is available on the national web site, but perhaps, the National Office can host a webinar series to the network. Also, impacts can be sent back to the regional communication leads to help enhance its story.